

# Project Coffee +

## Intercropping Models for Coffee







# About the Guidebook

This guidebook on “Intercropping Models for Coffee” is a companion or support material to the FBS Trainer's Manual. This forms part of the advocacy materials on intercropping in coffee to provide additional stream of income for the coffee farmers: since money-in or income from coffee comes only in the harvest months of October to April. The guidebook is primarily for use by the Nestle agronomists and technicians as reference material when they train or coach the farmers on coffee-based intercrop farming system.

The Intercropping Models for Coffee comprised of ten (10) recommended intercropping combinations: five (5) for the province of Bukidnon and five (5) for the province of Sultan Kudarat. Each combination has its recommended planting lay-out and good agricultural practices, and the corresponding economic computations in terms of cost and return.

*Project Coffee+* is currently doing on-farm trials of the intercropping models to develop the proof of concept and to have a better handle on the technology recommendations and on the actual economics of the different coffee-intercrop combinations. The on-farm trials shall likewise serve as learning areas for farmers to visit, and to have exposure and experiential sharing with fellow farmers on the technology and on the business aspect. We are likewise closely coordinating with the Department of Agriculture-Agricultural Training Institute (DA-ATI) for the eventual accreditation of the Coffee-Based Intercropping Model Farms as ATI Learning Sites for Agriculture (LSA) specifically for coffee. In the process, the farmer-owner shall gain additional income for the use of his farm as LSA and as trainer himself to the farmer-learners.

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\*The development and printing of this material forms part of the joint Nestle-GIZ private-public partnership project: “Improving Smallholder Coffee Farming Systems in Southeast Asia (Philippines, Thailand, and Indonesia)” or more popularly referred to as *Project Coffee+*.



# Acknowledgment

This manual was developed within the framework of sustainable coffee-based farming systems for the smallholder coffee farmers with technical support from both the public and private sector.

1<sup>st</sup> Edition: August 2021

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# Coffee Intercropping Models

## I. Introduction

### A. Rationale/Objectives of Intercropping for Coffee

1. Increase land productivity by optimizing land use, labor, fertility and inputs.
2. Secure a more diversified & wider income base: provide year-round employment
3. (or cash inflow) for the household.
4. Reduce risks of financial loss due to price fluctuations from a single crop or from coffee price fluctuations.
5. Climate adaptation to weather pattern variations: temperature change, rainfall pattern changes. . .

### B. General Considerations on the Choice of Intercrops for Coffee

1. Crops should not compete for fertility and water with the coffee plants.
2. Crops should not harbor or be a host to coffee pests and parasites.
3. Competition to sunlight from lateral shading to coffee plants should be avoided.
4. Considerations to erosion, particularly to areas with slopes beyond 15%.
5. Adequate spacing must be considered between coffee plants and the chosen intercrop.
6. Weed control and adequate fertilizer supplement to compensate for the nutrient removal, due to the intercrop.
7. The choice of intercrops should consider availability of a ready market and production technology.
8. Land tenure security should be considered, especially for long gestating intercrops (example: fruit trees).

### C. Types of Intercropping

	Placements		Time of Establishment
	Between Rows	Within Rows	
Temporary intercrops or catch cropping (short term) ≤ 4 months	- Beans - Soybeans - Vegetables - Peanuts - Sweet Potato - Yams - Ginger - Upland rice - Corn	- Ginger - Squash - Melons	≤ 3 years old Coffee plantings.
Permanent intercropping or strip cropping (medium to long term)	- Coconut - Bananas: Table and Cooking type - Black pepper - Pineapple - Durian	- Spices - Avocado - Papaya - Rambutan - Durian	During establishment, before establishment, or during rejuvenation of coffee trees (8 – 10 years).
	Between	Between & Within rows	
Agroforestry (long term)	- Falcata - Mosese - Fruit trees - Coconuts	- Falcata - Ipil-ipil	As perimeter or boundary crop; during establishment and/or rejuvenation period.

## II. Choice of Intercrop Materials

Based on field observations from coffee farmers from the provinces of Bukidnon and Sultan Kudarat, several crops were identified as potential intercrops. This selection is based on actual experiences by coffee farmers in both provinces.

The crop mixes come in ten (10) different combinations and are referred to as “models” in this document. They do not necessarily come as set or fixed combinations but can be recombined to suit the locality and the growing conditions as well as the markets for the products.

A brief description of each crop is provided to show their agronomic characteristics and present the pros and cons of the crop relative to the main coffee crop. We have also included the recommended production protocols and financial analysis to show the economic side of establishing the crops.

Finally, a sample lay-out of each “model” is presented as a guide to field establishment. A summary of the production costs and returns, and financial analysis is also provided for each model as a quick reference.

### 1 Hectare Production Cost of Coffee (Bukidnon Condition) – Base Crop

<b>Assumptions: Plantation Establishment up to 3 Years</b>				
<b>Productive years = 25 Years</b>				
<b>Distancing: 2 m x 3 m; Total Population = 1,666 plants/hectare</b>				

<b>Establishment Cost</b>	<b>Unit</b>	<b>Qty.</b>	<b>Price (Php)</b>	<b>Total (Php)</b>
Land Clearing	Piece rate	1	3,000	3,000
Lay-outing, Staking, Hole-digging	Piece rate	1,666	5	8,330
Herbicide	Liter	3	400	1,200
<b>Sub-total</b>				<b>12,530</b>
<b>Inputs</b>				
Seedlings	Pcs.	1,666	26	43,316
C. Dung - 30 kgs/sack	Sacks	40	100	4,000
Furadan – 16 kg/bag	Bags	1	1,200	1,200
Fertilizer – 50 kgs/bag	Bags	5	1,200	6,000
Chemical	Liters	2	850	1,700
<b>Sub-total</b>				<b>56,216</b>
<b>Labor</b>				
Hauling	MD	10	346 *	3,460
Planting	MD	6	346	2,076
Fertilizer Placement	MD	6	346	2,076
<b>Sub-total</b>				<b>7,612</b>
<b>Total Establishment Cost/hectare</b>				<b>76,358</b>
<b>Maintenance (over 3 years)</b>				
Spraying	MD	2 mds x 4/year x 3 years @ 346/md		8,304
Fertilization	MD	3 mds x 4/year x 3 @ 346/md		12,456
Fertilizer – 50 kgs/bag	Bags	10 bags/yr x 3 @ 1,200/bag		36,000
Furadan 3,5, G – 16 kgs/bag	Bags	1 bags/yr x 3 @ 1,200/bag		3,600
Foliar Fertilizer – 1kg/box	Kgs.	4 kgs/yr x 3 @ 250/kg		3,000
Herbicides	Liter	6 liters/year x 3 @ 400/liter		7,200
Pruning	MD	3 mds/quarter x 12 @ 346/md		12,456
<b>Total Cost – 3 Years</b>				<b>83,016</b>
<b>Maintenance cost/year</b>				<b>27,672</b>

\*Note: Php 346 is the minimum wage, Category II (DOLE -NWPC R10 Northern Mindanao per Wage Order No. RX-20 effective Nov. 1, 2018).



<b>Value/Tree Up to 3 years Establishment Stage:</b>	
= <u>Total Establishment Cost + Maintenance Cost</u>	= <u>76,358 + 83,016</u>
Total Population	1,666
<b>Cost of Establishment = 95.66/tree</b>	
<b>Cost of Maintenance per tree per year = 16.61/tree</b>	
<u>Maintenance Cost/Year</u>	= <u>27,672</u>
No. of Trees	1,666
<b>Break Even Production Yield/Tree = Php 16.61 / Php84 per kg</b>	
<b>= 0.198 kg/tree Green Coffee Beans</b>	

Projected Yield (GCB)		Gross Income: @ Selling Price (Php84/kg)	Net Income – Before Harvest cost
Volume			
@ 1.00 kg/tree	1,666 kgs	139,944	112,272
@ 1.5 kgs/tree	2,499 kgs	209,916	182,244
@ 2.5 kgs/tree	3,332 kgs	279,888	252,216

### Harvesting and Processing Cost @ 1kg. GCB / Tree

Harvesting		
Handpicking (pick red)	@ 5.00/kg cherry x 5.0 kg/tree x 1,666	41,650
Drying	@ 24 Mds @ 346/Mds	8,304
Dehulling	@ 4.00/kg x 3,000 kgs/ha (Dried cherry)	12,000
Total		<b>61,954</b>

<b>Depreciation Cost</b>	= 161,450 / 20 years <b>= 8,072/year</b>
<b>Cost of Production per kg GCB</b>	= Maintenance Cost + Harvesting Cost / Yield = 27,672 + 61,954 / 1,666 <b>= 53.80 per kg GCB</b>
<b>Contribution Margin per kg <u>GCB</u></b>	= Selling Price – Cost of Production per kg. GCB = 84 – 53.80
<b>Net Income per Ha</b>	= Contribution Margin x Yield = 30.20 Php/kg x 1,666 kg <b>= PhP 50,313</b>
<b>Return on Investment</b>	= Net Income / (Depreciation Cost + Harvest Cost + Maintenance Cost) = 50,313 / (8,072 + 61,954 + 27,672) = 50,313 / 97,698 = 0.51x 100 <b>= 51% / year</b>
<b>Recovery Period</b>	= Total Capital Invested / (Net Income/year) = 161,450 / 50,313 = 3.2 years after fully bearing + 2 years <b>= 5.2 years</b>

Depreciation Cost/ tree/ year = 4.84/ tree/year

Harvesting Cost = 37/kg.

Maintenance Cost = 16.24





# Selected **Crops for Intercropping**



## Durian

(Scientific Name: *Durio zibethinus*)

Durian is a tropical fruit found in Southeast Asia. In the Philippines, it is considered as a delicacy and one of the high-value fruit crops. Durian grows best in elevations of 600 meters above sea level (MASL) and below. In its normal environment, the natural shape of a durian tree (phyllotaxy) is rounded to oblong. In higher elevations, it takes a conical shape (similar to a Christmas tree shape). Durian can be planted as perimeter crop, or as an intercrop to coffee since its leaves are not densely positioned and allows a tolerable shade for coffee. A distancing of 20m x 20m between trees is an optimal planting distance giving a plant population of 25 plants to a hectare. A slight reduction of coffee trees will be necessary for those near its base and within its branches' perimeter. Topping off the upper branches of a full grown tree will be needed to prevent over shading to the coffee trees for better fruit and tree management of the durian tree. The durian can be planted at the same time when the coffee plants are established or when the coffee plants are fully grown or during rejuvenation time of the coffee plants.

Being a tree crop, it is deep-rooted and does not compete much to the fertility of the soil with the coffee crop once the tree is established. Fertilization is still recommended though, to maintain a good crop and harvest, and to compensate for the nutrient extraction from harvesting.

Pests and diseases of the durian tree are not the same with coffee trees. Durian trees start to produce regular fruiting on the 5<sup>th</sup> year of planting; some hybrids produce as early as 3 years after planting; durian can be induced to produce off season fruits.



## Production Costs & Returns: Durian (25 trees )

Money Out				
Inputs	Unit	Qty.	Price (Php)	Total (Php)
Seedlings	pcs.	25	250	6,250
Organic fertilizer (Manure)	sacks	1	180	180
Inorganic Fertilizer (14-14-14)	sack	1/2	1,400	700
Systemic Insecticide (Furadan)	kg.	3	250	750
<b>Total Costs – Inputs</b>				<b>7,880</b>
Labor				
Hole digging/staking	MD	2	346	692
Planting & fertilization	MD	2	346	692
<b>Total Cost – Labor</b>				<b>1,384</b>
<b>Total Establishment Cost</b>				<b>9,264</b>
Maintenance Cost*				
Fertilizer (14-14-14)	sack	2	1,400	2,800
Fertilizer side-dressing	MD	4	346	1,384
Spraying – Insecticide/Fungicide	MD	4	346	1,384
Insecticide/Fungicide	bottle	1	1,800	1,800
<b>Total Maintenance Cost</b>				<b>7,368</b>
Harvesting & Hauling				
Labor – Harvesting/Hauling	MD	10	346	3,460
<b>Total Cost - Harvesting</b>				<b>3,460</b>
Money In				
Yield x Price of Sale	kgs.	2,500	40	<b>100,000</b>
<b>Money In – Money Out</b>				$100,000 - (7,368 + 3,460 + 1,568)$ $= 100,000 - 12,396$
Profit or Loss?				<b>= 87,604</b>

## Financial Analysis

<b>Total Establishment Cost</b>	= Cost of planting + Maintenance cost until bearing fruit = $9,264 + (7,368 \times 3 \text{ years}) = \mathbf{31,368}$
<b>Production Cost/year</b>	= Maintenance cost + Cost of harvesting & hauling + Depreciation cost/year = $7,368 + 3,460 + 1,568 = \mathbf{12,396/yr.}$
<b>Depreciation Value</b>	= Total Establishment Cost/No. of productive years = $31,368/20 \text{ yrs.} = \mathbf{1,568/year}$
<b>Net Income / year</b>	= Total sales – (Production Cost/yr. + Depreciation Value) = $100,000 - 12,396 = \mathbf{87,604}$
<b>Return on Investment (%)</b>	= Net Income/ (Production Cost + Depreciation Value) = $87,604/ 12,396 = \mathbf{706\%}$
<b>Break-even Production Cost</b>	= (Production Cost + Depreciation Value) / Total Harvest yield = $12,396/2,500 = \mathbf{4.95 \text{ per kg.}}$
<b>Contribution Margin</b>	= Selling price – Breakeven Production cost = $40.00/\text{kg.} - 4.95/\text{kg.} = \mathbf{35.05/\text{kg.}}$
<b>Recovery Period</b>	= Total Establishment Cost/ Net Income per year = $31,368/87,604 \text{ per year}$ = $0.36 \times 12 \text{ mos.} = \mathbf{5^{th} \text{ month of the 5th year}}$ Or = Total Establishment cost / Contribution Margin/kg. = $31,386 / 35.05 = \mathbf{895 \text{ kgs. of sales}}$

\*Yearly Cost x 3 yrs.



## Mangosteen

(Scientific Name: *Garcinia mangostana*)

Mangosteen is a tree crop and belongs to the hard wood family of forest species. It grows on the lowlands in tropical forest settings. The tree is slow growing, heavily branching with thick, glossy leaves. Its shade will not allow any plant to grow beneath its arbor once it reaches maturity. Mangosteen is **not recommended** for intercrop to coffee but can be planted as perimeter crop; a planting distance of 20 meters along the perimeter will give 25 trees to a hectare. Coffee tree planted alongside may have to be culled when the mangosteen reaches its maturity (20 years or more).

The tree is extremely hardy once it is established. It needs very minimal care and maintenance. It does not harbor any diseases and pests detrimental to coffee. The tree starts to bear fruit on the 8<sup>th</sup> year with occasional volunteer fruits appearing on the 5<sup>th</sup> year onwards.

## Production Costs & Returns: Mangosteen (25 trees )

Money Out				
Inputs	Unit	Qty.	Price (Php)	Total (Php)
Seedlings	pcs.	25	250	6,250
Organic fertilizer (Manure)	sack	1	180	180
Inorganic Fertilizer (14-14-14)	sack	½	1,400	700
Systemic Insecticide (Furadan)	kg.	3	250	750
<b>Total Costs – Inputs</b>				<b>7,880</b>
Labor				
Hole digging/staking	MD	2	346	692
Planting & fertilization	MD	2	346	692
<b>Total Cost – Labor</b>				<b>1,384</b>
<b>Total Establishment Cost</b>				<b>9,264</b>
Maintenance Cost*				
Fertilizer (14-14-14)	sack	2	1,400	2,800
Fertilizer placement	MD	4	346	1,384
<b>Total Maintenance Cost</b>				<b>4,184</b>
Harvesting & Hauling				
Labor – Harvesting/Hauling	MD	10	346	3,460
Packing materials – Carton boxes	pcs.	90	30	2,700
Labor – Packing/Handling	MD	3	346	1,038
<b>Total Cost - Harvesting</b>				<b>7,198</b>
Money In				
Yield x Price of Sale	kgs.	2,500	30	<b>75,000</b>
<b>Money In – Money Out</b>				$75,000 - (4,184 + 7,198 + 855)$ $= 75,000 - 12,237$
Profit or Loss?				<b>= 62,763</b>
4. Financial Analysis				
<b>Total Establishment Cost</b>	= Total cost of planting + Maintenance until productive = $9,264 + 33,472 = \mathbf{42,736}$			
<b>Production Cost/year</b>	= Maintenance cost + Cost of harvesting & hauling + Depreciation Value/year = $4,184 + 7,198 + 855 = \mathbf{12,237}$			
<b>Depreciation Value</b>	= Total Establishment Cost/No. of productive years = $42,736/50 \text{ years} = \mathbf{855/year}$			
<b>Net Income / year</b>	= Total sales – (Production Cost/yr. + Depreciation Value) = $75,000 - 12,237 = \mathbf{62,763}$			
<b>Return on Investment (%) (ROI)</b>	= Net Income/ (Production Cost + Depreciation Value) = $62,763/12,237 = \mathbf{512\%}$			
<b>Breakeven Production Cost</b>	= (Production Cost + Depreciation Value) / Total Harvest yield = $12,237/2,500 = \mathbf{4.89/kg.}$			
<b>Contribution Margin</b>	= Selling price – Breakeven production cost = $30 - 4.89 = \mathbf{25.11/kg.}$			
<b>Recovery Period</b>	= Total Establishment Cost/ Net Income per year = $42,736/62,763$ = $0.68 \times 12 \text{ months/yr.} = \mathbf{8^{th} \text{ month of the } 8^{th} \text{ year}}$ Or = Total establishment cost / Contribution margin = $42,736 / 25.11 = \mathbf{1,702 \text{ kgs. of sales}}$			

Harvesting Cost = 2.87/kg.  
 Depreciation Cost = 34.20  
 Maintenance Cost/ tree/ year = 167

\*Maintenance Cost/year x 8 years period



## Coconut

(Scientific Name: *Cocos nucifera*)

Coconut is a traditional Filipino crop and is grown everywhere except in highland areas. It grows best in elevations of less than 600 MASL. Traditional varieties are generally tall while new introduced hybrids are short (dwarf). Both varieties are suitable for intercropping for coffee as well as a perimeter crop. The leaves of the coconut trees allow sunlight to penetrate below to the coffee trees. The roots of the coconut however are fibrous and shallow and extensive and will compete with the fertility of the soil with the coffee crop. Supplementary fertilizer placement is therefore needed if it is planted as an intercrop. A distancing of 10m x 10m is optimal and will give 100 coconut trees to a hectare. The planting layout needs to be particularly attended in relation to the coffee planting since it can affect the coffee in three ways:

1. the coconut leaves shedding could damage coffee branches and damage the fruit sets;
2. movement within the area should not be impeded for harvesting of both crops;
3. coconut leaves can harbor aphids and fungus which can be transmitted to the coffee plants

New diseases and pests in coconut (beetles, bugs, borers) have yet to be observed on their effects to coffee.

Coconuts start to be harvested on the 3<sup>rd</sup> – 5<sup>th</sup> year depending on the variety and harvesting is done on a quarterly basis thus the need to be particular about planting distances. Coffee should be planted not nearer than 2 meters from the coconut stands; so a significant reduction in coffee trees will be affected when in combination with coconut as an intercrop.



## Production Costs & Returns: Coconut (100 trees )

Money Out				
Inputs	Unit	Qty.	Price (Php)	Total (Php)
Seedlings	pcs.	100	150	15,000
Organic fertilizer (Manure)	sacks	8	180	1,440
Inorganic Fertilizer (14-14-14)	sacks	2	1,400	2,800
Systemic Insecticide (Furadan)	kgs.	3	250	750
<b>Total Costs – Inputs</b>				<b>19,990</b>
Labor				
Hole digging/staking/lay-out	piece rate	100	20	2,000
Planting & fertilizer placement	MD	4	346	1,384
Hauling of seedlings	MD	1	500	500
<b>Total Cost – Labor</b>				<b>3,884</b>
<b>Total Establishment Cost</b>				<b>23,874</b>
Maintenance Cost*1				
Fertilizer (14-14-14)	sack	4	1,400	5,600
Fertilizer placement	MD	4	346	1,384
Underbrushing	MD	8	346	2,786
<b>Total Cost - Maintenance</b>				<b>9,752</b>
Harvesting Cost*2				
Harvesting*3	piece rate (per nut)	2,600 Nuts	2.50	6,500
Hauling – Field	MD	MD	500	2,000
Dehusking	piece rate (per nut)	2,600 Nuts	3	7,800
Transport (to buyer)	per load	1	5,000	5,000
<b>Total Cost - Harvesting ((per quarter)</b>				<b>21,300</b>
Money In				
Yield x Price of Sale	Nuts/yr.	10,400	18	<b>187,200</b>
<b>Money In – Money Out</b>		$187,200 - (21,300 \times 4) = 187,200 - 85,200$		
Profit or Loss?		<b>102,000</b>		
Financial Analysis				
<b>Total Establishment Cost</b>	= Total cost of planting + Maintenance cost until fruiting = 23,874 + 48,760 = <b>72,634/ha.</b>			
<b>Production Cost/year</b>	= Maintenance cost + Cost of harvesting & hauling + Depreciation Cost/year = 85,200 + 9,752 + 2,905 = <b>97, 857</b>			
<b>Depreciation Value</b>	= Total Establishment Cost/No. of productive years = 72,634 / 25 years = <b>2,905/year</b>			
<b>Net Income/year</b>	= Total sales – (Production Cost/yr. + Depreciation Value) = 187,200 – 97,857 = <b>89,343/year</b>			
<b>Return on Investment (%)</b>	= Net Income/ (Production Cost + Depreciation Value) = 89,343 / 97,857 = <b>91%</b>			
<b>Breakeven Production Cost</b>	= (Production Cost + Depreciation Value) / Total Harvest yield = 97,857 / 10,400 = <b>9.40/Nut</b>			
<b>Contribution Margin</b>	= Selling price – Breakeven production cost = 18 – 9.40/nut = <b>8.60/nut</b>			
<b>Recovery Period</b>	= Total Establishment Cost/ Net Income per year = 72,634 / 89,343 = 0.81 x 12 = <b>9<sup>th</sup> month of the 5<sup>th</sup> year</b> Or = 72,634 / 9.40/nut = <b>7,727 nuts sold</b>			

\*1yearly x 3 years \*quarterly \*3whole nuts



## Corn (Hybrid/White)

(Scientific Name: *Zea mays*)

Corn is a commonly cultivated cash crop next to rice. There are different types planted either for food (usually white) or for feeds (usually yellow). Variants take the form of Native Corn varieties, usually open pollinated and the hybrids which are genetically modified to resist certain corn pests (armyworms, borers, fungus & bacteria), as well as adapt to the use of glyphosate-based herbicides for weed control.

The use of corn as an intercrop to coffee has limitations. Since its root system competes with that of the coffee root system, supplemental fertilization is a necessity every cropping cycle.

Corn is grown in furrows and can only be planted in between rows of the coffee trees. Deep plowing and furrowing are not advisable as it could damage the active surface roots of coffee. Planting, using the dibble method, is an option to minimize the disturbance of the coffee root system. **The use of corn as an intercrop is limited up to the 2<sup>nd</sup> year of the coffee plants establishment.** Beyond this period, its cultivation impacts significantly on the productivity of the coffee plants.

Corn does not have the same pests and diseases as coffee but competes with moisture and fertility with the coffee plant. There will be a reduction in the number of rows planted to corn per hectare when used as an intercrop, hence a potential yield reduction.

## Production Costs & Returns: Yellow/White Corn

Planting distance @ 30cm x 75cm rows planted in Furrows (44,444 plants/ha.)

Money Out				
Inputs	Unit	Qty.	Price (Php)	Total (Php)
Seeds – Hybrid Variety (9kg/bag)	bag	2	6,000	12,000
Inorganic Fertilizer – 50 kg/bag	Bags	10	1,200	12,000
Organic Fertilizer (Chicken Dung) 30 kg/bag	Bags	30	100	3,000
Herbicides (Glyphosate based)	Liters	3	400	1,200
<b>Total Costs – Inputs</b>				<b>28,200</b>
Services & Labor				
Land preparation – Harrowing and Furrowing	MD	6	500	3,000
Fertilization (Basal and Sidedress)	MD	6	346	2,076
Manure Spreading	MD	6	346	2,076
Planting	MD	10	346	3,460
Herbicide Application	MD	2	346	692
Harvesting – piece rate (cobs)	Per Kg	11,162	0.8	8,930
Shelling	Per sacks	156	18	2,808
Transport to Dryer	Per Kg (wet)	8,930	0.50	4,465
Labor – Drying	MD	12	346	4,152
Labor – sacking and loading	Per Sack	125	5	625
Transport to Buyer	Per Kg	6,250	1	6,250
<b>Total Costs – Services &amp; Labor</b>				<b>37,909</b>
Other Costs				
Sacks – Plastic 50 kg	Piece	125	15	1,875
<b>Total Costs – Other cost</b>				<b>1,875</b>
<b>Total costs – Input &amp; Labor</b>				<b>67,984</b>
Money In				
Yield x Price of Sale	Kg	6,250	15	<b>93,750</b>
<b>Money In – Money Out</b>				93,750 - 67,984
Profit or Loss?				<b>25,766</b>
Financial Analysis				
<b>Return of Investment (ROI)</b>	= Income/Capital Invested = 25,766 / 67,984 = 0.38 x 100 = <b>38% /cropping</b>			
<b>Production Cost/kg. or Breakeven Cost/kg.</b>	= 67,984 / 6,250 kgs. = <b>10.87/kg.</b>			
<b>Contribution Margin</b>	= Selling price – Breakeven production cost = 15.00 – 10.87 = <b>4.13</b>			
<b>Breakeven Volume</b>	= Production cost / Selling Price = 67,984 / 15.00 = <b>4,532 kgs.</b>			



## **Upland Rice**

(Scientific Name: *Oryza sativa*)

Upland rice varieties (traditional, open pollinated rice varieties) are characterized by good eating quality and aroma (aromatic rice). However, they are low yielding compared to the irrigated hybrid varieties. Upland rice commands high prices in the market. They are mostly grown for home consumption rather than for commercial purposes.

Upland rice can complement coffee as an intercrop. It does not compete with sunlight, and no common pests and diseases; but will compete with moisture and nutrients since it is a shallow rooted crop. Supplemental fertilization is necessary. Upland rice can only be grown between coffee plants in rows either furrowed or dibbled. They usually mature and are harvested at 110 to 120 days; though there are local varieties that are early maturing (90 days). Rice hay leftover after threshing is good material for mulching the base of coffee trees as well as organic matter once decomposed.



## Production Costs & Returns: Upland Rice

<b>Money Out</b>				
<b>Inputs</b>	<b>Unit</b>	<b>Qty.</b>	<b>Price (Php)</b>	<b>Total (Php)</b>
Rice seeds	Per can	7	500	3,500
Inorganic Fertilizer (46-0-0)	Sack	1	1,200	1,200
Foliar Fertilizer (crop giant)	Carton	2	350	700
Insecticides:				
Cypermithrin	Liter	1	400	400
Almex	Carton	1	350	350
Herbicides:				
Round-up	Liter	1	350	350
2-4D	Liter	1	400	400
<b>Total Costs – Inputs</b>				<b>6,900</b>
<b>Labor</b>				
Clearing	MD	6	346	2,076
Drilling (dibble method)	MD	12	346	4,152
Spraying herbicides	MD	1	346	346
Spraying Fungicide	MD	1	346	346
Spraying foliar fertilizer	MD	1	346	346
<b>Total Cost – Labor</b>				<b>7,266</b>
<b>Harvesting &amp; Threshing</b>				
Manual harvesting (Garab)	Sharing	20% (of harvest)	8,784	8,784
Threshing	Sharing	10% (of harvest)	4,392	4,392
Hauling	MD	2	346	692
Drying/ Sacking	MD	3	346	1,038
Sacks	sacks	40	15	600
<b>Total Cost - Harvesting</b>				<b>15,506</b>
<b>Money In</b>				
Yield x Price of Sale	Kgs.	2,440	18	<b>43,920</b>
<b>Money In – Money Out</b>				43,920 - 32,696
Profit or Loss?				<b>11,224</b>
<b>Financial Analysis</b>				
<b>Production Cost/year or Breakeven Cost</b>	= Production Cost + Cost of harvesting & hauling = 32,696 / 4,000 = <b>8.17/kg.</b>			
<b>Net Income / Cropping</b>	= Total sales – (Production Cost/yr. + Depreciation Value) = 43,920 – 32,696 = <b>11,224</b>			
<b>Return on Investment (%)</b>	= Net Income / Production Cost = 11,224 / 32,696 = 0.34 x 100 = <b>34%</b>			



## Peanuts

(Scientific Name: *Arachis hypogea*)

In the Philippines, peanuts are grown primarily for the snack food industry. It is considered a high value crop and enjoys a very popular demand in the market.

The use of peanut as an intercrop for coffee is acceptable as it does not compete with sunlight, and does not harbor any pests and diseases of coffee. Fertilization and moisture are its only competition to the coffee plant. Being a nitrogen fixer, it complements the fertility of coffee as far as nitrogen is concerned. The hull of peanuts (leftover vegetative part after the pods are taken out) is very rich in N, K and is a good mulch material for coffee. Being shallow rooted, care should be done not to deep plow the furrows so as not to disturb the roots of the coffee plant. Peanuts can only be planted between coffee rows in distances of 0.3m x 0.5m rows. Dry season planting is better than wet season planting as problems on harvesting and drying the crop may be experienced.

Planting peanuts needs high capital due to the cost of seeds and inputs. For intercropping in coffee, planting in a few blocks or rows may be advisable. Peanuts can be harvested in 110 to 120 days depending on the variety and season planted. Peanuts grow well in the lowland areas (not more than 800 MASL) in soils that are sandy to sandy loam. Avoid planting peanuts in heavy clay soils.

## Production Costs & Returns: Peanuts

(1 hectare) (0.3m x 0.5m distancing), 66,666 plants/hectare

Money Out				
A. Inputs	Unit	Qty.	Price (Php)	Total (Php)
Seeds (Peeled & Cleaned)	Kgs.	80	250	20,000
Organic fertilizer (Manure)	Sacks	40	180	7,200
Inorganic Fertilizer	Sacks			
	14-14-14	6	1,400	8,400
	0-0-60	4	1,200	4,800
	16-20-0	4	1,400	5,600
Agricultural lime	Sacks	40	30	1,200
Fungicide (Ridomil)	Kgs.	3	850	2,550
Herbicide (Contact)	Gallon	1	2,500	2,500
<b>Total Costs – Inputs</b>				<b>52,250</b>
Labor & Maintenance				
Plowing/ Furrowing	MD	8	500	4,000
Planting	MD	6	346	2,076
Fertilizer & Lime placement	MD	3	346	1,038
Spraying (Herbicide)	MD	2	346	692
Weeding	MD	30	346	10,380
Spraying (Fungicide + Insecticide)	MD	3	346	1,038
<b>Total Cost – Labor &amp; Maintenance</b>				<b>19,224</b>
Harvesting & Marketing				
Off barring	MD	2	500	1,000
Harvesting & Sacking	MD	20	346	6,920
Removal of pods	MD	5	346	1,730
Drying	MD	3	346	1,038
Sacking & Hauling	MD	2	346	692
Sacks & Ties	Pcs.	100	15	1,500
Transport Cost	Per trip	1	8,000	8,000
<b>Total Cost – Harvesting &amp; Marketing</b>				<b>20,880</b>
<b>Total Establishment Cost</b>				<b>92,354</b>
Money In				
Yield x Price of Sale	Kgs.	2,500*1	140	350,000
<b>Money In – Money Out</b>				350,000 – 92,354
Profit or Loss?				<b>257,646</b>
Financial Analysis				
<b>Production Cost/unit or Breakeven Cost</b>	= Production Cost + Cost of harvesting & hauling = 92,354/ 2,500 kg. = <b>36.94/kg.</b>			
<b>Net Income / Cropping</b>	= Total sales – Production Cost = 350,000 – 92,345 = <b>257,646</b>			
<b>Return on Investment (%)</b>	= Net Income / Production Cost = 257,646/ 92,354 = 2.79 x 100 = <b>279%</b>			
<b>Contribution Margin</b>	= Selling Price – Production Cost/unit = 140 – 36.94 = 103/kg.			

\*1Dried Peanuts in shelled form



## Abaca

(Scientific Name: *Musa textiles*)

Abaca is an industrial crop grown for its fiber. It belongs to the banana family (*musa*) and has similar agronomic and cultural practices. Unlike table or cooking bananas however, it is the trunk (body) of the abaca that is harvested and processed into fibers.

The market for abaca fiber is good and abaca is considered a high value crop. Prices for abaca have remained steady and the market for the fiber is growing both in the domestic and international market. As an intercrop, abaca is suitable to coffee plants. It provides partial shade, does not have pests and diseases hazardous to coffee and can be planted in densities that will not affect productivity of the coffee plants. It is however a shallow rooted plant and will compete with nutrients and moisture from the soil. Like bananas, abaca mats need to be managed properly, otherwise it will occupy space and make movements within the coffee trees difficult. Proper desuckering and maintaining a set number of stalks per mat is recommended. Abaca can be planted in rows in between coffee rows in alternative bands. A distancing of 8m. X 6m. will give 200 mats per hectare.

Abaca can be harvested after 24 months from planting and harvesting can be spaced either on a monthly or quarterly basis, making the crop a good source of regular cash flow. Once processed into dry fibers and baled, it does not spoil under storage. It is an ideal saving crop.

Manual stripping of abaca is strenuous and labor-intensive work. It is advisable to consider investment in a mechanical stripping machine for more efficient and better-quality grade fibers. **Caution:** abaca should not be planted adjacent/ near areas planted to corn. Both are susceptible to “alcoheres,” and fungal infections (downy mildew “agop-op”, tibagnol” or “gaob”) caused by a common fungus and this disease is highly transmittable by air, water, contact from infected clothes and equipment.



## Production Costs & Returns: Abaca

(1 hectare) Planting distance: 5m x 5m (400 mats)

Money Out				
Inputs	Unit	Qty.	Price (Php)	Total (Php)
Seed pieces (corms)	Pcs.	200	30	6,000
Inorganic Fertilizer (14-14-14)	Bag	1	1,400	1,400
Systemic Insecticide (Furadan)	Kg.	2	250	500
<b>Total Costs – Inputs</b>				<b>7,900</b>
Labor				
Hole digging/ Lay outing	MD	4	346	1,384
Planting & fertilization	MD	2	346	692
Clearing	MD	4	346	1,384
Hauling of corms	MD	2	346	692
<b>Total Cost – Labor</b>				<b>4,152</b>
<b>Total Establishment Cost</b>				<b>12,052</b>
Maintenance Cost*1				
Weeding/ Round weeding	MD	4	346	1,384
Deleafing & trimming	MD	2	346	692
Sucker management	MD	1	346	346
<b>Total Cost - Maintenance</b>				<b>2,422</b>
Harvesting & Stripping*2				
Tumbling	MD	2	346	692
Tuxying/ Hauling	MD	4	346	1,384
Stripping	Per kg.	200	5	1,000
Drying/Baling	MD	3	346	1,038
Transport	Per kg.	200	5	1,000
<b>Total Cost - Harvesting</b>				<b>5,114</b>
Money In				
Yield x Price of Sale	Kgs.*3	600	40	<b>24,000</b>
<b>Money In – Money Out</b>			24,000 – (2,422 + 5,114)	
Profit or Loss?			<b>7,536/Quarter</b>	
Financial Analysis				
<b>Production Cost/Unit or Breakeven Costs</b>	= Maintenance cost + Cost of harvesting & hauling + Depreciation Value/total production = (5,114 + 2,422 + 1,169) / 600 kgs. = <b>14.50/kg.</b>			
<b>Depreciation Value</b>	= Total Establishment Cost/No. of productive years = 70,180 / 15 years = <b>4,678/year</b>			
<b>Net Income</b>	= Total sales – (Maintenance Cost/yr. + Depreciation Value + Harvesting Cost/year) Total sales: 24,000 x 4 quarters = 96,000 = 96,000 – (14,532 + 20,456 + 4,678) = 96,000 – 39,666 = <b>56,334/year</b>			
<b>Contribution Margin</b>	= Selling Price – Production Cost or Breakeven Cost of Production = 40 – 14.50 = <b>25.50/kg.</b>			
<b>Return on Investment (%)</b>	= Net Income / Production Cost + Depreciation Cost = 56,334 / 39,666 = 1.42 x 100 = <b>142%/year</b>			
<b>Recovery Period</b>	= Establishment Cost / Net Income/year = 70,180 / 56,334 = <b>1.2 years after 2<sup>nd</sup> year (3 years)</b> Or Using Contribution Margin = Total Establishment Cost / Contribution Margin/kg. = 70,180 / 25.50 = <b>2,752 kgs. of Abaca fiber sale</b>			

\*1every 2 months \*2every quarter \*3yield @ 1.5kgs.per mat / quarter





## **Ginger**

(Scientific Name: *Zingiber Officinale*)

Ginger is a rhizome (similar to a tuber) grown for its value as a food spice and for medicinal value. It has a very good market and easy to sell. As an intercrop for coffee, ginger is compatible since it can be planted underneath the coffee trees (ginger tolerates a high degree of shading – up to 70%) and between rows of the coffee plants. It does not harbor any pests for coffee but is known to discourage berry borers that are lodged in coffee fruits on the ground (probably due to its strong aroma).

Ginger is planted in dense rows of 0.30m x 0.30m or can be spread around in irregular planting distances. It matures in 7 months but is best harvested at 10-12 months. Being a rhizome, it remains dormant in the soil even beyond its harvesting schedule, making it an ideal saving and hedge crop. Harvesting can be delayed while waiting for good prices. Ginger is a shallow rooted crop and could compete with coffee for both nutrition and moisture. The practice of mulching and supplemental organic fertilizer is advantageous to both crops.

Planting ginger in large batches is not recommended for two reasons: costs (the planting materials are expensive) and the market cannot absorb large volumes of harvests (unless there is an institutional buyer/processor). Planting ginger as an intercrop to coffee can be done by small area batches, and phased through the year to have a steady supply and capture the timing of higher prices in the market. Ginger prices fluctuate between lows of 30.00/kg. to highs of 180.00/kg.

## Production Costs & Returns: Ginger

500 m<sup>2</sup> (5,555 plants) Ginger Planted in between coffee rows @ 0.30 x 0.30m – 0.50m

<b>Money Out</b>				
<b>Inputs &amp; Services</b>	<b>Unit</b>	<b>Qty.</b>	<b>Price (Php)</b>	<b>Total (Php)</b>
Seedlings	Kgs	500	40	20,000
Insecticides/Fungicides	Liters	1	800	800
Fertilizer 14-14-14, Urea	50kg Bags	2	1,400	2,800
Chicken Dung	Sack	10	100	10,000
<b>Total Costs – Inputs &amp; Services</b>				<b>33,600</b>
<b>Services &amp; Labor</b>				
Furrowing	MD	2	500	1,000
Planting	MD	5	346	1,730
Fertilizing	MD	5	346	1,730
Weeding 1	MD	10	346	3,460
Harvesting	MD	8	346	2,768
Washing/Sacking	MD	4	346	1,384
Trucking (50 kgs/sack)	Sacks	40	50	2,000
Hauling (Labor) loading	MD	2	346	692
Cost of Sacks	sack	40	15	600
<b>Total Costs – Labor</b>				<b>15,364</b>
<b>Totals Costs – Inputs &amp; Labor</b>				<b>48,964</b>
<b>Money In</b>				
Yield x Price of Sale	Kgs	2,000	40	<b>80,000</b>
<b>Money In – Money Out</b>				80,000 – 48,964
<b>Profit or Loss?</b>				<b>31,036</b>
<b>Financial Analysis</b>				
<b>Breakeven/Production Cost</b>		= Production Cost / Total Yield = 48,964 / 2,000 kgs. = <b>24.48/kg.</b>		
<b>Contribution Margin</b>		= Selling Price – Breakeven Production Cost = 40 – 24.48 = <b>15.52/kg.</b>		
<b>Return on Investment (%)</b>		= Income / Capital Invested = 31,036 / 48,964 = 0.63 x 100 = <b>63%</b>		



## Banana

(Scientific Name: *Musa sp.*)

Variety:

Saba (*Musa acuminata* × *balbisiana*)

Lakatan (*Musa acuminata*)

There are two types of bananas that can be used for intercrop and perimeter crop for coffee: the cooking type (common name: saba, candava) and the table type (lakatan, tundan). Banana plants are compatible to coffee as an intercrop, as they are not host to coffee pests and diseases, their leaves do not create total shade to compete with coffee for sunlight, their planting distances are far apart between mats. However, caution must be taken in managing the banana clusters (called mats), as they tend to move outwards from their original planted sites when they produce suckers. These can cover the problems in movement within the coffee area.

The number and direction of the suckers have to be properly managed. Each mat should only contain a maximum of 5 plants – the mother, daughter, follower, peeper and the sucker. Beyond 5 plants/mat, the cluster becomes unmanageable and dense. A planting distance of 8m x 8m to 10m x 10m between mats can provide 100-156 mats/hectare.

Bananas bear fruit after 18 months planting and can provide a bunch every 2 – 3 months. Table bananas tend to have smaller fruit bunches averaging 15 – 25 kgs. / bunch, while cooking type bananas produce larger bunches of between 30 – 60 kgs. /bunch.

Since banana plants are shallow rooted, they compete with coffee for soil nutrients and moisture. Additional fertilizer supplements are necessary to maintain good fruit set without jeopardizing the productivity of the coffee crop.

# Production Costs & Returns: Banana

(100 trees) Distancing: 10m x 10m

Money Out					
Inputs	Unit	Qty.	Price (Php)	Total (Php)	
Suckers or Seedlings	pcs.	100	50	5,000	
Organic fertilizer (Chicken dung)	sacks	8	180	1,440	
Inorganic Fertilizer (14-14-14)	sacks	2	1,400	2,800	
Systemic Insecticide (Furadan)	kgs.	3	250	750	
<b>Total Costs – Inputs</b>				<b>9,990</b>	
Labor					
Hole digging/staking/lay-out	MD	2	346	692	
Planting & fertilizer placement	MD	1	346	346	
Hauling – seedlings & fertilizer	MD	1	346	346	
<b>Total Cost – Labor</b>				<b>1,384</b>	
<b>Total Establishment Cost</b>				<b>11,374</b>	
Maintenance Cost*1					
Fertilizer (14-14-14)	sack	4	1,400	2,800	
Desuckering/ deleafing	MD	8	346	2,768	
Fertilizer placement	MD	2	346	692	
<b>Total Cost - Maintenance</b>				<b>6,260</b>	
Harvesting Cost*2					
Harvesting/ Tumbling	MD	2	346	692	
Hauling – Field	MAD	1	500	500	
Transport (to market)	per trip	1	500	500	
<b>Total Cost - Harvesting</b>				<b>1,692</b>	
Money In					
Yield x Price of Sale	Saba	Bunch @ 40kgs.*3	100 x 40 kgs.	10	<b>40,000/Quarter</b> <b>128,192/Year</b>
	Lakatan	Bunch @ 20 kgs.*4	100 x 20 kgs	19	<b>38,000/Quarter</b> <b>152,000/Year</b>
Money In – Money Out					
Profit or Loss? (per quarter)	Saba = 40,000 – 7,952 = <b>32,048*5</b> Lakatan = 38,000 – 7,952 = <b>30,048*5</b>				
Financial Analysis					
Saba Variety					
<b>Total Establishment Cost</b>	= Total Establishment cost + Maintenance until harvest = 11,374 + (6,260 x 6) = <b>48,934</b>				
<b>Production Cost/year</b>	= Maintenance cost + Cost of harvesting & hauling + Depreciation cost/year = 7,952/quarter x 4 + 4,893 = <b>36,701</b>				
<b>Depreciation Value</b>	= (Total Establishment Cost + Maintenance Cost up to 18 <sup>th</sup> month) / No. of productive years = 48,934 / 10 yrs. (life span) = <b>4,893.40/year</b>				
<b>Net Income / year</b>	= Total sales – (Production Cost/yr. + Depreciation Value) = 128,192 – (31,808 + 4,893/year) = <b>91,491/year</b>				
<b>Return on Investment (%)</b>	= Net Income/ Production Cost/year + Depreciation Value = 91,491 / 36,701 = 2.49 x 100 = <b>249%</b>				
<b>Breakeven Production Cost</b>	= (Production Cost + Depreciation Value) / Total Harvest yield = (31,808 + 4,893) / 16,000kgs. = <b>2.29/kg.</b>				
<b>Contribution Margin</b>	= Total Establishment Cost/ Net Income per year = 48,934 / 91,491 = 0.53 x 12 = <b>6<sup>th</sup> month after the 18<sup>th</sup> month (2<sup>nd</sup> year)</b>				
<b>Recovery Period</b>	= Selling Price – Breakeven Cost = 10.00 – 2.29 = <b>7.71/kg.</b> Recovery Period using Contribution Margin = 48,934 / 7.71 = <b>6,347 kgs. of sale</b>				

# Production Costs & Returns: Banana

(100 trees) Distancing: 10m x 10m

Money Out					
Inputs	Unit	Qty.	Price (Php)	Total (Php)	
Suckers or Seedlings	pcs.	100	50	5,000	
Organic fertilizer (Chicken dung)	sacks	8	180	1,440	
Inorganic Fertilizer (14-14-14)	sacks	2	1,400	2,800	
Systemic Insecticide (Furadan)	kgs.	3	250	750	
<b>Total Costs – Inputs</b>				<b>9,990</b>	
Labor					
Hole digging/staking/lay-out	MD	2	346	692	
Planting & fertilizer placement	MD	1	346	346	
Hauling – seedlings & fertilizer	MD	1	346	346	
<b>Total Cost – Labor</b>				<b>1,384</b>	
<b>Total Establishment Cost</b>				<b>11,374</b>	
Maintenance Cost*1					
Fertilizer (14-14-14)	sack	4	1,400	2,800	
Desuckering/ deleafing	MD	8	346	2,768	
Fertilizer placement	MD	2	346	692	
<b>Total Cost - Maintenance</b>				<b>6,260</b>	
Harvesting Cost*2					
Harvesting/ Tumbling	MD	2	346	692	
Hauling – Field	MAD	1	500	500	
Transport (to market)	per trip	1	500	500	
<b>Total Cost - Harvesting</b>				<b>1,692</b>	
Money In					
Yield x Price of Sale	Saba	Bunch @ 40kgs.*3	100 x 40 kgs.	10	<b>40,000/Quarter</b> <b>128,192/Year</b>
	Lakatan	Bunch @ 20 kgs.*4	100 x 20 kgs	19	<b>38,000/Quarter</b> <b>152,000/Year</b>
Money In – Money Out					
Profit or Loss? (per quarter)		Saba = 40,000 – 7,952 = <b>32,048*5</b>			
		Lakatan = 38,000 – 7,952 = <b>30,048*5</b>			
Financial Analysis					
Lakatan Variety					
<b>Production Cost/year</b>	= Maintenance cost + Cost of harvesting & hauling + Depreciation Value/year = 31,808 + 16,311 = <b>48,119</b>				
<b>Depreciation Value</b>	= Total Establishment Cost/No. of productive years = 48,934 / 3 yrs. = <b>16,311/yr.</b>				
<b>Net Income / year</b>	= Total sales – (Production Cost/yr. + Depreciation Value) = 150,000 – (31,808 + 16,311) = <b>101,881/year</b>				
<b>Return on Investment (%)</b>	= Net Income/ (Production Cost + Depreciation Value) = 101,881 / 48,119 = 2.11 x 100 = <b>211%</b>				
<b>Breakeven Production Cost</b>	= (Production Cost + Depreciation Value) / Total Harvest yield = (31,808 + 16,311) / 8000kgs = <b>6.01/kg.</b>				
<b>Contribution Margin</b>	= Total Establishment Cost/ Net Income per year = 48,934 / 101,881 = 0.48 x 12 = <b>6<sup>th</sup> month after the 18<sup>th</sup> month (2 years)</b>				
<b>Recovery Period</b>	= Selling price – Breakeven Cost = 19 – 6.01 = <b>13.00/kg.</b>  Recovery Period using Contribution Margin = 48,934 / 13 = <b>3,764 kgs. of sale</b>				

\*1Quarterly \*2Quarterly \*3Saba variety \*4Lakatan Variety \*5per Quarter

Note: Banana fruits (both types) do not mature at the same time and harvesting can be intermittent within the quarter.







## Sayote

(Scientific Name: *Sechium edule* )

Sayote is a vine. The fruits are used as a vegetable in many Filipino dishes. As an intercrop to coffee, it is not recommended as it has the capacity to smother the coffee trees with their vines and leaves and kill it. However, sayote is a good crop for diversification. It needs to be planted separately and away from coffee plants.

Although a low value product, it provides good cash flow as it can be harvested bi-weekly (every two weeks) and does not require high input. Sayote can last up to three to five years with proper pruning and maintenance.

A potential application for sayote to coffee is as a perimeter fence. It can provide income as well as serve as a windbreak. Prop plants (Madre de cacao, kakawate, ipil-ipil) or posts (bamboo) can be used as vertical braces to support the vines. They need to be planted or established earlier around the perimeter if live posts are to be used.

Sayote can be planted at a distance of 2m x 2m with one plant per hill. The plants start to bear fruit in 90 to 110 days. Harvesting is done every 15 days with 10 pieces of fruit harvested per hill. A kilogram of sayote takes between 2 - 3 regular sized fruit.

# Production Costs & Returns: Sayote

Module size: 1000m<sup>2</sup> area (Note: separate from coffee trees)  
 2m x 2m distancing: 250 plants/ Module

Money Out				
A. Inputs	Unit	Qty.	Price (Php)	Total (Php)
Bamboo poles – 8' length	pcs.	250	30	7,500
Propping twine (banana propping)	rolls	30	350	10,500
Seed pieces	pcs.	250	5	1,250
Organic fertilizer (Chicken dung)	sacks	5	180	900
Inorganic Fertilizer (14-14-14)	sacks	1	1,400	1,400
Systemic Insecticide (Furadan)	kgs.	2	250	500.00
<b>Total Costs – Inputs</b>				<b>22,050</b>
Labor				
Underbrushing/ Plowing	MD	1	500	500
Lay-out & trellis setting	MD	8	346	2,768
Hauling of materials	MD	2	346	692
Planting & fertilization	MD	3	346	1,040
<b>Total Cost – Labor</b>				<b>5,000</b>
<b>Total Establishment Cost</b>				<b>27,050</b>
Maintenance Cost*				
Insecticide/ Fungicide	Liters	½	1,200	600
Urea (46-0-0)	Sack	¼	1,400	350
Spraying	MD	1	346	346
Desuckering/ Trimming	MD	2	346	692
<b>Total Cost - Maintenance</b>				<b>1,988</b>
Harvesting & Marketing*2				
Harvesting/ Hauling	MD	2	346	692
Sorting & Sacking	MD	2	346	692
Transport to market	per trip	1	800	800
<b>Total Cost – Harvesting &amp; Marketing</b>				<b>2,184</b>
Money In				
Yield x Price of Sale	Kgs.	833*3	5	4,165
				4,165/ every 15 days x 2 x 12
				<b>99,960/ year</b>
<b>Money In – Money Out</b>	Total Sales – Cost of Maintenance + Harvesting Cost + Depreciation Cost = 99,960 – (11,928 + 52,416 + 11,004) = 99,960 – 75,348			
Profit or Loss?	<b>24,612</b>			
Financial Analysis				
<b>Production Cost/Unit or Breakeven Production Cost</b>	= Maintenance cost + Cost of harvesting & hauling + Depreciation Cost = (6,279/month)/ 1,666kgs. = <b>3.22/ kg.</b>			
<b>Depreciation Value</b>	= Total Establishment Cost/No. of productive years = 33,014 / 3 years = 11,004/year or <b>917/month</b>			
<b>Net Income/ year</b>	= Total sales – (Production Cost/yr. + Depreciation Value) = 99,960 – 75,348 = <b>24,612</b>			
<b>Return on Investment ROI (%)</b>	= Net Income/ (Production Cost + Depreciation Value) = 24,612 / 75,348 = 0.33 x 100 = <b>33%</b>			
<b>Contribution Margin</b>	= Selling Price – Breakeven Cost = 5.00 – 3.77/kg = <b>1.23/kg.</b>			
<b>Recovery Period</b>	= Total Establishment Cost/ Net Income per year = 75,348 / 24,612 = <b>3 years after planting</b> Or = 75,348 / 1.23 = <b>61,258 kgs. of sales</b>			

\*1Every 2 months \*2Every 15 days \*3 (250 plants x 10 pcs./plant)/ 3 pcs./kg.



## **Falcata**

(Scientific Name: *Albizia falcataria* )

Falcata is a fast-growing forest tree species planted for its use in the plywood and paper industries. The use of falcata as an intercrop to coffee is already tested by several coffee farmers. Falcata has a generally positive contribution to coffee plantings. The leaves which are small and finely spread creates a filtering effect to direct sunlight and provides beneficial shade to coffee. The tree is also a nitrogen fixer, so it adds to soil fertility. The tree is deep rooted hence, does not pose much competition to nutrients and moisture. The main drawback to falcata as an intercrop is during harvesting since it will damage the coffee plants during felling. However, since it can be harvested on the 7th year (earliest) and ideally on the 10th year, scheduling the coffee rejuvenation at the same time as harvesting of falcata is an ideal situation.

Falcata trees can be planted at 10m x 10m to give 100 trees per hectare. It can also be planted closer distances (8 meters) along the perimeter of the area. Establishment of the trees is critical until the third year; regular maintenance work done on the coffee plant can extend to the trees to minimize cost.

# Production Costs & Returns: Falcata

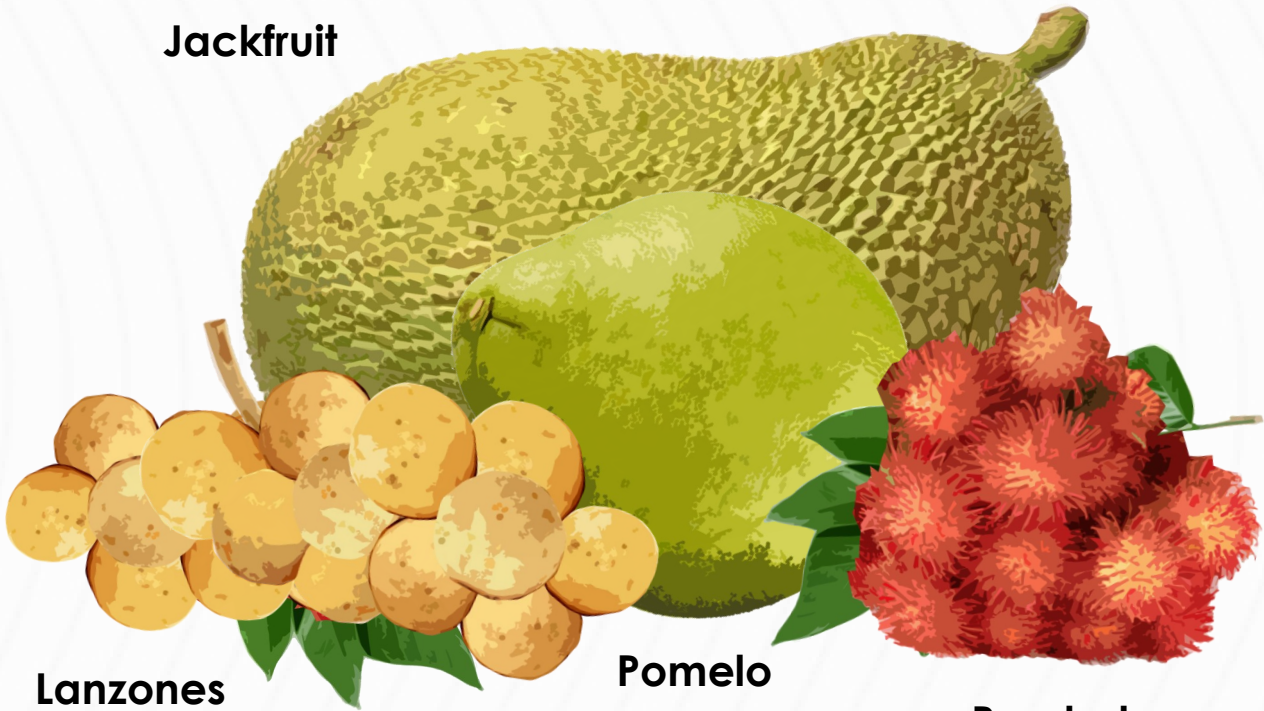
(100 trees on 1 hectare) @ 10m x 10m distance

<b>Money Out</b>				
<b>Inputs &amp; Services</b>	<b>Unit</b>	<b>Qty.</b>	<b>Price (Php)</b>	<b>Total (Php)</b>
Seedlings	Pcs.	100	5	500
Hole digging/ Lay-out	MD	4	346	1,384
Planting	MD	2	346	692
Underbrushing/ Clearing	MD	4	346	1,384
<b>Total Costs – Inputs &amp; Services</b>				<b>3,956</b>
<b>Maintenance</b>				
Underbrushing*1	MD	24	346	8,304
<b>Total Cost – Maintenance (3 years)</b>				<b>24,912</b>
<b>Total Establishment Cost</b>				<b>28,868</b>
<b>Harvesting &amp; Marketing*2</b>				
Cutting permit & Transport permit	Per harvest	1x	5,000	5,000
Felling & Bucking	Per lot	1	10,000	10,000
Loading (piece rate)	Per truck	3	5,000	15,000
Transport to buyer	Per load	3	15,000	45,000
<b>Total Cost – Harvesting &amp; Marketing</b>				<b>75,000</b>
<b>Money In</b>				
Yield x Price of Sale	Cu. m.	250	1,800	<b>450,000</b>
<b>Money In – Money Out</b>				450,000 – 103,868
<b>Profit or Loss?</b>				<b>346,132</b>
<b>Financial Analysis</b>				
<b>Total Investment Cost</b>	= Cost of Establishment + Maintenance Cost (3 years) = 24,912 + 3,956 = <b>28,868</b>			
<b>Return on Investment (%)</b>	= Net Income/ (Production Cost + Depreciation Value) = 346,132/ 103,868 = 3.33 x 100 = <b>333%</b>			
<b>Payback period</b>	= <b>7 – 10 years</b>			

\*1Per year @2 MD per mos. \*2Selling can also be done thru direct negotiation with buyer – per tree basis



**Jackfruit**



**Lanzones**

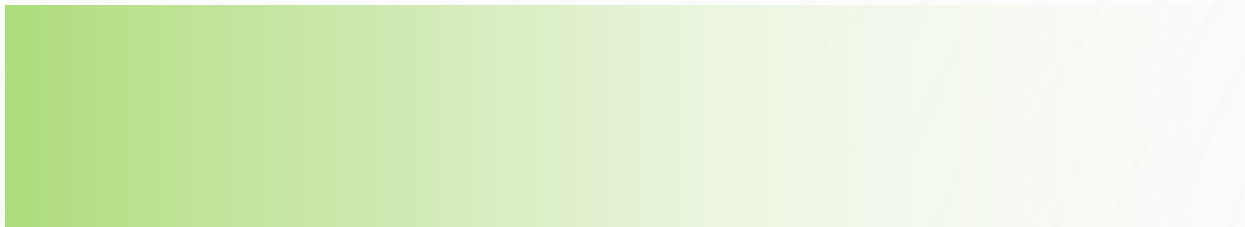
**Pomelo**

**Rambutan**

## **Other crops with potential intercrop values: Fruit trees**

Among the fruit trees selected with potential values as coffee intercroppings are the following: Lanzones (*Lansium Domesticum*); Langka (*Artocarpus heterophyllus*); Rambutan (*Nephelium lappaceum*) and Pomelo (*Citrus max*). The basis of selection are agronomic compatibility, market value, and marketability, as well as historical; these crops having been tested on field by coffee farmers. For short term crops: papaya (*Carica papaya*); sugarcane (*Saccharum officinarum*); sweet potato (*Ipomoea batatas*); yams (*Dioscorea alata*).

# **Bukidnon:** Intercropping Models and Summary of Particulars



# Bukidnon Model 1:

Coffee + Abaca + Ginger



## Summary of Particulars: Model 1, Bukidnon

Production									
Crop	Spacing	No. of Trees / ha.	Production (kg/tree)	Production/ha./yr.	Cost of Establishment/tree	Total Cost of Establishment			
<b>Coffee</b>	2m. x 3m.	1,603	1 kg.	1,603 GCB	96.--	153,888			
<b>Abaca</b>	8m. x 8m.	196 hills	6 kgs.	1,176 kgs.	175.--	34,300			
<b>Ginger</b>	0.5m x 0.3m planted in 8 alternate rows of 3m. x 100m. (2,400m <sup>2</sup> )	16,000 hills	0.360 kgs. /hill	5,760 kgs.	141,030/ha.	141,030			
<b>Financials</b>						<b>Total Establishment Cost of Model</b>			
		Gross Income		Production Cost		Net Income		Payback Period	
Yield		Price/kg.	Sale	Cost/kg.	Total Cost	ROI		Payback Period	
<b>Coffee</b>	1,603 kgs.	84.--	134,652	54.--	86,562	55		5 years	
<b>Abaca</b>	1,176 kgs.	40.--	47,040	14.50	17,052	80		3 years	
<b>Ginger</b>	5,760 kgs.	40.--	230,400	24.50	141,120	63		1 year	
						<b>Total Net Income of Model</b>		<b>167,358</b>	

Cash Flow Model 1, Bukidnon	Year 1			Year 2			Year 3		
	Coffee	Abaca	Ginger	Coffee	Abaca	Ginger	Coffee	Abaca	Ginger
Particulars									
Money Out									
Establishment Cost/Yield	75,468	5,905	48,964			48,964	0.5 kgs.	3.0 kgs.	48,964
Maintenance Cost				26,033	14,532		26,033	14,532	
Depreciation Cost							7,759	2,292	
Harvesting Cost							29,655	2,506	
Total – Money Out	74,468	5,905	48,964	26,033	14,532	48,964	63,448	19,330	48,964
Money In									
Total – Harvest			5,760 kgs.				801 kgs.	588 kgs.	5,760 kgs.
Sales from Harvest			230,400			230,400	67,284	23,520	230,400
Money In – Money Out									
Net Income/Loss	74,468	5,905	181,036	26,033	14,532	181,036	3,836	4,190	181,036
Total – Year End	99,663			140,471			189,062		247,788
Year End Balance	99,663			240,134			429,196		676,984



Particulars	Year 4			Year 5		
	Coffee	Abaca	Ginger	Coffee	Abaca	Ginger
Money Out						
Establishment Cost/ Yield	1.0 kg.	6.0 kgs.	48,964			
Maintenance Cost	26,033	14,532				
Depreciation Cost	7,759	2,292				
Harvesting Cost	59,310	5,012				
Total – Money Out	93,102	21,836	48,964			
Money In						
Total – Harvest	1,603	1,176 kgs.	5,760 kgs.			
Sales from Harvest	134,650	47,040	230,400			
Money In – Money Out						
Net Income/Loss	41,548	25,204	181,036			
Total – Year End						
Year End Balance						

# Bukidnon Model 2:

Coffee + Banana + Sayote



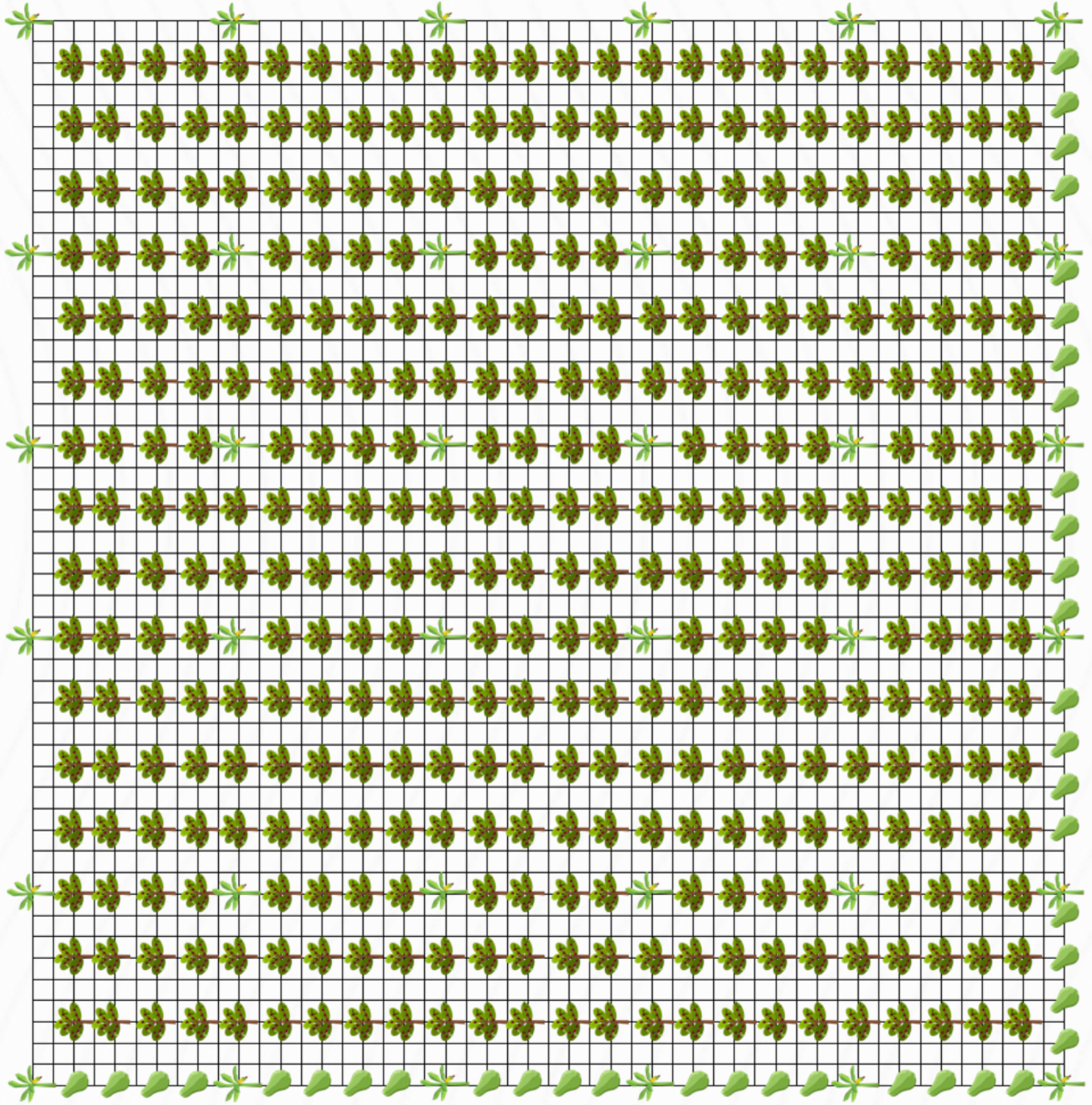
Coffee



Banana



Sayote



## Summary of Particulars: Model 2, Bukidnon

Production									
Crop	Spacing	No. of Trees / ha.	Production (kg/tree)	Production /ha./yr.	Cost of Establishment/ tree	Total Cost of Establishment			
<b>Coffee</b>	2m. x 3m.	1,667 trees	1	1,667 kga.	96.--	160,032			
<b>Banana</b>									
<b>Saba</b>	10m. x 10m.	100 mats	160	16,000	489/tree	48,900*			
<b>Lakatan</b>	10m. x 10m.	100 mats	80	8,000	489/tree	48,900*			
<b>Sayote</b>	2m. distance along the perimeter	200 hills	73 kgs./plant	14,600	108/tree	21,600			
<b>Financials</b>						<b>Total Establishment Cost of Model</b>	<b>230,532</b>		
Financials									
	Yield	Gross Income		Production Cost		Net Income	ROI (%)	Payback Period	
		Price/kg.	Sale	Cost/kg.	Total Cost				
<b>Coffee</b>	1,667	84.--	140,028	54.--	90,018	50,010	55	5 years	
<b>Banana</b>									
<b>Saba</b>	16,000	10.--	160,000	2.30	36,800	124,000	187	2 years	
<b>Lakatan</b>	8,000	19.--	152,000	2.30	18,400	133,600	147	2 years	
<b>Sayote</b>	14,600	5.--	73,000	3.22	47,012	25,988	65	1 year	
<b>Total Net Income of Model</b>						<b>333,598</b>			

\*either of the two types

Cash Flow Model 2, Bukidnon	Year 1			Year 2			Year 3		
	Coffee	Lakatan Banana	Sayote	Coffee	Lakatan Banana	Sayote	Coffee	Lakatan Banana	Sayote
Particulars									
Money Out									
Establishment Cost/ Yield	78,349	30,154	27,050				0.5 kgs.	80 kgs.	80 kgs.
Maintenance Cost			7,157	27,072	25,040	9,542	27,072	25,040	9,542
Depreciation Cost			8,253			8,803	8,068	4,893	8,803
Harvesting Cost			39,312			41,933	30,821	6,768	41,933
Total – Money Out	78,349	30,154	81,772	27,072	25,040	60,278	65,961	36,701	60,278
Money In									
Total – Harvest			16,000 kgs.			16,000 kgs.	833 kgs.	8,000	16,000 kgs.
Sales from Harvest			80,000			80,000	69,972	152,000	80,000
Money In – Money Out									
Net Income/Loss	78,349	30,154	1,772	27,072	25,040	19,722	4,011	115,299	19,722
Total – Year End	110,275			32,390			139,032		
Year End Balance	110,275			142,665			3,633		

Particulars	Year 4			Year 5		
	Coffee	Lakatan Banana	Sayote	Coffee	Lakatan Banana	Sayote
Money Out						
Establishment Cost/ Yield	1.0 kg.	80 kgs.	80 kgs.			
Maintenance Cost	27,072	25,040	9,542			
Depreciation Cost	8,068	4,893	8,803			
Harvesting Cost	61,642	6,768	41,933			
Total – Money Out	96,782	36,701	60,278			
Money In						
Total – Harvest	1,667 kgs.	8,000	16,000 kgs.			
Sales from Harvest	140,028	152,000	80,000			
Money In – Money Out						
Net Income/Loss	43,246	115,299	19,722			
Total – Year End	178,267					
Year End Balance	174,634					

End of Lifespan/ Rejuvenation



# Bukidnon Model 3:

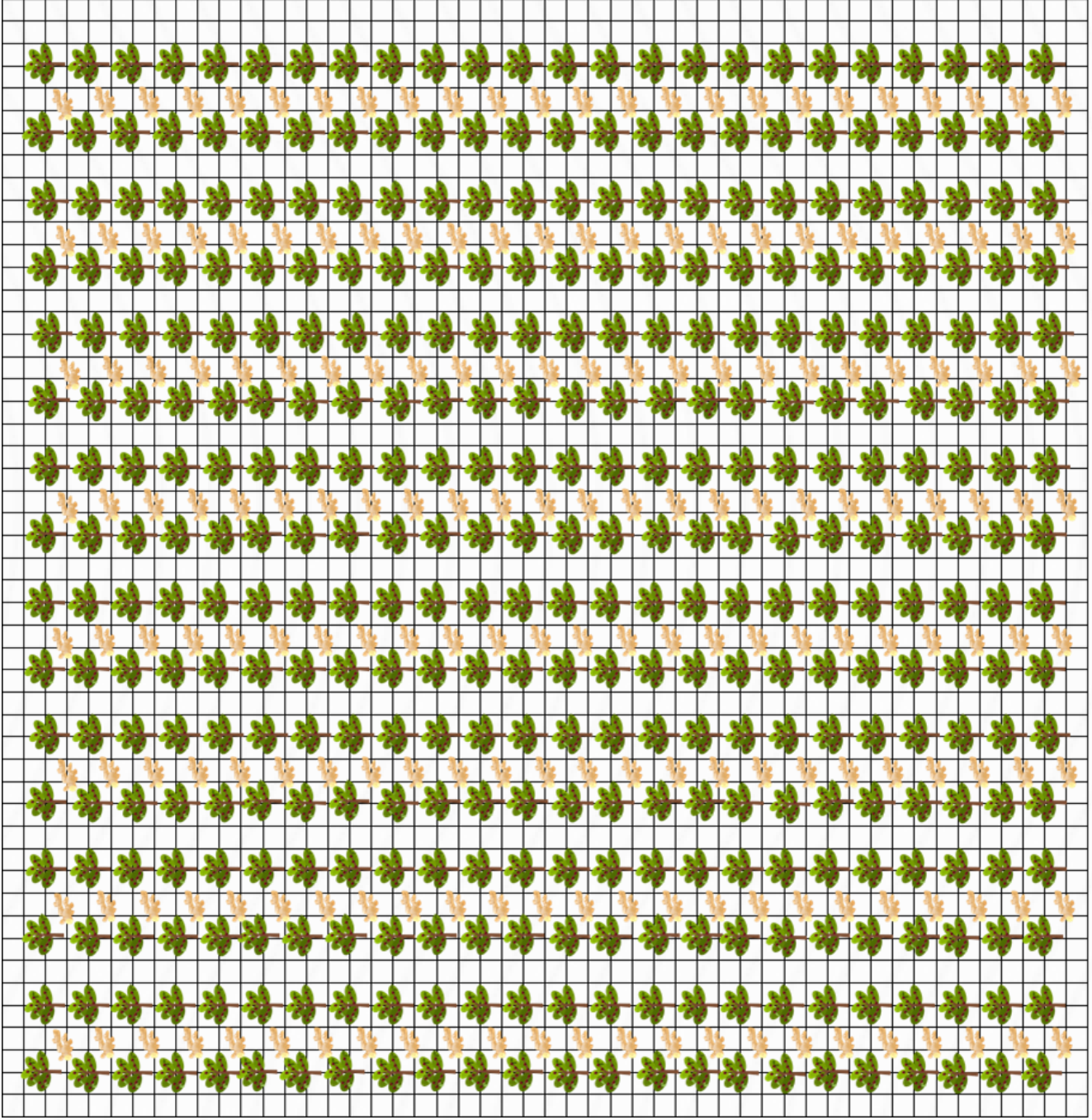
Coffee + Ginger



Coffee



Ginger



## Summary of Particulars: Model 3, Bukidnon

Production									
Crop	Spacing	No. of Trees / ha.	Production (kg/ tree)	Production (ha./yr.	Cost of Establishment/tree	Total Cost of Establishment			
Coffee	2m. x 3m.	1,667	1	1,667 kgs.	96	160,032			
Ginger	0.5 x 0.3 planted in between row of 3m. x 100m. x 16 alternating rows (4,800m <sup>2</sup> )	32,000	0.360kg./hill	11,520 kgs.	282,060	282,060			
<b>Total Establishment Cost of Model</b>						<b>442,092</b>			
Financials									
	Yield	Gross Income		Production Cost		Net Income	ROI (%)	Payback Period	
		Price/kg.	Sale	Cost/kg.	Total Cost				
Coffee	1,667	84	140,028	54.--	90,018	50,010	55	5 years	
Ginger	11,520	40	460,800	24.50	282,240	178,560	63	1 year	
<b>Total Net Income of Model</b>						<b>228,570</b>			

Cash Flow Model 3, Bukidnon	Year 1		Year 2		Year 3	
	Coffee	Ginger	Coffee	Ginger	Coffee	Ginger
Particulars						
Money Out						
Establishment Cost/Yield	78,349	97,928		97,928	0.5 kgs.	97,928
Maintenance Cost			26,033		26,033	
Depreciation Cost					7,759	
Harvesting Cost					29,655	
Total – Money Out	78,349	97,928	26,033	97,928	63,448	97,928
Money In						
Total – Harvest		11,520 kgs.		11,520 kgs.	801 kgs.	11,520 kgs.
Sales from Harvest		460,800		460,800	67,284	460,800
Money In – Money Out						
Net Income/Loss	78,349	362,872	26,033	362,872	3,836	362,872
Total – Year End	284,532		336,839	262,872	366,708	
Year End Balance	284,532		621,362		988,070	





# Bukidnon Model 4:

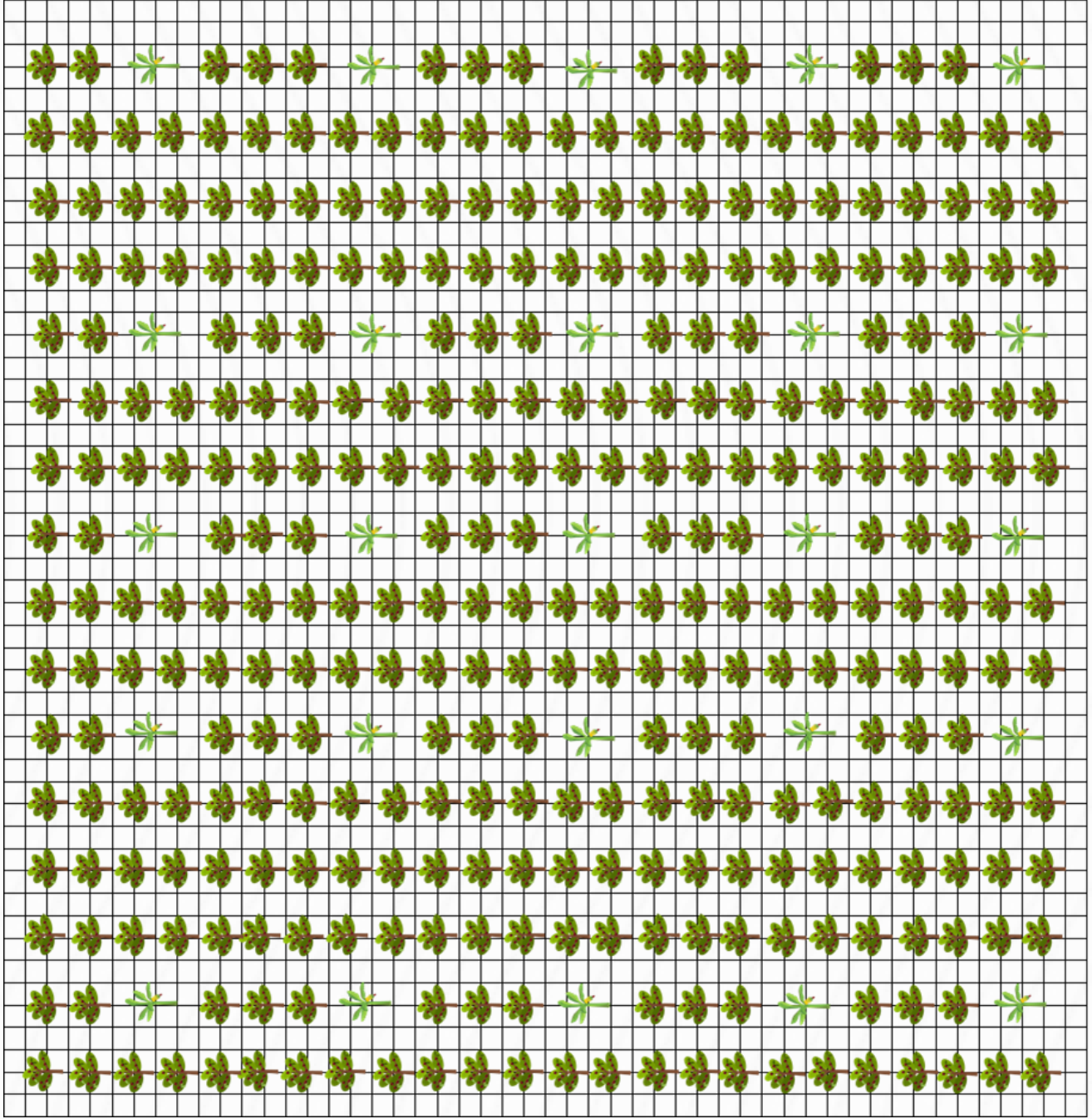
Coffee + Banana



Coffee



Banana





## Summary of Particulars: Model 4, Bukidnon

Production									
Crop	Spacing	No. of Trees / ha.	Production (kg/tree)	Production (ha./yr.	Cost of Establishment/tree	Total Cost of Establishment			
Coffee	2m. x 3m.	1,667	1	1,667 kgs.	96	160,032			
Banana									
Saba	10m. x 10m.	100 mats	160	16,000	489/tree	48,900*			
Lakatan	10m. x 10m.	100 mats	80	8,000	489/tree	48,900*			
<b>Total Establishment Cost of Model</b>						<b>208,932</b>			
Financials									
	Yield	Gross Income		Production Cost		Net Income	ROI (%)	Payback Period	
		Price/kg.	Sale	Cost/kg.	Total Cost				
Coffee	1,667	84	140,028	54.--	90,018	50,010	55	5 years	
Banana									
Saba	16,000	10.--	160,000	2.30	36,800	124,000	187	2 years	
Lakatan	8,000	19.--	152,000	2.30	18,400	133,600	147	2 years	
<b>Total Net Income of Model</b>									
						<b>Coffee + Saba</b>			<b>174,010</b>
						<b>Coffee + Lakatan</b>			<b>183,610</b>

\*either of the two types

Cash Flow Model 4, Bukidnon	Year 1		Year 2		Year 3	
	Coffee	Lakatan Banana	Coffee	Lakatan Banana	Coffee	Lakatan Banana
Particulars						
Money Out						
Establishment Cost/Yield	78,349	30,154			0.5 kgs.	80 kgs.
Maintenance Cost			27,072	25,040	27,072	25,040
Depreciation Cost					8,068	4,893
Harvesting Cost					30,821	6,768
Total – Money Out	78,349	30,154	27,072	25,040	65,961	36,701
Money In						
Total – Harvest					833 kgs.	8,000
Sales from Harvest					69,972	152,000
Money In – Money Out						
Net Income/Loss	78,349	30,154	27,072	25,040	4,011	115,299
Total – Year End	108,503		52,112		119,310	
Year End Balance	108,503		160,615		41,305	

Particulars	Year 4		Year 5	
	Coffee	Lakatan Banana	Coffee	Lakatan Banana
Money Out				
Establishment Cost/Yield	1.0 kg.	80 kgs.		
Maintenance Cost	27,072	25,040		
Depreciation Cost	8,068	4,893		
Harvesting Cost	61,642	6,768		
Total – Money Out	96,782	36,701		
Money In				
Total – Harvest	1,667	8,000		
Sales from Harvest	140,028	152,000		
Money In – Money Out				
Net Income/Loss	43,246	115,299		
Total – Year End	158,545			
Year End Balance	117,240			

# Bukidnon Model 5:

Coffee + Banana + Falcata +  
Fruit tree (Rambutan)



Coffee



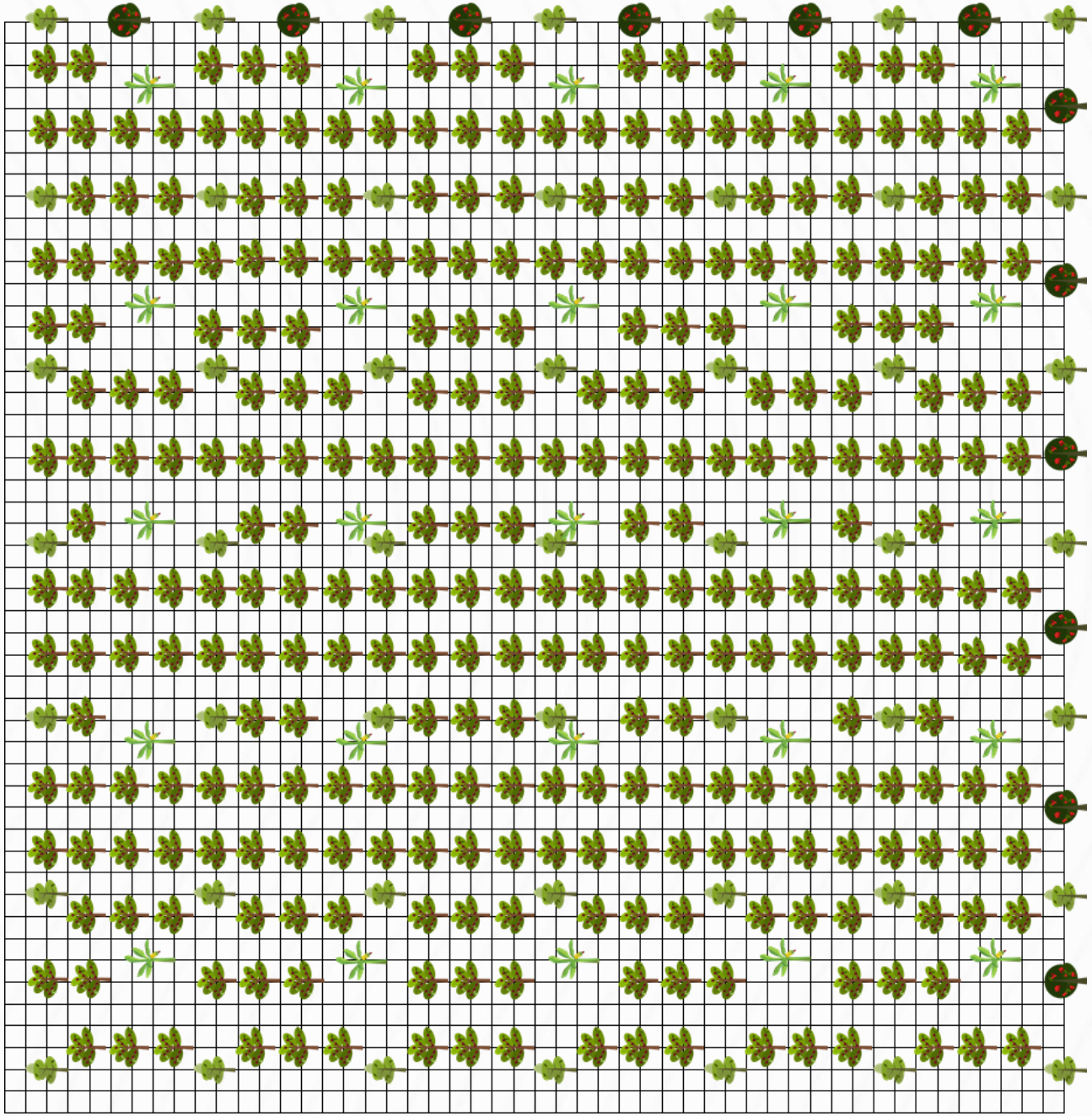
Banana



Falcata



Fruit Tree (Rambutan)



## Summary of Particulars: Model 5, Bukidnon

Production													
Crop	Spacing	No. of Trees / ha.	Production (kg/tree)		Production/ ha./yr.	Cost of Establishment/ tree	Total Cost of Establishment	Financials					
			Cost/kg.	Total Cost				Gross Income	Net Income	ROI (%)	Payback Period		
Coffee	2m. x 3m.	1,619	1		1,619	96	155,424						
Banana													
Saba	10m. x 10m.	100 mats	160 kgs.		16,000	489/tree	48,900*						
Lakatan	10m. x 10m.	100 mats	80 kgs.		8,000	489/tree	48,900*						
Falcata	8m. x 8m.	196	2.5 cu.m. /tree*2		n.a.	289.--	56,644						
Fruit tree*	8m. (perimeter)	48	100 kgs.		4,800	1,255.--	60,240						
<b>Total Establishment Cost of Model</b>							<b>321,208</b>						
Financials													
	Yield	Gross Income		Production Cost		Net Income	ROI (%)	Payback Period					
		Price/kg.	Sale	Cost/kg.	Total Cost								
Coffee	1,619	84	135,996	54.--	87,426	48,570	55	5 years					
Banana													
Saba	16,000	10.--	160,000	2.30	36,800	124,000	187	2 years					
Lakatan	8,000	19.--	152,000	2.30	18,400	133,600	147	2 years					
Falcata	490 cu.m.	1,800/ cu.m.	882,000	(n.a)	107,824	774,176	717	10 years					
Fruit tree*	4,800	20.--	96,000	10,000	48,000	48,000	100	5 years					
<b>Net Income for Model</b>							<b>1,004,346</b>						

\*Rambutan \*1Either crop \*210 year period



Cash Flow Model 5, Bukidnon	Year 1					Year 2					Year 3				
	Coffee	Lakatan Banana	Falcata	Rambutan		Coffee	Lakatan Banana	Falcata	Rambutan		Coffee	Lakatan Banana	Falcata	Rambutan	
Money Out															
Establishment Cost/ Yield	76,175	30,154	3,956	17,787							80 kgs				
Maintenance Cost					26,293	25,040	8,304	14,160		26,293	25,040	8,304	14,160		
Depreciation Cost										7,836	4,893				
Harvesting Cost										29,952	6,768				
Total – Money Out	76,175	30,154	3,956	17,787	26,293	25,040	8,304	14,160		64,081	36,701	8,304	14,160		
Money In															
Total – Harvest										809 kgs.	8,000				
Sales from Harvest										67,956	152,000				
Money In – Money Out															
Net Income/Loss	76,175	30,154	3,956	17,787	26,293	25,040	8,304	14,160		3,875	115,299	8,304	14,160		
Total – Year End	128,072				73,797					96,710					
Year End Balance	128,072				201,869					105,159					

Particulars	Year 4					Year 5					Year 6					
	Coffee	Lakatan Banana	Falcata	Rambutan	Coffee	Lakatan Banana	Falcata	Rambutan	Coffee	Lakatan Banana	Falcata	Rambutan	Coffee	Lakatan Banana	Falcata	Rambutan
Money Out																
Establishment Cost/ Yield	1.0 kg.	80 kgs.			1.0 kg.	80 kgs.		40 kgs.	1.5 kgs	Re-planting		80 kgs.				80 kgs.
Maintenance Cost	26,293	25,040	8,304	14,160	26,293	25,040	8,304	14,160	26,293		8,304	14,160	26,293		8,304	14,160
Depreciation Cost	7,836	4,893			7,836	4,893		3,010	7,836			3,010	7,836			3,010
Harvesting Cost	59,904	6,768			59,904	6,768		5,510	89,856			11,020	89,856			11,020
Total – Money Out	92,780	36,701	8,304	14,160	94,033	36,701	8,304	22,680	123,985		8,304	28,190	123,985		8,304	28,190
Money In																
Total – Harvest	1,619 kgs.	8,000			1,619	8,000		1,920 kgs.	2,428			3,840	2,428			3,840
Sales from Harvest	135,996	152,000			135,996	152,000		38,400	203,994			76,800	203,994			76,800
Money In – Money Out																
Net Income/Loss	43,216	115,299	8,304	14,160	41,963	115,299	8,304	15,720	80,009		8,304	48,610	80,009		8,304	48,610
Total – Year End	136,051				164,678				120,315				120,315			
Year End Balance	30,892				195,57				315,885				315,885			

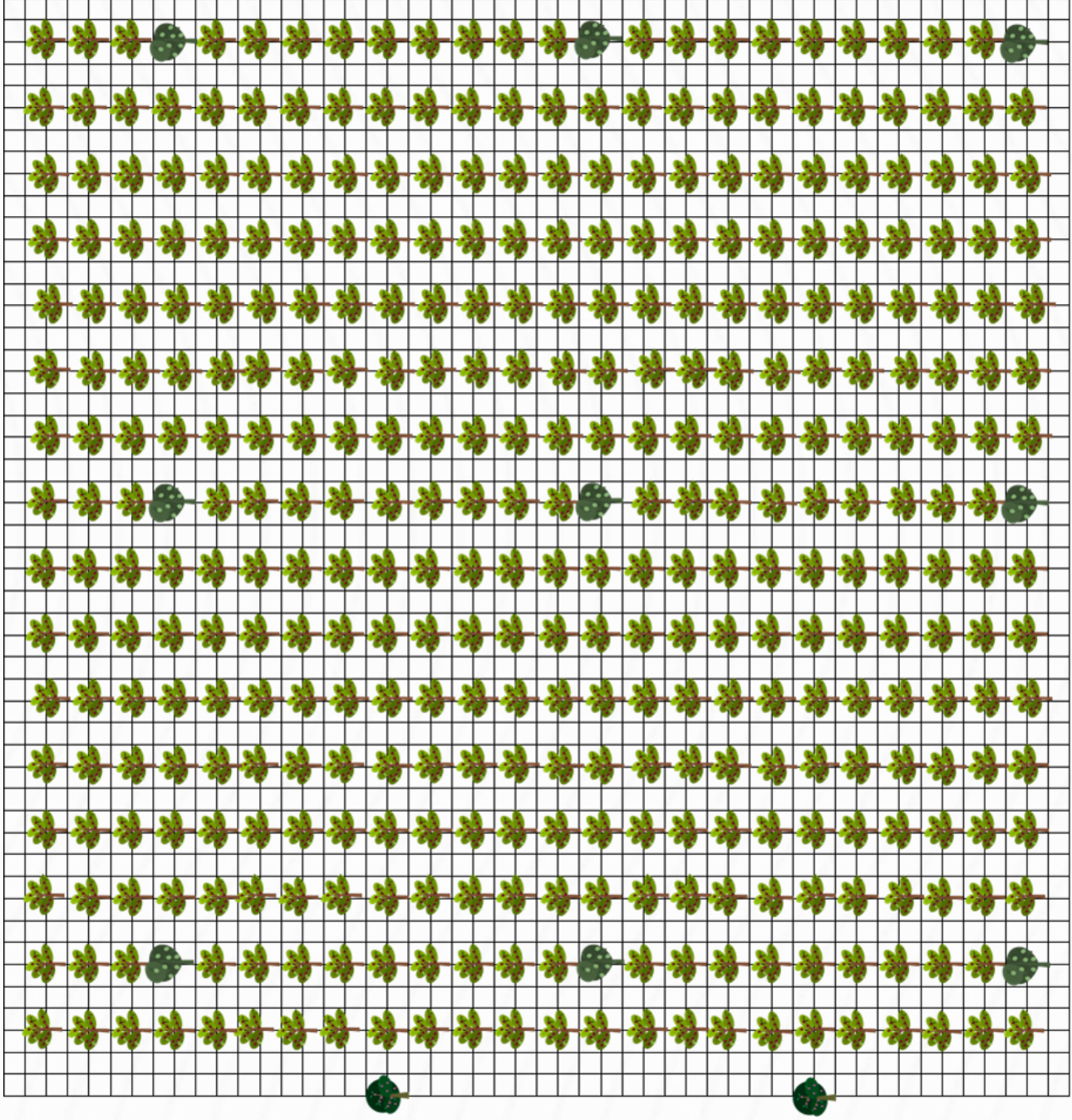
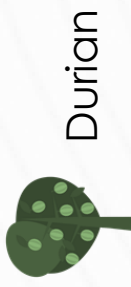
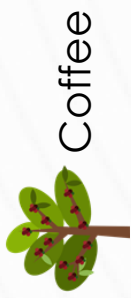
Year 7				
Particulars	Coffee	Lakatan Banana	Falcata	Rambutan
Money Out		Replanting		
Establishment Cost/ Yield	1.5 kgs.		2.5 cu.m./ tree	100 kgs.
Maintenance Cost	26,293			14,160
Depreciation Cost	7,836			3,010
Harvesting Cost	89,856		147,000	13,776
Total – Money Out	123,985		147,000	30,946
Money In				
Total – Harvest	2,428		490 cu.m.	4,800
Sales from Harvest	203,994		882,000	96,000
Money In – Money Out				
Net Income/Loss	80,009	735,000	65,054	
Total – Year End	880,063			
Year End Balance	1,195,948			

# **Sultan Kudarat:** Intercropping Models and Summary of Particulars



# Sultan Kudarat Model 1:

Coffee + Durian + Mangosteen





## Summary of Particulars: Model 1, Sultan Kudarat

Production									
Crop	Spacing	No. of Trees / ha.	Production (kg/tree)		Production/ ha./yr.	Cost of Establishment/tree	Total Cost of Establishment		
Coffee	2m x 3m	1,584	1 kg.		1,584 GCB	96.--	151,525		
Durian	20m x 14m	36	100 kgs.		3,600 kgs.	1,255	45,180		
Mangosteen	20m along the perimeter	20	100 kgs.		2,000 kgs.	1,709	34,180		
<b>Total Cost of Model</b>							<b>230,885</b>		
Financials									
Yield	Gross Income		Production Cost		Net Income	ROI (%)	Payback Period (years)		
	Price/kg.	Sale	Cost/kg	Total Cost					
Coffee	1,584	84.--	133,056	54.--	85,536	47,520	54	5	
Durian	3,600	40.--	144,000	5.--	18,000	126,000	706	5	
Mangosteen	2,000	30	60,000	5.--	10,000	50,000	513	8	
<b>Total Net Income/year</b>							<b>223,520</b>		

Cash Flow Model 1, Sultan Kudarat	Year 1				Year 2				Year 3			
	Coffee	Durian	Mangosteen		Coffee	Durian	Mangosteen		Coffee	Durian	Mangosteen	
Particulars												
Money Out												
Establishment Cost/Yield*1	78,434	11,347	6,304					0.5 kgs.				
Maintenance Cost*3					25,464	10,610	3,340	25,464	10,610	3,340		3,340
Depreciation Cost								7,675				
Harvesting Cost								29,304				
Total – Money Out	78,434	11,347	6,304		25,464	10,610	3,340	62,443	10,610	3,340		3,340
Money In												
Total – Harvest								792 kgs.				
Sales from Harvest								66,528				
Money In – Money Out												
Net Income/Loss	78,434	11,347	6,304		25,464	10,610	3,340	4,085	10,610	3,340		3,340
Total – Year End	96,085				39,414			9,865				
Year End Balance	96,085				135,499			145,364				

Particulars	Year 4			Year 5			Year 6		
	Coffee	Durian	Mangosteen	Coffee	Durian	Mangosteen	Coffee	Durian	Mangosteen
Money Out									
Establishment Cost/Yield*1	1.0 kg.			1.0 kgs.	25 kgs.		1.5 kgs.	50 kgs.	
Maintenance Cost**3	25,464	10,610	3,340	25,464	10,610	3,340	25,464*3	10,610	3,340
Depreciation Cost	7,675			7,675	2,258		7,675	2,258	
Harvesting Cost	58,608			58,608	865		87,912*2	1,730	
Total – Money Out	91,747	10,610	3,340	91,747	13,733	3,340	121,051	14,598	3,340
Money In									
Total – Harvest	1,584 kgs.			1,584 kgs.	900 kgs.		2,376 kgs.	1,800 kgs.	
Sales from Harvest	133,056			133,056	36,000		199,584	72,000	
Money In – Money Out									
Net Income/Loss	41,309	10,610	3,340	41,309	22,267	3,340	78,533	57,402	3,340
Total – Year End	27,359			60,236			132,595		
Year End Balance	118,005			57,769			74,826		

	Year 7		
*Particulars	Coffee	Durian	Mangosteen
Money Out			
Establishment Cost/Yield*1	1.5 kgs.	100 kgs.	50 kgs.
Maintenance Cost*3	25,464	10,610	3,340
Depreciation Cost	7,675	2,258	684
Harvesting Cost	87,912	3,460	3,599
Total – Money Out	121,051	16,328	7,623
Money In			
Total – Harvest	2,376 kgs.	3,600 kgs.	1,000 kgs.
Sales from Harvest	199,584	144,000	30,000
Money In – Money Out			
Net Income/Loss	78,533	127,672	22,377
Total – Year End	228,582	Income starts on year 7 for Model 1	
Year End Balance	303,408		

\*1per tree \*237.18/kg. \*316.24/tree





# Sultan Kudarat Model 2:

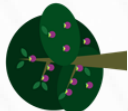
Coffee + Durian + Mangosteen  
+ Coconut



Coffee



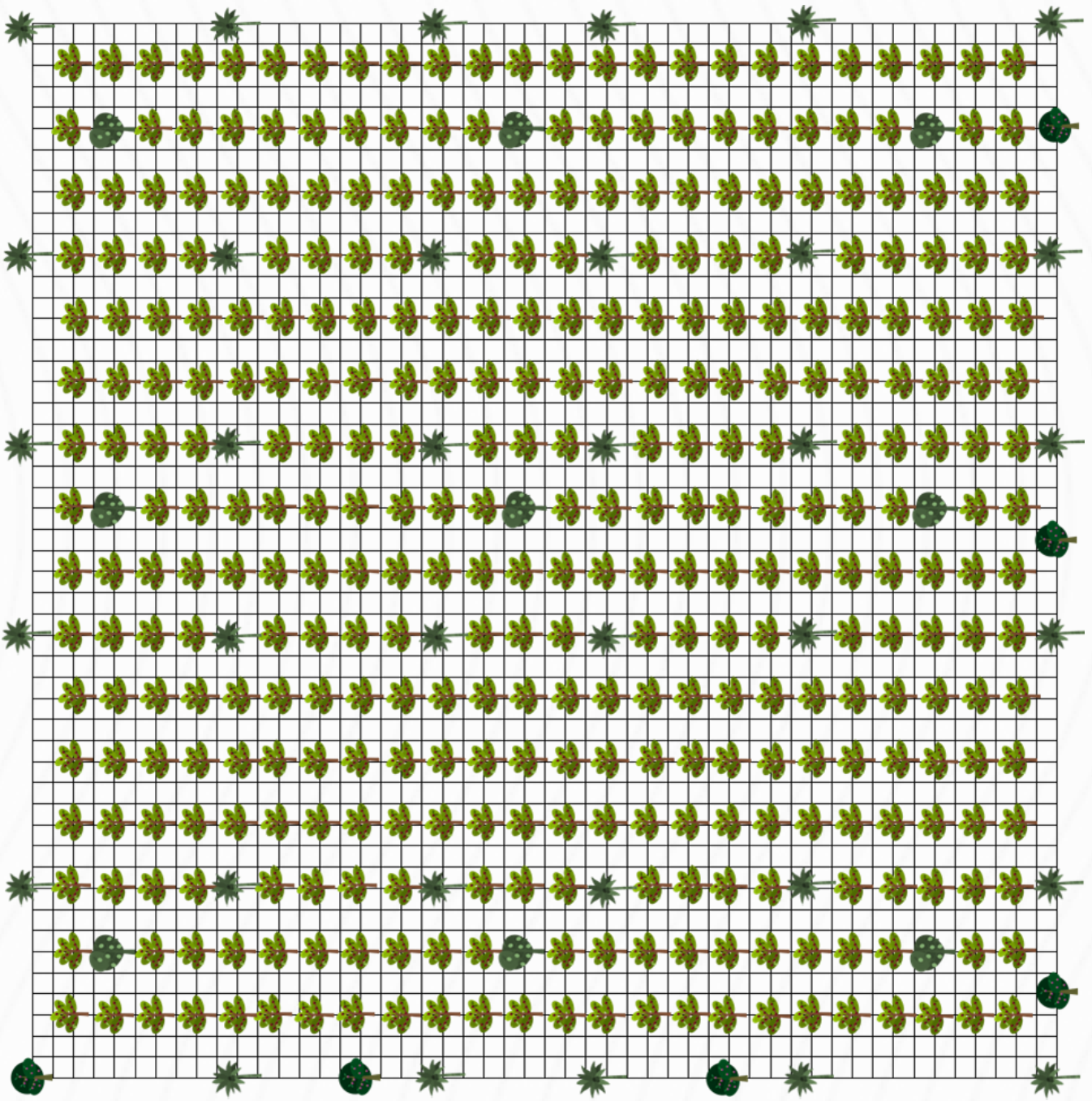
Durian



Mangosteen



Coconut



## Summary of Particulars: Model 2, Sultan Kudarat

Production									
Crop	Spacing	No. of Trees / ha.	Production (kg/tree)	Production/ ha./yr.	Cost of Establishment/tree	Total Cost of Establishment			
Coffee	2m x 3m	1,581	1 kg.	1,581 GCB	96.00	151,776.00			
Durian	20m x 14m	36	100 kgs.	3,600 kgs.	1,255.00	45,180.00			
Mangosteen	20m along the perimeter	20	100 kgs.	2,000kgs.	1,709.00	34,180.00			
Coconut	10m x 10m	100	104 nuts	10,400 nuts	726.34	72,634.00			
						<b>Total Cost of Model</b>	<b>303,770.00</b>		
Financials									
	Yield	Gross Income		Production Cost		Net Income	ROI (%)	Payback Period	
		Price/kg.	Sale	Cost/kg.	Total Cost				
Coffee	1,581 kgs.	84.00	132,804	54.00	85,374	47,430	55	5	
Durian	3,600 kgs.	40.00	144,000	5.00	18,000	126,000	706	5	
Mangosteen	2,000 kgs.	30.00	60,000	5.00	10,000	50,000	513	8	
Coconut	10,400 nuts	18.00	187,200	8.50	88,400	98,800	112	6	
						<b>Net Income/year for Model</b>	<b>322,230</b>		

Cash Flow Model 2, Sultan Kudarat	Year 1					Year 2					Year 3				
	Coffee	Durian	Mangosteen	Coconut		Coffee	Durian	Mangosteen	Coconut		Coffee	Durian	Mangosteen	Coconut	
Particulars															
Money Out															
Establishment Cost/ Yield	74,307	11,347	6,304	23,874						0.5 kgs.					
Maintenance Cost					25,296	10,610	3,340	9,752		25,296	10,610	3,340	9,752		9,752
Depreciation Cost										7,562					
Harvesting Cost										58,497					
Total – Money Out	74,307	11,347	6,304	23,874	25,296	10,610	3,340	9,752		91,355	10,610	3,340	9,752		9,752
Money In															
Total – Harvest										790 kgs.					
Sales from Harvest										66,360					
Money In – Money Out															
Net Income/Loss	74,307	11,347	6,304	23,874	25,296	10,610	3,340	9,752		24,995	10,610	3,340	9,752		9,752
Total – Year End	115,832				48,998					48,697					
Year End Balance	115,832				164,830					213,527					

Particulars	Year 4					Year 5					Year 6				
	Coffee	Durian	Mangosteen	Coconut		Coffee	Durian	Mangosteen	Coconut		Coffee	Durian	Mangosteen	Coconut	
Money Out															
Establishment Cost/ Yield	1.0 kg.					1.0 kg.	25 kgs.				1.5 kgs.	50 kgs.			
Maintenance Cost	25,296	10,610	3,340	9,752		25,296	10,610	3,340	9,752		25,296	10,610	3,340	9,752	
Depreciation Cost	7,562					7,562	2,258				7,562	2,258			
Harvesting Cost	58,497					58,497	865				87,746	1,730			
Total – Money Out	91,355	10,610	3,340	9,752		91,355	13,733	3,340	9,752		120,604	14,598	3,340	9,752	
Money In															
Total – Harvest	1,581 kgs.					1,581 kgs.	900 kgs.				2,372 kgs.	1,800			
Sales from Harvest	132,804					132,804	36,000				199,206	72,000			
Money In – Money Out															
Net Income/Loss	41,449	10,610	3,340	9,752		41,449	22,267	3,340	9,752		78,602	57,402	3,340	9,752	
Total – Year End	17,747					50,624					122,912				
Year End Balance	195,780					145,156					22,244				

Particulars	Year 7					Year 8				
	Coffee	Durian	Mangosteen	Coconut	Coconut	Coffee	Durian	Mangosteen	Coconut	
<b>Money Out</b>				8.19/ Nut Harvesting Cost						
<b>Establishment Cost/Yield</b>	1.5 kgs.	100 kgs.	50 kgs.	26 Nuts.	100 kgs.	100 kgs.	100 kgs.	100 kgs.	52 Nuts	
<b>Maintenance Cost</b>	25,296	10,610	3,340	9,752	10,610	10,610	3,340	3,340	9,752	
<b>Depreciation Cost</b>	7,562	2,258	684	291	2,258	2,258	684	684	291	
<b>Harvesting Cost</b>	87,746	1,730	3,599	21,294	1,730	1,730	3,599	3,599	42,588	
<b>Total – Money Out</b>	120,604	14,598	7,623	31,337	14,598	14,598	7,623	7,623	52,631	
<b>Money In</b>										
<b>Total – Harvest</b>	2,372 kgs.	3,600 kgs.	1,000 kgs.	2,600 Nuts.	3,600 kgs.	3,600 kgs.	2,000 kgs.	2,000 kgs.	5,200 Nuts	
<b>Sales from Harvest</b>	199,206	144,000	30,000	46,800	144,000	144,000	60,000	60,000	93,600	
<b>Money In – Money Out</b>										
<b>Net Income/Loss</b>	78,602	129,402	22,377	15,463	129,402	129,402	52,377	52,377	40,969	
<b>Total – Year End</b>	245,844									
<b>Year End Balance</b>	223,600									





# Sultan Kudarat Model 3:

Coffee + Durian + Mangosteen  
+ Coconut + Corn



Coffee



Durian



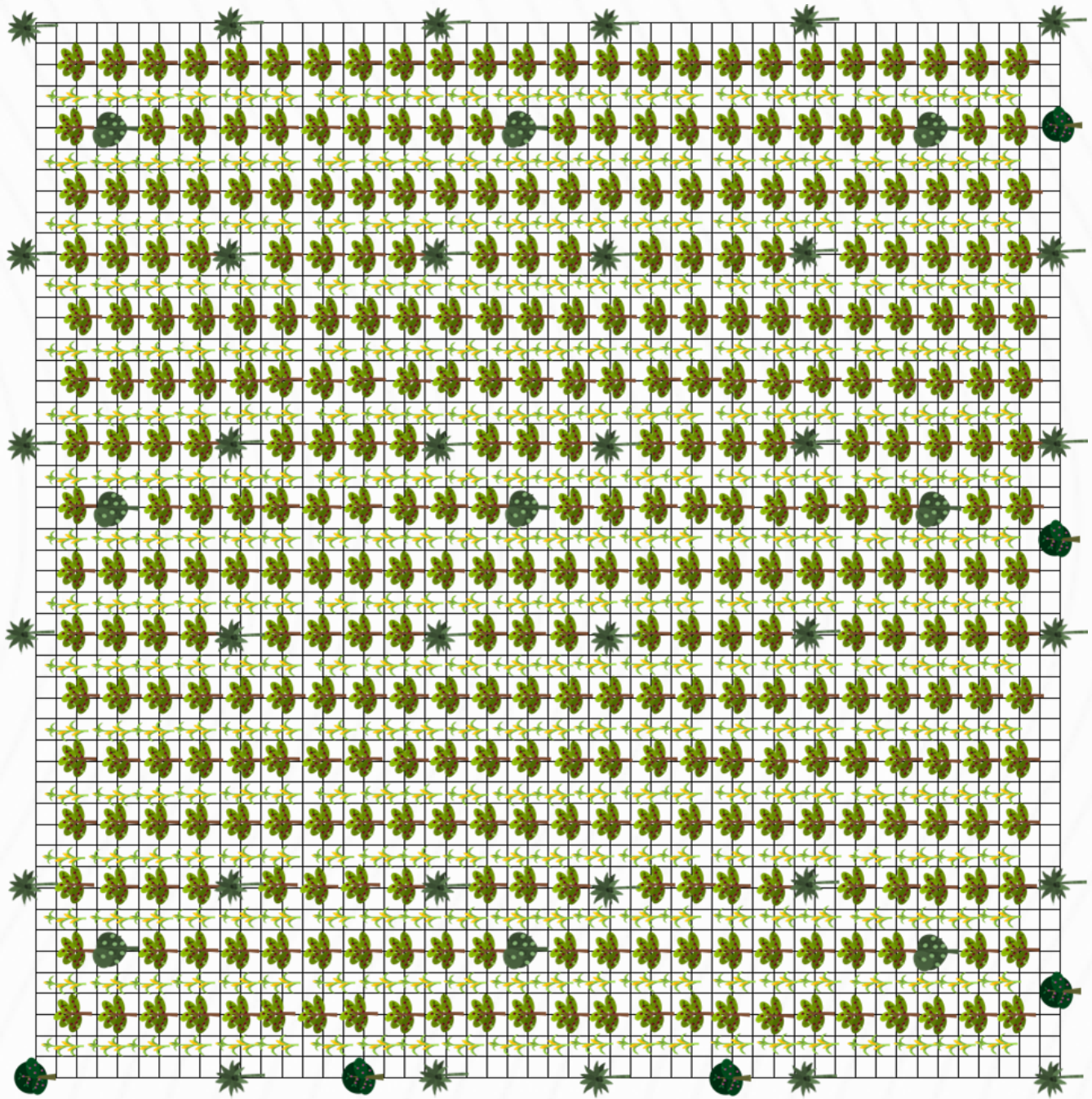
Mangosteen



Coconut



Corn



## Summary of Particulars: Model 3, Sultan Kudarat

Production									
Crop	Spacing	No. of Trees / ha.	Production (kg/tree)	Production/ha./yr.	Cost of Establishment/ tree	Total Cost of Establishment			
<b>Coffee</b>	2m x 3m	1,581	1 kg.	1,581 GCB	96	151,776			
<b>Durian</b>	20m x 14m	36	100 kgs.	3,600 kgs.	1,255	45,180			
<b>Mangosteen</b>	20m along the perimeter	20	100 kgs.	2,000kgs.	1,709	34,180			
<b>Coconut</b>	10m x 10m	100	104 nuts	10,400 nuts	726.34	72,634			
<b>Hybrid Corn</b>	30cm. x 75cm. in 32 rows x 100m.	26,640	3,812 kgs./ha.	3,812/cropping	42,150/ha.	41,436.			
						<b>Total Establishment Cost of Model</b>			
<b>Financials</b>									
	Yield	Gross Income		Production Cost		Net Income	ROI (%)	Payback Period	
		Price/kg.	Sale	Cost/kg.	Total Cost				
<b>Coffee</b>	1,581 kgs.	84.--	132,804	54.	85,374	47,430	55	5	
<b>Durian</b>	3,600 kgs.	40.--	144,000	5.	18,000	126,000	706	5	
<b>Mangosteen</b>	2,000 kgs.	30.--	60,000	5.	10,000	50,000	513	8	
<b>Coconut</b>	10,400 nuts	18.--	187,200	8.50	88,400	98,800	112	6	
<b>Hybrid Corn</b>	3,812 kgs.	15.--	57,180	10.87	41,436	15,743	38	Per cropping	
						<b>Net Income/year for Model</b>	<b>337,973</b>		

Cashflow Model 3, Sultan Kudarat	Year 1						Year 2					
	Coffee	Durian	Mangosteen	Coconut	Hybrid Corn		Coffee	Durian	Mangosteen	Coconut	Hybrid Corn	
Particulars												
Money Out												
Establishment Cost/Yield	74,307	11,347	6,304	23,874	41,436					41,436		
Maintenance Cost							25,296	10,610	3,340	9,752		
Depreciation Cost												
Harvesting Cost												
Total – Money Out	74,307	11,347	6,304	23,874	41,436		25,296	10,610	3,340	9,752	41,436	
Money In												
Total – Harvest											3,812 kgs.	
Sales from Harvest											57,180	
Money In – Money Out												
Net Income/Loss	74,307	11,347	6,304	23,874	15,743		25,296	10,610	3,340	9,752	15,743	
Total – Year End	115,832						48,998					
Year End Balance	115,832						164,830					

Year 3						
Particulars	Coffee	Durian	Mangosteen	Coconut	Hybrid Corn	
Money Out						
Establishment Cost/Yield	0.5 kgs.					
Maintenance Cost	25,296	10,610	3,340	9,752		
Depreciation Cost	7,562					
Harvesting Cost	58,497					
Total – Money Out	91,355	10,610	3,340	9,752		
Money In						Stop Planting
Total – Harvest	790 kgs.					
Sales from Harvest	66,360					
Money In – Money Out						
Net Income/Loss	24,995	10,610	3,340	9,752		
Total – Year End	48,697					
Year End Balance	213,527					



# Sultan Kudarat

## Model 4:

Coffee + Durian + Mangosteen  
+ Corn



Coffee



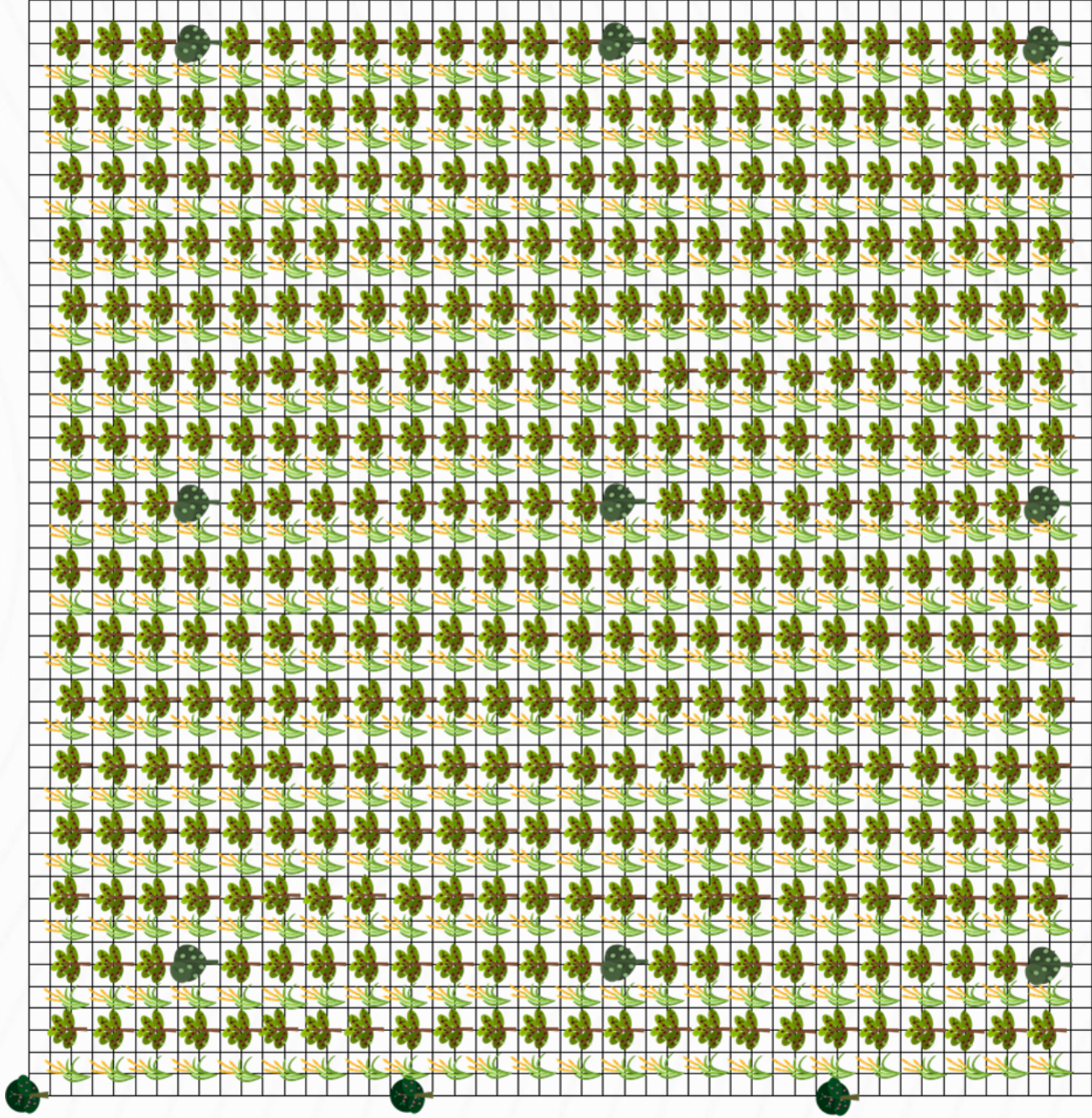
Durian



Mangosteen



Upland rice



## Summary of Particulars: Model 4, Sultan Kudarat

Production									
Crop	Spacing	No. of Trees / ha.	Production (kg/tree)	Production/ha. /yr.	Cost of Establishment/ tree	Total Cost of Establishment			
Coffee	2m x 3m	1,581	1 kg.	1,581 GCB	96	151,776			
Durian	20m x 14m	36	100 kgs.	3,600 kgs.	1,255	45,180			
Mangosteen	20m along the perimeter	20	100 kgs.	2,000 kgs.	1,709	34,180			
Upland Rice	0.3m x 0.5m in 34 rows of 3m. x 100m.	67,932	2,440 kgs. /ha.	2,440 kgs. /ha.	14,166/ha.	14,166			
<b>Total Establishment Cost of Model</b>						<b>245,302</b>			
Financials									
Yield	Gross Income		Production Cost		ROI (%)	Payback Period			
	Price/kg.	Sale	Cost/kg.	Total Cost			Net Income		
1,581 kgs.	84	132,804	54	85,374	55	5			
3,600 kgs.	40	144,000	5	18,000	706	5			
2,000 kgs.	30	60,000	5	10,000	513	8			
2,440	18	43,920	8.17	32,696	34	Per cropping			
<b>Total Net Income of Model</b>						<b>200,039</b>			

Cash Flow Model 4, Sultan Kudarat	Year 1				Year 2				Year 3			
	Coffee	Durian	Mangosteen	Upland Rice	Coffee	Durian	Mangosteen	Upland Rice	Coffee	Durian	Mangosteen	Upland Rice
Particulars												
Money Out												Area =50% of Population
Establishment Cost/ Yield	74,307	11,347	6,304	14,166				14,166	0.5 kgs.			7,083
Maintenance Cost					25,296	10,610	3,340		25,296	10,610	3,340	
Depreciation Cost									7,562			
Harvesting Cost				18,530				18,530	58,497			9,265
Total – Money Out	74,307	11,347	6,304	32,696	25,296	10,610	3,340	32,696	91,355	10,610	3,340	16,348
Money In												
Total – Harvest				2,440 kgs.				2,440 kgs.	790 kgs.			1,220 kgs.
Sales from Harvest				43,920				43,920	66,360			21,960
Money In – Money Out												
Net Income/Loss	74,307	11,347	6,304	11,224	25,296	10,610	3,340	11,224	24,995	10,610	3,340	5,612
Total – Year End	80,734				28,022				33,333			
Year End Balance	80,734				108,756				142,089			

Particulars	Year 4				Year 5				Year 6			
	Coffee	Durian	Mangosteen	Upland Rice	Coffee	Durian	Mangosteen	Upland Rice	Coffee	Durian	Mangosteen	Upland Rice
Money Out												
Establishment Cost/ Yield	1.0 kg.				1 kg.	25 kgs.			1.5 kgs.	50 kgs.		
Maintenance Cost	25,296	10,610	3,340		25,296	10,610	3,340		25,296	10,610	3,340	
Depreciation Cost	7,562				7,562	2,258			7,562	2,258		
Harvesting Cost	58,497				58,497	865			87,746	1,730		
Total – Money Out	91,355	10,610	3,340		91,355	13,733	3,340		120,604	14,598	3,340	
Money In												
Total – Harvest	1,581 kgs.				1,581 kgs.	900 kgs.			2,372 kgs.	1,800 kgs.		
Sales from Harvest	132,804				132,804	36,000			199,206	72,000		
Money In – Money Out												
Net Income/Loss	41,449	10,610	3,340		41,449	22,267	3,340		78,602	57,402	3,340	
Total – Year End	27,499					60,378			132,664			
Year End Balance	169,588					109,212			12,452			

Year 7				
Particulars	Coffee	Durian	Mangosteen	Upland Rice
Money Out				
Establishment Cost/ Yield	1.5 kgs.	100 kgs.	50 kgs.	
Maintenance Cost	25,296	10,610	3,340	
Depreciation Cost	7,562	2,258	684	
Harvesting Cost	87,746	1,730	3,599	
Total – Money Out	120,604	14,598	7,623	
Money In				Stop Planting
Total – Harvest	2,372 kgs.	3,600 kgs.	1,000 kgs.	
Sales from Harvest	199,206	144,000	30,000	
Money In – Money Out				
Net Income/Loss	78,602	129,402	22,377	
Total – Year End	230,381			
Year End Balance	253,833			





# Sultan Kudarat

## Model 5:

Coffee + Durian + Mangosteen  
+ Peanut + Corn



Coffee



Durian



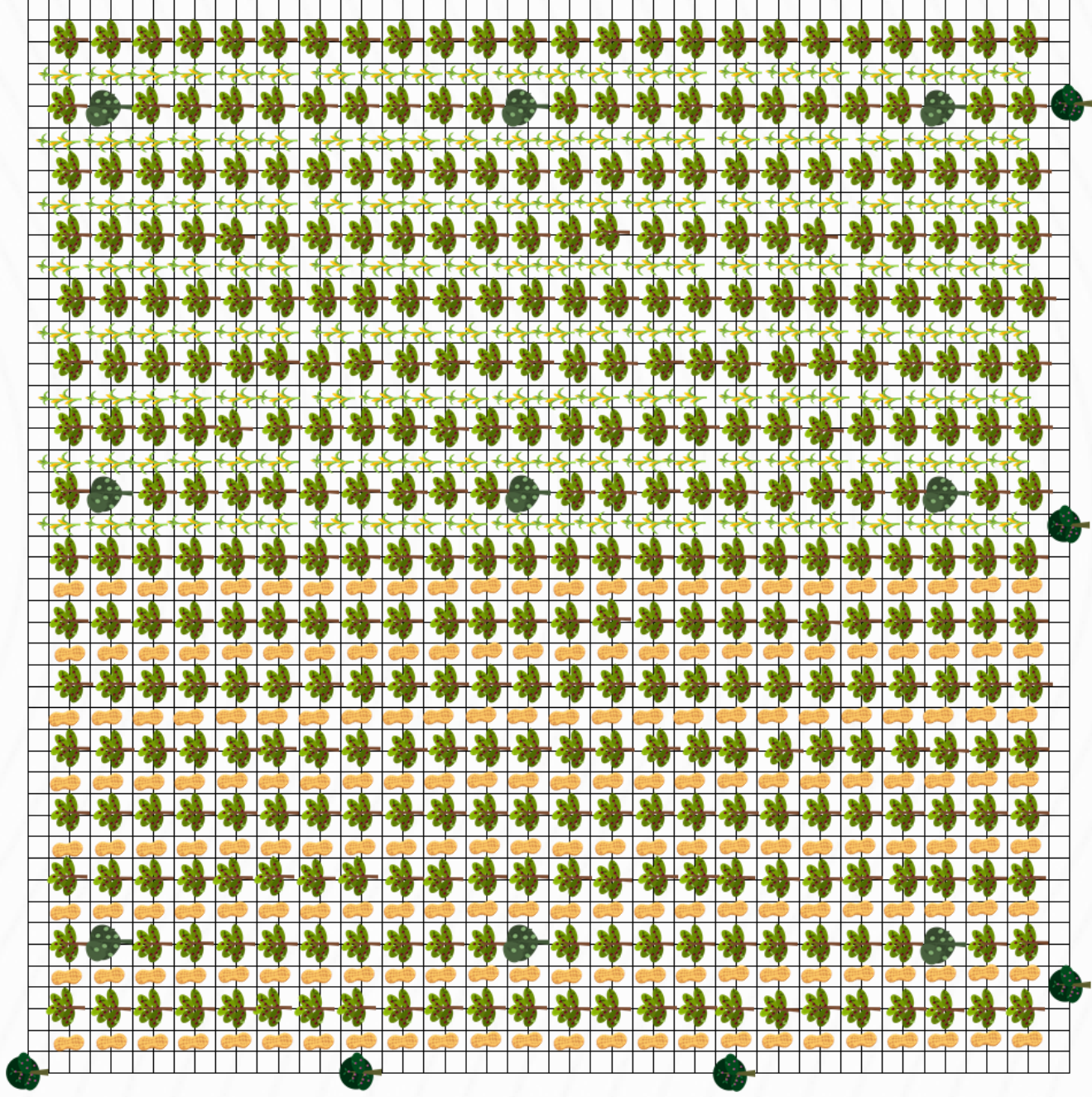
Mangosteen



Peanut



Corn



## Summary of Particulars: Model 5, Sultan Kudarat

Production									
Crop	Spacing	No. of Trees / ha.		Production (kg/tree)	Production/ha./yr.	Cost of Establishment/tree	Total Cost of Establishment		
Coffee	2m x 3m	1,581	1 kg.	1 kg.	1,581 GCB	96	151,776		
Durian	20m x 14m	36	100 kgs.	100 kgs.	3,600 kgs.	1,255	45,180		
Mangosteen	20m along the perimeter	20	100 kgs.	100 kgs.	2,000kgs.	1,709	34,180		
Hybrid Corn	30cm. x 75cm. in 16 rows of 3m. x 100m. (4,800m <sup>2</sup> area)	13,764 plants/ha. (30%)	1,202 kgs./ha.	1,202 kgs./ha.	1,202 kgs.	21,075	21,075		
Peanut	0.3m x 0.5m in 16 rows of 3m. x 100m. (4,800m <sup>2</sup> area)	32,000 plants (45%)	1,200 kgs./ha.	1,200 kgs./ha.	1,200 kgs.	44,330	44,330		
<b>Total Establishment Cost of Model</b>							<b>296,541</b>		
Financials									
	Yield	Gross Income		Production Cost		Net Income	ROI	Payback Period	
		Price/kg	Sale	Cost/kg	Total Cost				
Coffee	1,581 kgs.	84	132,804	54	85,374	47,430	55	5	
Durian	3,600 kgs.	40	144,000	5	18,000	126,000	706	5	
Mangosteen	2,000 kgs.	30	60,000	5	10,000	50,000	513	8	
Hybrid Corn	1,202 kgs.	15	18,030	10.87	13,066	4,964	38	Per cropping	
Peanut	1,200 kgs.	140	168,000	36.94	44,328	123,672	279	Per cropping	
<b>Total Net Income of Model</b>							<b>352,066</b>		

Cashflow Model 5, Sultan Kudarat	Year 1						Year 2					
	Coffee	Durian	Mangosteen	Hybrid Corn	Peanut		Coffee	Durian	Mangosteen	Hybrid Corn	Peanut	
Particulars												
Money Out												
Establishment Cost/Yield	74,307	11,347	6,304	20,395	25,080				20,395		25,080	
Maintenance Cost							25,296	10,610	3,340			
Depreciation Cost												
Harvesting Cost					10,022							
Total – Money Out	74,307	11,347	6,304	20,395	35,102		25,296	10,610	3,340		25,080	
Money In												
Total – Harvest				1,875 kgs.	1,200 kgs.					1,875 kgs.	1,200 kgs.	
Sales from Harvest				28,125	168,000					28,125	168,000	
Money In – Money Out												
Net Income/Loss	74,307	11,347	6,304	7,730	132,898		25,296	10,610	3,340		132,898	
Total – Year End	48,670						101,382					
Year End Balance	48,670						150,052					

Particulars	Year 3						Year 4					
	Coffee	Durian	Mangosteen	Hybrid Corn	Peanut		Coffee	Durian	Mangosteen	Hybrid Corn	Peanut	
Money Out												
Establishment Cost/Yield	0.5 kgs.						1.0 kg.					
Maintenance Cost	25,296	10,610	3,340			25,296	10,610	3,340				
Depreciation Cost	7,562					7,562						
Harvesting Cost	58,497					58,497						
Total – Money Out	91,355	10,610	3,340			91,355	10,610	3,340				
Money In												
Total – Harvest	790 kgs.						1,581 kgs.					
Sales from Harvest	66,360					132,804						
Money In – Money Out												
Net Income/Loss	24,995	10,610	3,340			41,449	10,610	3,340				
Total – Year End	38,945					27,499						
Year End Balance	111,107					83,608						



	Year 5						Year 6					
Particulars	Coffee	Durian	Mangosteen	Hybrid Corn	Peanut		Coffee	Durian	Mangosteen	Hybrid Corn	Peanut	
Money Out												
Establishment Cost/Yield	1.0 kg.	25 kgs.					1.5 kgs.	50 kgs.				
Maintenance Cost	25,296	10,610	3,340			25,296	10,610	3,340				
Depreciation Cost	7,562	2,258				7,562	2,258					
Harvesting Cost	58,497	865				87,746	1,730					
Total – Money Out	91,355	13,733	3,340			120,604	14,598	3,340				
Money In												
Total – Harvest	1,581 kgs.	900 kgs.				2,372 kgs.	1,800 kgs.					
Sales from Harvest	132,804	36,000				199,206	72,000					
Money In – Money Out												
Net Income /Loss	41,449	22,267	3,340			78,602	57,402	3,340				
Total – Year End	60,376					132,664						
Year End Balance	23,232					109,432						



## **D. Annex**

### **D.1. References & Sources**

Coffee: Growing, Processing, Sustainable Production  
A Guidebook for Growers, Processors, Traders and Researchers  
Jean Nicholas Wintgens, 2<sup>nd</sup> Edition Updated

Coconut Check: Ensuring Quality and Prouctivity in Coconut Production,  
Farm Management and Product Utilization. USDA/ ACIDI-VOCA/ Cocolink

PUR Project Pure Nescafe Plan, 2013  
Creating Shared Value/ Agroforestry

Crop Nutrition and Fertilization Management of Selected Tropical Industrial Tree Crops  
Severino S. Magat, 1<sup>st</sup> Edition 2005, PCArrd

GIZ/ Nestle Field Notes – Bukidnon and Sultan Kudarat Field Officers

Actual Footage of COFAM Farm demo slides – Bukidnon and Sultan Kudarat

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# Project Coffee+

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Implemented by



### Published by:

**Deutsche Gesellschaft für Internationale  
Zusammenarbeit (GIZ) GmbH**

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*1<sup>st</sup> Edition: August 2021*