MINAG

HILLSIDE AGRICULTURE SUB-PROJECT (HASP)

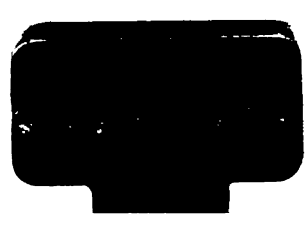
Costs and Returns Under Different Technology Packages for Fruit Trees

A. Shaun-Marie Grant
Jamaica, W.I.

December 1994

USAID

IICA



ISSN/0534-5391

Costs and Returns Under Different Technology Packages for Fruit Trees

A. Shaun-Marie Grant
Jamaica, W.I.

December 1994

MISCELLANEOUS PUBLICATION SERIES
ISSN-0534-5391
A2/JM-94/010

December 1994
Kingston, Jamaica

Acknowledgements

The Hillside Agriculture Sub-Project is a unique project in that it is a project staffed and executed by a multi-disciplinary team of specialists. It is in this vain, that this document is the outcome of the work of team effort and collaboration throughout all stages of its preparation. Therefore, I first wish to thank Messrs. E. Pinnock, E. Stone, Z. Annakie, HASP Agronomists, as well as Ms. J. Mayne and Messrs. H. Demetrius and G. Wallace for their contribution in terms of supplying technical information.

I would also like to thank Drs. A. Reyes and J. T. Mulleady as well Mr. C. Reid, for their contribution in terms of reviewing the document and providing technical guidance.

Preface

The main purpose of this report is to present the findings of the cost analysis of the sub-project's on-farm trial results. However, there is yet another very important purpose, that is, it also informs agriculturists on the profitability of the technological packages, developed by the Hillside Agriculture Sub-Project (HASP).

This report has been organized into 5 main chapters. The first chapter introduces the reader to the basic concepts and terms as well as gives a description of the target group and its resource environment. This is followed by an explanation of the relationship between production costs and technology in chapter 2. In chapter 3, the analytical model is presented in terms of its data sources, assumptions, limitations, and results. In this case, the results are the costs and returns under the HASP technology. In chapter 4, there is a comparison of costs and returns both on a per acre and per unit basis, for various agricultural organizations. An outline of Farmers' cost schedules are also presented in this section. The final chapter presents a conclusion of the discussions.

The appendices contains individual 10 year cost schedules for ackee, avocado, cocoa, coconut, coffee, mango, soursop and sweetsop under the HASP technology as well as schedules on cocoa, coconut and coffee under the low-input farmer technology. This section concludes with a Glossary and a Bibliography.

Table of Contents

Page

1. Introduction

Presently, there are a number of technological packages in Jamaica, promoted by various agricultural development agencies, Commodity Boards, farmer organizations, research agencies as well as the Ministry of Agriculture. In the case of HASP, it is examining ways in which small, hillside farmers can improve the productivity of selected crops, particularly tree crops, given constraints such as credit, input and labour scarcities as well as agronomic conditions of poor soils and steep land .

The objective of this report is to compare these packages with a view of assessing their profitability. As such, the results of multi-period production models will be used, to show the feasibility of adopting the technological packages under HASP. These models have been restricted primarily, to the establishment of the following crops, namely : ackee, avocado, cocoa, coconut, coffee, mango, soursop and sweetsop .

1.1 Justification

Surveys and other related studies carried out by the HASP team in the area, have revealed that the low yields of tree crops are the result of certain constraints in the typical environment of the small farmer. Hence, HASP is testing the viability of technologies on the hillsides, and developing packages to enable the farmer to increase his productivity.

Given an economic climate of frequent price increases, the costs of recommended packages is proving to be a deterrent to encouraging small farmers into tree crop production. This intensifies the need for finding an effective, efficient and affordable package for this group of farmers.

1.2 Target group

Survey findings (Baseline Survey report 1993) have indicated that the HASP project area is comprised of four distinct farm categories, on the basis of farm size. They are namely: tiny (less than 2 acres), small (2-5 ac.) medium (5-10 ac.) and large (over 10 ac.). Most of the farms in the project area are in the small farm category.

The distinctions between these groupings have many implications for farmers and researchers alike, in terms of resource use and availability, cropping systems, farm management practices, adoption of new technological packages and even the suitability of the packages.

HASP is committed to the preservation of the watershed areas of the Rio Cobre, and in the process, managing the hillsides. However, these areas do not exist in a vacuum, but are populated by mainly resource-poor farmers and their families. Their very existence depend on exploiting their land to its fullest potential.

Hence, preserving the hillsides means preserving the livelihood of these farmers. HASP, thereby hopes to achieve these objectives by increasing tree crop production and farmer productivity.

1.2.1 Characteristics

Resource-poor farmers can be considered to be risk averse, as they operate in an environment of high risk, in terms of rainfall dependent conditions, pest, disease, praedial larceny and uncertain market conditions. As a result, they adopt many strategies to minimize their risks.

Contrary to popular opinion, farmers in the area are market -oriented and not subsistence-level farmers. They supply both the domestic market with food crops and export market via Cocoa and Coffee commodity boards.

1.3. Resource environment

In this context, we define a resource as a factor of production, which when combined with inputs creates the output. Economists usually consider land, labour, capital and management. However, for the purpose of this analysis we will expand the category to include water, energy and technology. In comparison to large land owners, small farmers have limited resources. Their potential is further hampered by inadequate infrastructural development such as poor roads as well as the availability of piped water and electricity and inadequate and unreliable transportation.

1.3.1 Land

As mentioned earlier, they operate on marginal land, usually of poor soil quality, which is susceptible to land slides and other forms of erosion. It was reported in the HASP Baseline Survey, that 30-65% of project area farmers observed some form of soil erosion on their farms, particularly, gully erosion. However, any attempt at soil conservation is thwarted by many instances of insecure tenure.

In many cases in the area, farmers simultaneously cultivate numerous parcels of land. From the HASP Baseline Survey, it was reported that 51% of the sample had one parcel and 34% had 2 or 3 parcels of land. In many cases, distance between these parcels dictate their cropping pattern.

1.3.2 Labour

Unlike the large farmers, small farmers depend on family labour, exchanged labour as well as hired. All these forms are interdependent and complementary.

As indicated in the informal survey, there is a gender difference in labour, men are more involved in production and women in marketing. There are some tasks such as weeding and harvesting, which are carried out by females and children .

There is outward migration to rural areas, particularly of the young men, thus leaving behind a 'nursery' community of children and the elderly and draining the local pool of labour. This situation is also affected by relatively low wages as well as a perception of a low status of farm labour.

Unlike the large estates, there is a heavy reliance on short-term labour due to the seasonality of demand for labour. This demand is usually for land preparation and planting during the rainy seasons. It was reported in the HASP Baseline Survey, that male farmers used an average of nine labourers, which was higher than the average for female farmers. Furthermore, farmers operating smaller acreages (less than 5 acres) used fewer labourers per year, that is,an average of five persons.

1.3.3 Capital

In comparison to large farmers, small farmers have a great deal of difficulty in accessing capital due to the absence of land titles. Hence, their farms are usually under-capitalized. They solve this problem in many ways, but mostly by seeking off farm work, whether overseas, road work, or in another sector. Construction work is a popular source in the project area.
Based on Baseline Survey findings, a third of the farmers sampled, was involved in some form of off-farm work for which they were receiving some form of wage or salary.

There is limited access to loans from the formal financial sector, as 19% of the sample in the Baseline survey reported that they obtained a loan from the Parish council (PC) Bank. Farmers who operated smaller acreages as well as female farmers were less likely to obtain formal credit than those farmers with larger acreages.

The typical small farmer's need for loans is dealt with through informal sources, such as the popular 'partner' system.

1.3.4 Water

Small farmers cultivate their crops under rainfed conditions Due to the steep slopes, there is a high rate of water runoff on the hillsides. The water situation is aggravated by the farmers' limited capacity for storage, and irrigation and in most cases, there is little or no watershed management.

1.3.5 Energy

Unlike the large land owners mainly on the plains who can utilize mechanization, small farmers rely solely on human muscle power in terms of family and temporary labour.
Their efficiency is limited due to the restricted range of tools that they use, such as the hoe, fork and machete.

1.3.6 Management

Due to vast number of small farmers in the area and the fragmentation of their farms, dissemination of information by extension officers is minimal. This was borne out by the findings of the Informal Survey. This has implications to the transfer of technology to the farmers in the watershed areas.

Farmers are also not privy to market intelligence information. For instance, some farmers complain that they do not know the current price for cocoa. This paucity of information contributes to cycles of glut and shortage in the local marketplace. In order to cope with this problem, the small farmer adopts the strategy of market diversification, in which he disposes of the farm produce in multiple marketing channels.

In coping with the numerous risks in his environment, the typical small farmer practices risk diversification, through mixed cropping systems, off-farm work, random spatial arrangements in planting, and even restricting the use of fertilizers and chemicals to crops with a faster turnover in sales.

1.3.7 Technology

"Technology can be said to consist of the knowledge, skills, methods and procedures associated with the production of socially useful goods and services from the production of the natural environment."[1]

In terms, of a technological package we are concerned with the combination of inputs, resources as well as skills in using, understanding and applying the information.

Technological packages in the Jamaican Agricultural sector range from high, medium to low-tech. As shown in table 1, each is targeted for specific scale of farm operation.

The high "tech-pack" has been adopted, adapted and developed by the agricultural development agencies, Ministry of Agriculture and Commodity Boards. These are usually adopted by farmers who operate large acreages, plantation-type farms or farms geared primarily for export.

At the other extreme, "low-tech" agriculture has evolved inevitably (and in an uncoordinated manner) among the small farmers, in response to harsh environmental conditions. However, their concerns have for the most part, been neglected by the traditional research and development agencies.

"Medium-tech" packages are derivatives of the "high-tech" in which the key components which have been desegregated or adapted to the needs of small and medium-scale farmers to suit their particular agro-ecological conditions.

[1] See page 9 of N.Girvan's 'Technology policies for developing countries....'

TABLE 1

COMPARISON OF DIFFERENT LEVELS OF TECHNOLOGY

	LOW	HIGH
Emphasis	labour intensive	capital intensive
Land use	intensive	extensive
Water use	none, little	irrigation
Energy base	Wood	fossil fuel, that is, oil

1.3.7.1 HASP and technology

As a medium-input technological package, the reliance on agricultural chemicals under HASP for weeding as well as pest and disease control, is meant to be labour saving. While not being capital intensive, there is some use of small equipment and tools, such as pruning hooks, mistblowers, knapsack sprayers, and machetes

One of the main goals for promoting this technological package, is increased productivity. Hence there is a strong emphasis on fertilizers, both organic and inorganic. There is also the use of improved seedlings, recommended plant densities, shade management, intercropping as well an orchard management approach to the establishment of non-traditional crops.

2. Production Systems

Based on survey findings, the project area is primarily devoted to the cultivation of tree crops. The traditional tree crops in the area are cocoa and coffee, with increasing areas now planted with coconut and citrus.

HASP's strategy is not only to concentrate on the development and expansion of these traditional crops but also to encourage farmers to go into orchard production of nontraditional fruit crops.As such, there are various plots all across the project area for the following crops, ackee, avocado, coconut, mango, soursop and sweetsop.

2.1 Production costs

Each model outlines the various costs and returns that are associated with the establishment and maintenance of a one acre plot for a ten (10) year period. It should be noted that these figures are averages, that is, average expenditures and income for farmers who follow the recommended labour operations and material input purchases.

In individual locations, throughout the area, there will be some variation in these expenses due to many reasons, such as soil type, wage rates and farm practices.

Additionally, most of the costs given in this report are cash variable costs. These costs can be considered to be the costs of labour and input used in the production and harvesting of the selected crop(s).They do not include interest on cash used in the production process [2].

It is hoped that the adoption and use of these technologies will increase crop yields and also the return to the farmers' labour and management (that is, the income in excess of all costs).

2.2 Production Costs and Technology

As shown in table 1, any one of the technological packages offered by the various agencies can be classified as either low-tech, medium-tech or high-tech.

The "low-tech is usually, associated with the small farmers and farms on the hillsides. "High-tech", at the other extreme is associated with the large plantation-type farms found on the plains.

The technological package that has been developed under the project can be considered one of a medium level, falling midway between the extremes of low-input technology, and "high-tech".

2.2.1 Low-tech costs

Low-input technology, which is associated with relatively low yields, is characterized as a labour intensive technology. There is very little use of fertilizers and agricultural chemicals, particularly for tree crops, therefore, most of the farm expenditures are for wage payments of the labourers.

2.2.2 High-tech Costs

Conversely, "high-tech" packages are usually capital intensive as this permits greater mechanization on the large acreage of usually flat lands. There is also a heavy reliance on fertilizers and agricultural chemicals.

The chief cost components related to high input technology, are for irrigation, machinery and farm equipment, nursery establishment (dependent on the need for transplanting), harvesting and packaging .

This is opposed to low-input technology where components consist of mainly, nursery-bed (vegetables),small tools, establishment and later harvesting.

The differences are even greater, in the case of non-traditional crops, where stringent regulations, stiff international competition and a heavy emphasis on quality in the export markets, implies higher costs for production and post-harvesting activities

[2] See IICA/MINAG publication on the Costs of Production of Food Crops, St Catherine (1991)

Table 2

Production System under HASP
Traditional and nontraditional fruit crops

Crop	Cultivar	Spacing	Plant density	First Bearing
Traditional				
Cocoa, *Theobroma cacao*	PA 150 X ICS 60	10'x 10'	435	2 1/2 yrs
Coconut, *Cocos nucifera* L.	Maypan	20' x 20'	135	4 yrs
Coffee, *Coffea arabica* L.	Typica	10' x 5'	1744	3 yrs
Non-traditional				
Ackee, *Blighia Sapida* Koenig	local	20' x 20'	109	3 yrs
Avocado, *Persea americana* Mill	Simmonds	25' x 25'	70	4 yrs
Mango, *Mangifera indica* L. Anacardiaceae	-Tommy Atkins -Hayden -Keitt -Kent	25' x 25'	70	3yrs
Soursop, *Annona muricata* L.	local	15' x 15'	109	3yrs
Sweetsop, *Annona squamosa* L.	local	15' x 15'	193	3 yrs

2.3 Cost components under HASP

The cost components for the crops grown under HASP, for the various phases of the crop life, are :

a) Set-up - This category covers land clearing and preparation as well as the early stages of plant development for both the main and companion crops. Although there is a heavy reliance on manual labour for land clearing, the more popular equipment and tools are the Power-saw and machete.

However, activities such as, lining, staking, hole preparation, planting and weed control are done mainly by hand.

b) Growth - This phase deals specifically with early plant growth for both the main as well as companion crops, and takes in fertilization, pest and disease control, weed control and pruning. There is also a heavy reliance on manual labour.

c) Production - This is related to the fruit-bearing stage, and such activities as, weeding, pruning and pest and disease control.

Traditional Crops

It should be noted that the packages developed for the traditional crops, such as Cocoa and Coffee, are high density production models. This approach has been adopted from Latin American countries where there is a higher plant population per acre and closer spacing among plants than under traditional system. The adoption of these models is influenced by the recommendations from the Commodity Boards. Here, the benefits of higher production and more manageable maintenance compensates for the additional costs associated with increased plant densities to the acre. For instance, the spacing for Cocoa under HASP, was 10' x 10' in contrast to the former 12' x 12' under traditional systems.

Non-traditional Crops

In contrast to the traditional crops, they are relatively low density production models. They are planted as pure stand, orchard crops, thus demanding a more traditional "plantation-style" type of farm management.

As a result, maintenance costs especially for weeding operations will be higher in the short to medium term.

Unlike the traditional crops, non-traditional crops have a choice of marketing channels, both locally and overseas. As many of the crops can be marketed in export centers in industrialized countries, they are subjected to the most stringent regulations in terms of fruit content and quality. For instance, Ackee cannot be presently exported to the United States due to the high concentration of certain chemicals in the fruit.

Consequently, the type of marketing channel has further implications for cost and price. In order to ensure and maintain the required quality standard and in so doing a

better price, there will be higher production and marketing costs. This is in contrast to the local markets, both processing and fresh fruit, which do not have such requirements. Hence, fruits of a lesser quality can enjoy high prices.

3. The Model

3.1 Data Sources

In order to satisfy stringent data requirements for the cost analysis, a detailed record-keeping system has been developed within the Sub-Project. Quantitative agro-economic data are obtained from two main sources, namely: routine agronomic reports and individual farmer files.

However, the study has been supplemented with secondary data on material input prices. This has been derived from Quarterly Agricultural Input Surveys, from the Data Bank Division of the Ministry of Agriculture. They have been used to keep track of the rapidly changing prices over the period of 1989-1992.

3.2 Methodology

All the agro-economic data collected, has been based on the early stages of crop life of the selected crop. The data have been entered into a personal computer system and later processed, in order to calculate the technical coefficients (input quantities), as well as the input prices. The results have been analyzed for a one-acre unit of operation.

In response to very rapid price changes in the Jamaican economy, both the data on wage rates and material input prices have had to be updated on a regular basis. For example, the 1989 daily wage rate in the project area. of North-Eastern St. Catherine had been in the $30.00-$35.00 range. However, two years later, this wage rate jumped to $100.

This is in contrast to the technical coefficients, which have remained relatively stable over the same period. However, in terms of material inputs, such as fertilizers, many of the popular NPK formulations have been replaced by more concentrated mixes.

3.3 Limitations

(a) No Fixed Costs

The analysis does not include any fixed costs such as interest on loans, taxes or transportation charges. The farmer has to pay his fixed costs,regardless of the range of activities or farm size. Hence, the total amount borne by him is independent of the scale of his operation.

(b) Generalized Scope of Study

It should be stressed again that the Cost Schedule gives a summary of the AVERAGE costs.Hence, extensionists should not be surprised to find varying individual situations.

(b) Production and Income Estimates

As the project has a limited life span of less than five years, it will end before most of the tree crops reach a stage of economic bearing. As a result, the levels of typical production and expected income for the HASP packages, will have to be estimated and projected into the future.

3.4 Assumptions

Under its programme, certain aspects have been emphasized, such as orchard management, increased and selective use of fertilizers, improved plant stock as well as better shade and pest management. All these practices must be employed, while preventing or rather, minimizing soil erosion of the watershed areas.

Before the results are presented, it is important to note all the underlying assumptions of the analysis. In other words, the farmers will experience increased income, given certain conditions are fulfilled.The assumptions are listed below:

1. One acre of land is used in crop production.

2. Medium level of vegetation cover (such as grasses and low-level shrubs) existed before land clearing.

3. The farmer follows all the recommended agronomic practices.

4. Persons engaged in land clearing or weeding, are paid on a job basis, for the amount of land worked.

5. The typical job rate for land clearing is $2000 per acre.

6. The typical job rate for weeding manually is $1000.00 per acre.

7. The most typical daily wage rate is $80.00.

8. The labourer finds his own lunch.

9. The typical costs for hole-digging or manure and moulding of holes, are $2.00 per hole (main crop) and $2.00 (temporary shade).

10. Other costs, such as rent, land tax, interest on loans as well as transportation charges are held constant.

Production models were developed for a 10 year period, as the rationale was that these perennial crops could be considered long term investments . Furthermore, farmers would not be able to break even and make profit within a shorter term period.

Results will be given on the economics of tree crop cultivation, in terms of total variable costs (plus land charges), revenue and gross margin. Analysis will also be geared at the composition of production costs in terms of labour and material inputs.

In terms of costs, attention is given to those that vary with the scale of operation of the farm. In other words, one will use more inputs, when cultivating a larger acreage. Therefore, total costs will be higher than for a small operation.

3.5 Results

3.5.1 Costs and Returns under HASP

The costs for cultivating the high density systems, which are mostly associated with the traditional crops, are relatively high. In many cases, these production costs are over $30,000 per acre for the ten (10) year period.

By contrast, the production costs for the non-traditional crops are mostly under $50,000 per acre with the exception of mango. Avocado is at the lower, that is, under $40,000 and Mango at the higher end, over $60,000 per acre.

However, these non-traditional crops are planted in a mono-culture environment while crops such as coffee and cocoa are planted in a mixed cropping system.

There are two main reasons for the adoption of this mixed system arrangement. Firstly, the shade crops, such as coconut and plantain, in the system provide the suitable microclimate for the main crop's survival and development.

As the shade crops are also economic trees, these crops particularly the temporary shade, would provide income in the short term while the farmer awaits harvests from his tree crops, and in so doing provide a better cash flow.

This is of particular importance to small farmers in a tree-based cropping system. The HASP Baseline Survey indicated that inadequate cash flow is one of the main problems faced by farmers in the project area.

Hence, production costs will be higher for mixed cropping systems, but the farmer will be receiving cash inflows at an earlier stage. Therefore, the perennial crops should be coming into production after the cash crop is phased out.

<u>Ackee</u>

Based on the production model, the total variable cost (plus land charge) for the crop would be $44,137.40 over the ten year period. Approximately, 18% would be spent in the set-up stage for establishment. Total operating costs for the 10 year growth stage would be $25,288.13 .

Approximately 20% of all total variable costs would go toward the procurement of material inputs. Hence, the labour component would contribute more to the total production cost.

Total production over the 10 year period would be approximately 2952 boxes. The selling price has been estimated to be $75 per box over the 10 years.

The total revenue should be $221,400 for the 10 year period, therefore the farmer would end up with a total gross margin of $177,262.60.

It should be noted that this is the second highest gross margin among the non-traditional crops.

Avocado

The total variable cost (plus land charge)for the 10 year period would be $39,661.90. Approximately 15% of the total cost would be for establishment purposes. Total operating costs for the period would be $28,397.90.

Approximately 15% of the total variable cost would be spent on material inputs, namely : organic and inorganic fertilizers, seedlings as well as herbicides.

The total yield has been projected to be 1550 dozen for the 10 year period. Selling price has been fixed at $72 per dozen for the same period.

Total revenue generated from crop sales, would be $111,600. The farmer would have a negative gross return in each of the first three years but would have a positive total margin at the end of the period of $71,938.10.

Cocoa

This crop is grown in conjunction with the shade crops, coconut and plantain. The total variable cost (plus land charge) for this mixed system would be $71,146.60 for the 10 year period.

Approximately, 20 % of the costs would be spent in the set -up stage of establishment. However, total operating expenses for the period would be $43,185.00.

Approximately a third of the total variable costs would be spent on material inputs for cocoa, coconut and plantain.

Total production for cocoa for the 10 years should be 201 boxes. The selling price would be fixed at $200 per box. Total production for plantain would be 1224 stems at an average selling price of $4.50 per stem. Production of dry and jelly coconuts would be 10920 and 4680 nuts respectively, both having an average price of $4.00 per nut.

The farmer would earn a total revenue over the period under review, of $108,108.00, from which $40,200 would come from cocoa sales and a further $43,680 from sales of dry coconut.

The total gross margin for the 10 year period would be approximately, $37,000.

Coconut

The total variable cost (plus land charges) for the 10 year period for pure stand coconut would be $39,887.06, with 12% spent on establishment. Total operating expenses would be $29,593.82 for the period under review. Approximately, 18% would be spent on material inputs for the 10 years.

Total production would be 190.3 units or rather 20,924 nuts after initial bearing in the fifth year of crop life. The selling price would remain fixed at $205 per unit for the purpose of the analysis.

The revenue for the 10 year period, would be $39,011.50, but this would not prevent the farmer from earning a negative total gross margin of ($875.56) at the end of the period under review.

Coffee

Like cocoa, coffee is grown in a mixed system with coconut and plantain. Due to factors, such as high plant density, coffee has the highest total variable cost (plus land charge), that is, $114,197.26 for the 10 year period.

Approximately 19% of total variable cost would be spent in the set-up stage. Total operating costs would be $79,982.97 for the period. Approximately 47% would go towards material input purchases for the 10 years.

Total production of coffee for the 10 year period, would be 570 boxes, with the selling price being fixed at $450 per box. Total production of plantain would be fixed 1,224 stems, dry coconuts 10,920 nuts and 4,680 nuts.

Total revenue earned by the farmer would be $144,048. Coffee sales would contribute $76,500 to this total. The total gross margin would be $29,850.44 over the period under review.

Mango

This crop has the highest total variable cost of all the non-traditional tree crops. Based on the model, its total variable cost (plus land charge) would be $60,197.41 over the 10 year period.

Approximately, 10% would be spent in the set-up stage. Total operating costs would be $46,889.49.

Approximately, 37% would be spent for material input purchases over the 10 years.

Total production over the period under review, would be 8,680 dozens. The selling price would be fixed at $70 per dozen.

It also has the highest revenue among the non-traditional crops, that is, $607,600. The farmer would also earn the highest total gross margin of $547,402.59.

Soursop

This crop has the second highest total variable cost (plus land charge) among the non-traditional fruit tree crops, that is, $44,933 per acre over the 10 year period.

Approximately, 14% would be spent in the set-up stage. Total operating costs would be $32,534.72.

Approximately, 18% would be spent for material input purchases over the 10 years.

Total production would be 19,423.8 pounds at an average selling price of $6.50 per pound.

As a result, the farmer would receive $126,254.70 in total revenue over the 10 year period.

At the end of the period, he will have a positive gross margin of $81,8320.91 which is the third highest of all the non-traditional crops studied.

Sweetsop

This crop has the third highest production cost per acre among the non-traditional crops. Its total variable cost (plus land charge) for the ten year period, is $49,259.28.

Approximately, 21% would be spent in the set-up stage. Total operating costs would be $32,740.98.

Approximately, 24% would be spent for material input purchases over the 10 years.

Total production for pure-stand sweetsop over the 10 year period, should be 34,391 pounds (or 1,302.1 dozens). The selling price would remain fixed at $25 per dozen.

Therefore, the farmer should be able to earn a total income of $32,552.50 over the decade. However, he would be left with a negative total gross margin of ($16,706.78) at the end of the period under review. This total gross margin is the lowest among all the fruit tree crops.

Profitability of HASP Tree crop technologies

As mentioned earlier, tree crop cultivation can be considered as a long-term investment. One of the main ways of evaluating the profitability of a long-term investment over time is through the use of the Net Present value analysis. Hence, one would discount future streams of income and cost into present day values, in order to assess whether one would earn a profit.

This translation of future investment streams into present day values would be through the use of a discount factor. This discount factor is also the opportunity cost of capital, that is, the interest rate. Hence, the discount factor can be seen as the cost of borrowing funds. Therefore, the difference between the present value revenue and present value costs would give the net present value. In this analysis, land charges have been included in the present value costs.

For the purpose of this analysis, the discount factor will be 35%, which is also the current lending rate for agricultural loans for small farmers.

A positive net present value would indicate that the venture is profitable, while a negative value would signify a loss. Hence, the net present value would be the return that would compensate the farmer for the use of his capital, labour and management.

It should be noted that the net present value gives an indication of profitability. This does not mean that this is the most profitable venture. Neither does it indicate the venture's financial feasibility, in terms of taking out a loan. Other analyses would have to be carried out in order to answer those questions.

The farmer would also have to take into account other factor such as market prospects and strategy, labour availability in making his investment decision .

Based on the net present value analysis of the production models under review, avocado, ackee, mango and soursop have positive net present values. Mango has the highest value among all the crops.

Although the other crops have negative values, some such as cocoa and sweetsop have the lowest net present values.

Therefore, the four non-traditional crops, mango, ackee, avocado and soursop can be viewed as the most attractive investment for farmers.

4. Comparative Cost Analysis of Tech-Packs

As mentioned earlier, the aim of the study is on evaluating the profitability of the technological packages for tree crop establishment on the hillsides. As such, packages promoted by HASP, Ministry of Agriculture, Commodity Boards and research/development agencies (such as JARP) will be evaluated.

4.1 Criteria for evaluation

Any proposed package should enable the resource-poor farmer to effectively manage limited resources while earning higher returns. It should also assist in dealing with his resource constraints as well as problems of inadequate cash flow, and low market prices.

As this is an economic study, each technological package will be evaluated by its Net Present Value (NPV) for the ten (10) year period.

However, the analysis will begin with a comparison of production costs per acre, as shown in tables 3 and 4, and later income and gross return per acre as well as per unit.

We will now begin the discussion with an overview of the farmer's cost/return situation.

4.2 Farmers' costs and returns

Production models similiar for those of HASP, have been developed for cocoa, coconut and coffee under farmer's financed/farmer managed systems. As such, they have been termed "Farmers' costs of production".

These cost models have been derived from case studies with participating farmers in the project, and are based on actual costs particularly those for crop establishment.

The analysis has been based on the assumptions that farmers' fields have lower plant density, lower usage of fertilizers and chemicals and also that they do not follow all the recommended practices.

Production has had to be projected and in some cases estimated. In any case, their production figures have adjusted downwards to 45% of the recommended yields. This downward adjustment takes into account the lower input usage, rainfed conditions, praedial larceny, intensified pest and disease problems as well harsh weather conditions of drought and flood.

Farmers adopt a minimum maintenance strategy in order to deal with the numerous risks in their farming system thus their cropping system has been associated with low costs and low yields. This is the outcome of a risk minimization strategy ,particularly in response to market risk, which occurs the longer the period farmers have to wait for harvests from their tree crops. With tree crop establishment, any mistakes are costly and farmers cannot reverse their decisions easily.

It should be noted that maintenance costs for subsequent years were simulated from secondary data as well as assumptions based on observations of farmers' practices in the project area.

It was also assumed that farmers use some material inputs such as improved seedlings, fertilizers and rat bait (although not in the recommended quantities). This assumption is borne out by the Baseline Survey finding that farmers borrow money mainly to purchase planting materials.

It is also assumed that the farmer hires all the labour necessary for farm operations hence any return will be mainly for his capital, supervision and management.

Results

Cocoa

Total variable costs (plus land charges) for the cocoa/coconut/plantain mix under a farmer financed/ farmer managed system would be $29,820 over a 10 year period.

Approximately, 9% would be spent in the set-up stage. Total operating costs would be $22,922.06.

Approximately, 25% would be spent for material input purchases over the 10 years.

It is assumed that the farmer would reap 68 boxes of cocoa, 4158 nuts (dry coconut), 1782 (jelly coconut) as well as 556 stems of plantain over the 10 year period.

At $200 per box for cocoa, the farmer should receive $13,600 from cocoa sales. He would also receive $16,632 from dry coconut sales. Total revenue for the 10 year period would be $39,862.

After receiving negative gross margin in the each of the first three years of cultivation, the farmer should end up with a total gross margin of $10,041.50 for the period under review.

At a discount factor of 35%, total present value revenue should be $5,351.89 and present value cost, $9,016.15 at the end of the 10 year period. As a result, the farmer would end up with a negative net present value of ($3,664.46) at the end of the period.

Coconut

For the 10 year period, the total variable cost (plus land charge) under the farmer managed/farmer financed system would be $38,029.22.

Approximately, 10% would be spent in the set-up stage. Total operating costs would be $28,976.82.

Approximately, 18% would be spent for material input purchases over the 10 years.

Total production would be 10462 nuts, a downward adjustment of 33% of standard recommended yields. At a selling price of $4.00 per nut over the period, the total revenue would be $41,848.

There would be a negative gross margin in each of the first three years of cultivation. However, the farmer should end up with a total gross margin of $3,818.78 after 10 years.

With the discount factor remaining at 35%, total present value revenues would be $4,466.34 and total present value costs, $11,656.81 over the 10 years. Hence, the farmer would be left with a negative NPV of $7,170.47.

Coffee

Total variable costs (plus land charges) for the farmer's coffee based mixed cropping for a ten year period, would be $72,466. These costs also include establishment, maintenance and harvesting of the shade crops, coconut and plantain.

Approximately, 18% would be spent in the set-up stage. Total operating costs would be $51,415.

Approximately, 20% would be spent for material input purchases over the 10 years.

Total revenue from these crops for the ten year period is $123,561. The highest proportion of revenue comes from coffee sales, which would be $98,550 as well as $16,632 from dry coconut sales.

At the end of the period under review, total gross margin earned by the farmer, would be $51,094 despite negative gross margins obtained in the first three years of cultivation.

Total present value revenue should be $17,477.48 while total present value costs are $27,314.72. The discount factor remains at 35%. However, the farmer would end up with a negative net present value of $9,837.25.

4.3 Costs and returns under the various tech-packs

4.3.1Traditional crops

The total costs of production per acre of the various agricultural institutions for the cultivation for cocoa, coconut and coffee over a ten (10) year period have been presented in table 3. These total costs include the total variable costs (establishment and operating cost) as well as charges for contingency and land.

Cocoa

The farmer's cost of production for cocoa is the lowest among the various agricultural agencies/farming groups, and is less than $30,000 per acre. This in contrast to both HASP and the commodity Board. For HASP and the Cocoa Industry board, they are both fall in the $71,000 to $72,000 range. HASP' costs are approximately $110 higher than the commodity board.

It should be noted that costs of production for the commodity board have been estimated from base information supplied by that institution. It must be repeated that these costs are for crop establishment on virgin land.

Coconut

The cost of production as estimated by the Ministry of Agriculture (MINAG), is the highest for the crop, of over $300,000 per acre for the 10 year period. The second highest is the Coconut Industry Board with $63,615.18 and is based on estimates supplied by the board.

The lowest costs of production is that of the farmer financed/farmer managed system, which is less than $40,000 per acre for the period and a little over half of the board's. HASP' production cost is almost $1,000 higher than that of the farmer's costs.

Coffee

Production costs for coffee among the three agricultural groupings/institutions are among the highest of all the tree crops. As shown in table 3, the farmer's method has the lowest production cost, which is less than half of that of the Coffee Industry Board, which is over $200,000 per acre for the 10 year period. The HASP technology falls in the mid-range with approximate;y $114,000.

4.3.2Non-traditional crops

A summary is given in table 4.

Ackee

There are only two institutions which report production costs for this crop, namely the Jamaica Agricultural Development Foundation (JADF) as well as HASP. Costs under the JADF technology are higher , with $74,632 as compared to HASP's $44,147.40. JADF first year's cost is $13,113 while for HASP, its $8,765.14 even though JADF's recommended plant density is 97 to HASP's 109 per acre.

Table 3
Traditional crops
Comparison of Production costs per acre
for a 10 year period

Crop Name	Farmer	HASP	Commodity Board	MINAG
	$	$	$	$
Cocoa	29,820.50	71,146.60	*71,036.65	-
Coconut	38,029.22	39,887.06	*63,615.18	335,831
Coffee	72,466	114,197.26	200,107.0*	-

* This figure has been computed from data supplied by the relevant Commodity Board.

Table 4
Non-traditional crops
Comparison of Production Costs per acre
for a 10 year period

Crop Name	Farmer	HASP	JADF	MINAG
	$	$	$	$
Ackee	-	44,137.40	74,632	-
Avocado	-	39,661.90	-	118,345
Mango	-	60,197.41	89,272	132,900
Soursop	-	44,933.79	79,436	23,750
Sweetsop	-	44,259.28	-	-

Avocado

There are only two institutions which report production costs for this crop, namely the Ministry of Agriculture (MINAG) as well as HASP. Costs are higher for the MINAG technology, which is $118,345 as compared to approximately $40,000 per acre under HASP technology over the 10 year period.

First year's cost for MINAG's technology is $13,733 in contrast to HASP's $8,008.10 per acre. This could be partially explained by the different plant densities, MINAG has 110 plants to the acre while HASP has 70 plants.

Mango

There are three institutions which report production costs for mango over a 10 year period. They are namely : HASP, JADF and MINAG.

The MINAG technology has the highest costs of over $130,000 per acre for the 10 year period while HASP has the lowest. JADF falls in the mid-range. Plant density under JADF technology is 107 plants per acre compared to 70 plants under HASP.

Soursop

Three agricultural institutions report 10 year Cost schedules for the crop, namely : JADF, HASP and MINAG. Production costs for JADF technology are the highest for the crop, of nearly $80,00 per acre. MINAG reports the lowest production cost of less than half that figure. HASP's cost schedule fall in the mid-range.

Sweetsop

HASP is the only agricultural agency that has a 10 year production cost schedule for this crop. Production costs are only slightly higher than most of the other non-traditional fruit tree crops with the exception of mango.

4.4 Costs and returns per unit different technological packages

Traditional crops

Cocoa

For the purpose of the analysis, it has been assumed that the projected yield of cocoa for both HASP and the Cocoa Board technologies would be 201 boxes per acre for the 10 year period. It is also assumed that the selling price per unit is held constant at $200 per box.

As such, the total production cost for the HASP Technology would be $353.96 per box while that of the Cocoa Board, would be $353.42 per box.

Therefore, the return to the grower's labour and management would be negative for both HASP and Cocoa board technologies.

It is also assumed that the farmer would reap 50% of the yield of the HASP and Commodity Board technologies, and consequently would also have a negative return.

Coconut

The cost per unit for all of the technological packages, namely : HASP, Commodity Board and MINAG, would be under $300 per unit (where 1 unit equals 110 nuts). The lowest would be HASP with a cost of $209.6 per unit while the highest would be MINAG, with $280 per unit.

However, at a selling price of $205 per unit, the return for each one of those three organizations would be negative.

Coffee

It has been assumed that lowland production would be 570 boxes per acre over the 10 year period for both HASP and the Coffee Board technologies. It is also assumed that the selling price per box for lowland coffee would remain constant at $450 per box.

Hence, the cost of producing one box of coffee under the HASP technology would be $200.35 in contrast to that of the Coffee Board's $351.06 per box.

However, the return to the grower per box would be positive, that is, $249.65 under the HASP technology and $98.94 under the Coffee Board technology.

It has been assumed that the projected yield per acre would be 219 boxes for the farmer under low-input technology over the 10 year period. Hence, cost per box would be $330.89 and the return to the farmer's labour and management would be $119.11 per box.

Non-traditional crops

Ackee

The costs per unit for HASP technology is lower for ackee under the HASP technology than under JADF. In other words, HASP's cost of production per box is $14.95 as opposed to $28.41 per box for JADF.

At a selling price of $75.00 per box where a box is equivalent to 70 lbs. of ackee, the return to the farmer' labour and management under HASP would be $60.05 in contrast to $46.59 per box under JADF costing.

Avocado

The cost per unit for producing avocado is under $30 per dozen for the two institutions, MINAG and HASP. However, the cost per unit for HASP is lower than that of MINAG. HASP's cost is $25.59 per dozen and for MINAG, its $27.90 per dozen.

At a selling price of $72 per dozen, the return to the grower's labour and management under HASP technology is $46.41 and for MINAG, $44.10 per dozen.

Mango

Production cost per unit for both technologies, JADF and HASP, is under $10 per dozen. The cost of production per unit for HASP technology is $6.93 per dozen, in comparison to $5.03 per dozen under JADF technology.

At a selling price of $70 per dozen, both packages would give the grower positive returns, to his capital, labour and management. The return under HASP would be $63.07 per dozen under HASP as compared to $64.97 per dozen for JADF technology.

Soursop

Between the three technological packages of JADF, HASP and MINAG, the production cost per unit would be under $4.00 per pound. If the grower utilized the HASP technology, the cost per unit would be $2.31 per pound. The MINAG production cost per unit would be lower, at $1.11 per pound. However, the JADF cost per unit would be higher, that is, $3.41 per pound.

At a selling price of $6.50 per pound, the returns to the grower's capital, labour and management would be positive. This return would range from $3.09 per pound for JADF, $4.19 for HASP to $5.34 per pound for MINAG.

Sweetsop

HASP was the only organization that produced a cost schedule for sweetsop. Due to the paucity of information on sweetsop yields, production was assumed to be similiar to that of soursop as they are in the same family.

Hence, the cost of producing one unit of sweetsop was $37.83 per dozen. At a selling price of $25 per dozen, the grower would earn a negative return of ($12.83) per dozen.

4.5 Summary

COSTS,INCOME AND RETURN PER ACRE
UNDER LOW-TECH FARMER TECHNOLOGY
FOR A 10 YEAR PERIOD

CROP	TOTAL VARIABLE COSTS	TOTAL INCOME	TOTAL GROSS MARGIN	NET PRESENT VALUE
	$	$	$	$
COCOA	29,820.50	39,862.00	10,041.50	(3,664.26)
COCONUT	38,029.22	41,848.00	3,818.78	(7,190.47)
COFFEE	72,466.00	123,561.00	51,094.00	(9,837.25)

COSTS,INCOME AND RETURN PER ACRE
UNDER HASP TECHNOLOGY
FOR A 10 YEAR PERIOD

CROP	TOTAL VARIABLE COSTS	TOTAL INCOME	TOTAL GROSS MARGIN	NET PRESENT VALUE
	$	$	$	$
COCOA	29,820.50	108,108.00	36,961.40	(13,410.46)
COCONUT	38,029.22	39,011.50	(818.6)	(9,454.86)
COFFEE	114,197.26	144,048.00	30,510.74	(9,312.97)
ACKEE	44,137.40	221,400.00	177,262.60	12,968.01
AVOCADO	39,661.90	111,600.00	71,938.10	1,051.27
MANGO	60,197.41	607,600.00	547,402.59	60,794.95
SOURSOP	44,933.79	126,254.70	81,320.91	2,299.61
SWEETSOP	44,259.28	32,552.50	16,706.78	(14,961.52)

5 Conclusion

There are various technological packages for tree crop establishment that can be classified as high-tech, medium-tech and low-tech. Packages of JADF, MINAG and the Coffee Board can be classified as high-tech while HASP and the other Commodity Boards can be regarded as medium-tech. The farmers' method can be regarded as low-tech.

These classifications have implications for cost as higher production costs will be regarded with high-tech packages and lower cost with low-tech. However, the profitability of all these packages should be evaluated on the basis of their returns to the farmers' resources as well as their Net Present Values.

Based on the analyses, crops such as coffee, avocado, ackee, soursop and mango can be regarded as the more profitable crops over the period of 10 years.

One may also evaluate the associated costs and returns on a per unit basis in order to overcome differences in methodology in computing production costs, among the various agencies. With this analysis, the results confirm the findings that coffee, soursop, mango and also ackee generate positive and high returns to the grower's capital, labour, supervision and management.

6. Appendix

Introduction

An overview of the various establishment and management costs under HASP has been presented in the previous chapter. In this section, all the individual production models for HASP technological packages as well as the farmer financed/farmer managed models, will be presented . However, the emphasis will be on the Cash Variable Costs (plus land charges).

The models will be presented as, follows :

HASP

Farmers' costs of production

APPENDIX

A Glossary of Economic Terms and Definitions

This section is concerned with explaining the definitions and terms [3] that formed the basis of the Economic Analysis and subsequently, the results and conclusions. These terms have been listed in an alphabetic order as follows:-

Cash Variable Costs : cost of labour and inputs used in the production and harvesting of the crop. The cash costs do not include the interest on the cash used in the production process (that is, the return on investment in operating Capital).

Cost of Production : sum of fixed plus variable costs incurred in production. It also represents the value of all the resources that participate in the production process, including a return on investment in land and capital and a return on the farmers' labour.

Fixed Costs : costs that will occur regardless of the level of production. They will generally include depreciation and interest on investment in machinery, equipment, buildings, breeding livestock and return on investment in land, plus cash expenditures in insurance, administrative expenses and taxes.

Gross Income : the crop yield per acre times the farmgate price.

Management Return : income in excess of all variable costs.

Return on Farmers' Capital and Management : income in excess of all costs that compensates the farmer for the capital, labour, supervision and management that he invested in the enterprise.

[3] see IICA / MINAG (Farm Management Section)
Cost of Production of Food Crops
St. Catherine (1991)

References

- Alvin, Paul de T. and Trout, G.A.
  Cacao production in Jamaica and its potential expansion in hillside farming (1986) Report prepared for USAID

- Baker,R.J. and Chin, A.V.
  Seminar on Writing Technical and scientific Papers for publication (1988)

- Blustain, H. and Lefranc, E.
  Strategies for organization of small-farm agriculture in jamaica (1981) ISER/UWI and RDC, Center for international studies, Cornell University

- Budhall, Penelope E.
  Growing Coffee in Jamaica. Coffee Industry Development Co. Kingston, Jamaica. 1986.

- Coke, L.B., Gomes,P.I. and Gaharj,A.M.
  The agriculture sector and environmental issues (1984) ISER/UWI Caribbean Technology studies Project

- Fisher, D.
  A review of coffee productivity and processing in Jamaica (1985) report for USAID/Jamaica

- Girvan, N., Gomes, P.I., Sangster,D.B.
  Technology policies for small developing economies: a study of the caribbean (1983) ISER,UWI, Caribbean Technology studies Project

- Grant, A. Shaun-Marie Grant
  Hillside Agriculture Sub-Project
  Report Of The Preliminary Findings Of The Informal Survey 1989-1990 (November 1991) IICA Office In Jamaica Kingston, Jamaica

- Hawaiian Agronomics (international) Inc.
  Jamaica Agro-Industrial Development project
  Agro-sub sector commodity profile
  Tropical soft fruit and orchard crops

  Mango profile final report vol.VI (1986)

- Hillside Agriculture Project
  HASP Economist's Report in the '1991 HAP Retreat Proceedings'

- Hillside Agriculture Sub-Project
Improving Watershed Management and Increasing Socio-Economic Well-being through Farming Systems Research and Development, Volume 1 - Proposal (1988)

- Hillside Agriculture Sub-Project
Paper on the Comparative Analysis - Production Costs for Perennial Establishment (1991)

- IICA / MINAG (Farm Management Section)
Cost of Production of Food Crops
St. Catherine (1991)

- IICA Office in Dominica
First Regional Workshop in Tropical Fruit Crops (1991)

- IICA Office in Trinidad and Tobago
Second Regional Workshop on Tropical Fruit Crops (1991)

- Marte, R.
Assessment of less-traditional fruit enterprises for the caribbean : potential and constraints. 1988 (IICA) paper presented at the workshop 'Alternative Agricultural enterprises for the caribbean' Ja. 18-20 Aug 1988

- Mulleady, Tomas
Long Run Farm Planning
Investment Analysis. October, 1991.
IICA Office in Jamaica. Kingston, Jamaica.

- Todd Bockarie, Anne H.
Hillside Agricultural Sub-Project (HASP)
Baseline Survey Results 1990 Technical Report (June 1993) IICA Office in Jamaica, Kingston, Jamaica

- Topper, Brian F.
Growing cocoa in Jamaica. Cocoa Industry Board/Ministry of Agriculture, AIS. December, 1992.

Yield/jelly	nut				360	720	900	900	900	900	4680.0
price/coffee	box			$450.00	$450.00	$450.00	$450.00	$450.00	$450.00	$450.00	
price/plantain	stem	$4.50	$4.50	$4.50							
price/Dry co	nut				$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	
price/jelly	nut				$3.00	$4.00	$4.00	$4.00	$4.00	$4.00	
Revenue/coffee	box			$13,500.00	$27,000.00	$36,000.00					$76,500.00
Revenue/Plantain	stem	$2,448.00	$1,836.00	$1,224.00	$0.00	$0.00					$5,508.00
Revenue/Dry Co	nut				$3,360.00	$6,720.00	$8,400.00	$8,400.00	$8,400.00	$8,400.00	$43,680.00
Revenue/Jelly	nut				$1,080.00	$2,880.00	$3,600.00	$3,600.00	$3,600.00	$3,600.00	$18,360.00
Total Revenue		$2,448.00	$1,836.00	$14,724.00	$31,440.00	$45,600.00	$12,000.00	$12,000.00	$12,000.00	$12,000.00	$144,048.00
Tot.GROSS MARGIN		($27,886.58)	($3,657.01)	($7,202.14)	$4,643.23	$22,517.11	$35,167.23	$1,567.23	$1,567.23	$1,567.23	$1,567.23	$29,850.74

Costnof prod of Coffee (Lowland)
Crop duration : Plant pop.densit 1744

Items	Rate	Qty	Unit	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOTAL
Establishment	$													
(a) Labour														
Landclearing	$2,000.00	1	acre	$2,000.00										$2,000.00
Peg prep	$80.00	2	day	$160.00										$160.00
Lining	$80.00	6	day	$480.00										$480.00
Hole-digging	$2.00	872	hole	$1,744.00										$1,744.00
Man/mould	$2.00	872	hole	$1,744.00										$1,744.00
Planting	$80.00	7	day	$560.00										$560.00
Herbicide appl.	$80.00	10	day	$800.00										$800.00
Lining(shade)	$80.00	2.5	day	$200.00										$200.00
Hole-dig(shade)	$80.00	4	day	$320.00										$320.00
prep/plant shade	$80.00	4.3	day	$344.00										$344.00
plant perm.shade	$80.00	1	day	$80.00										$80.00
(ii)Materials														
Seedling	$5.50	872	Double	$4,796.00										$4,796.00
coconut sdlng	$10.00	70	each	$700.00										$700.00
plantain sucker	$4.00	435	each	$1,740.00										$1,740.00
Bioganic	$59.00	87.2	50lb	$5,144.80										$5,144.80
Daconater Herbic	$382.50	0.6	gal	$229.50										$229.50
Mocap	$1,944.50	0.5	50LB	$972.25										$972.25
(b) Operating Costs														
Weeding	$1,000.00	1	acre	$1,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$19,000.00
Fertilizing	$80.00	2.1	day	$168.00	$640.00	$1,280.00	$1,280.00	$1,280.00	$1,280.00	$1,280.00	$1,280.00	$1,280.00	$1,280.00	$11,048.00
Replace seedling	$80.00	2	day	$160.00										$160.00
Harvesting	$80.00		day		$320.00	$640.00	$960.00	$1,200.00	$1,280.00	$1,280.00	$1,280.00	$1,280.00	$1,280.00	$9,520.00
(ii) materials														
NPK8:21:32	$225.10	2	112lb	$450.20										$450.20
NPK15:5:35	$220.01	2.7	112lb	$594.03										$594.03
npk14:28:14	$217.37	1.1	112lb	$239.11										$239.11
AmmSul	$126.45	4.3	112lb	$543.74	$986.31	$1,972.62	$1,972.62	$1,972.62	$1,972.62	$1,972.62	$1,972.62	$1,972.62	$1,972.62	$17,311.01
NPK10:5:20	184.66		112lb		$1,421.88	$2,142.06	$2,769.90	$1,477.28	$2,769.90	$2,769.90	$2,769.90	$2,769.90	$2,769.90	$21,660.62
SUB-TOTAL(a+b)				$25,169.62	$5,368.19	$8,034.68	$8,982.52	$7,929.90	$9,302.52	$9,302.52	$9,302.52	$9,302.52	$9,302.52	$101,997.51
(c) Other charges														
contingency(10%a+b)				$2,516.96	$536.82	$803.47	$898.25	$792.99	$930.25	$930.25	$930.25	$930.25	$930.25	$10,199.75
land charge	200	1	acre	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$2,000.00
SUB-TOTAL(c)				$2,716.96	$736.82	$1,003.47	$1,098.25	$992.99	$1,130.25	$1,130.25	$1,130.25	$1,130.25	$1,130.25	$12,199.75
TOTAL VAR.COST				$27,886.58	$6,105.01	$9,038.14	$10,080.77	$8,922.89	$10,432.77	$10,432.77	$10,432.77	$10,432.77	$10,432.77	$114,197.26
Yield/coffee			box				30	60	80	100	100	100	100	570.00
Yield/Plantain			stem		544	408	272							1224.0
Yield/Dry co			nut					840	1680	2100	2100	2100	2100	10920.0

	YR0	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOTAL
Total Inflows	$0.00	$2,448.00	$1,836.00	$14,724.00	$31,440.00	$45,600.00	$12,000.00	$12,000.00	$3,600.00	$12,000.00	$12,000.00	$147,648.00
Total Outflows	$22,014.55	$5,872.03	$6,105.01	$9,038.14	$10,080.77	$8,922.89	$10,432.77	$10,432.77	$10,432.77	$10,432.77	$10,432.77	$114,197.26
Net Flows	($22,014.55)	($3,424.03)	($4,269.01)	$5,685.86	$21,359.23	$36,677.11	$1,567.23	$1,567.23	($6,832.77)	$1,567.23	$1,567.23	$33,450.74
Discount Rate=35%	1	0.7407	0.5487	0.4064	0.3011	0.223	0.1652	0.1224	0.0906	0.0671	0.0497	
PVCosts	$22,014.55	$4,349.41	$3,349.82	$3,673.10	$3,035.32	$1,989.80	$1,723.49	$1,276.97	$945.21	$700.04	$518.51	$43,576.23
PVrevenue	$0.00	$1,813.23	$1,007.41	$5,983.83	$9,466.58	$10,168.80	$1,982.40	$1,468.80	$326.16	$805.20	$596.40	$33,618.82
NPV flows@35%	($22,014.55)	($2,536.18)	($2,342.41)	$2,310.73	$6,431.26	$8,179.00	$258.91	$191.83	($619.05)	$105.16	$77.89	($9,957.41)
NPVvalues@30%	($22,014.55)	($2,633.76)	($2,525.97)	$2,588.20	$7,477.87	$9,877.15	$324.73	$249.82	($837.70)	$147.79	$113.62	($7,232.81)
NPVvalues@25%	($22,014.55)	($2,739.22)	($2,732.47)	$2,911.16	$8,748.74	$12,019.09	$410.77	$328.65	($1,146.54)	$210.32	$168.32	($3,835.43)
NPVvalues@20%	($22,014.55)	($2,853.24)	($2,964.40)	$3,290.41	$10,301.56	$14,740.53	$524.86	$437.41	($1,589.30)	$303.73	$253.11	$430.11

Costnof prod of Mango
Crop duration : Plant pop.density: 70

Items	Rate	Qty	Unit	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOTAL
Establishment $														
(a) Labour														
Landclearing	$2,000.00	1	acre	$2,000.00										$2,000.00
Peg prep/ining	$80.00	2	day	$160.00										$160.00
Hole-digging	$2.00	70	hole	$140.00										$140.00
Man/mould	$2.00	70	hole	$140.00										$140.00
Planting	$80.00	1.3	day	$104.00										$104.00
Herbicide appl	$80.00	4.5	day	$360.00										$360.00
(ii) Materials														
Seedling	$35.00	70	each	$2,450.00										$2,450.00
Bioganic	$59.00	8	50lb	$472.00										$472.00
Diaconater Herb	$382.50	0.5	gal	$191.25										$191.25
(b) Operating Costs														
Weeding	$1,000.00	1	acre	$1,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$19,000.00
Fertilizing	$80.00	3	day	$240.00	$240.00	$320.00	$320.00	$320.00	$320.00	$320.00	$320.00	$320.00	$320.00	$3,040.00
Replace seedli	$80.00		day	$0.00										$0.00
Slug Bait appl	$80.00	1	day	$80.00	$80.00	$80.00	$80.00	$80.00	$80.00	$80.00	$80.00	$80.00	$80.00	$800.00
Harvesting	$80.00		day			$240.00	$320.00	$480.00	$640.00	$800.00	$800.00	$800.00	$800.00	$4,880.00
(ii) materials														
NPK8:21:32	$225.10	0.2	112lb	$45.02	$168.83	$281.38	$281.38	$281.38	$281.38	$281.38	$281.38	$281.38	$281.38	$2,464.85
AmmSul	$126.45	0.5	112lb	$63.23	$37.94	$37.94	$37.94	$37.94	$37.94	$37.94	$37.94	$37.94	$37.94	$404.64
Slug Bait	$163.00	10	lb	$1,630.00	$1,630.00	$1,630.00	$1,630.00	$1,630.00	$1,630.00	$1,630.00	$1,630.00	$1,630.00	$1,630.00	$16,300.00
SUB-TOTAL (a+b)				$9,075.50	$4,156.76	$4,589.31	$4,669.31	$4,829.31	$4,989.31	$5,149.31	$5,149.31	$5,149.31	$5,149.31	$52,906.73
(c) Other Charges														
Contingency10%(a+b)				$907.55	$415.68	$458.93	$466.93	$482.93	$498.93	$514.93	$514.93	$514.93	$514.93	$5,290.67
Land charges	200	1	Acre	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$2,000.00
SUB-TOTAL(c)				$1,107.55	$615.68	$658.93	$666.93	$682.93	$698.93	$714.93	$714.93	$714.93	$714.93	$7,290.67
TOTAL VAR.COST				$10,183.04	$4,772.44	$5,248.24	$5,336.24	$5,512.24	$5,688.24	$5,864.24	$5,864.24	$5,864.24	$5,864.24	$60,197.41
Yield			doz			140	700	840	1400	1400	1400	1400	1400	8680.0
Price			doz			$70.00	$70.00	$70.00	$70.00	$70.00	$70.00	$70.00	$70.00	
REVENUE						$9,800.00	$49,000.00	$58,800.00	$98,000.00	$98,000.00	$98,000.00	$98,000.00	$98,000.00	$607,600.00
GROSS MARGIN				($10,183.04)	($4,772.44)	$4,551.76	$43,663.76	$53,287.76	$92,311.76	$92,135.76	$92,135.76	$92,135.76	$92,135.76	$547,402.59

	YR0	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOTAL
Inflows	$0.00	$0.00	$0.00	$9,800.00	$49,000.00	$58,800.00	$98,000.00	$98,000.00	$98,000.00	$98,000.00	$98,000.00	$607,600.00
Outflows	$6,017.25	$4,165.79	$4,772.44	$5,248.24	$5,336.24	$5,512.24	$5,688.24	$5,864.24	$5,864.24	$5,864.24	$5,864.24	$60,197.41
Net flows	($6,017.25)	($4,165.79)	($4,772.44)	$4,551.76	$43,663.76	$53,287.76	$92,311.76	$92,135.76	$92,135.76	$92,135.76	$92,135.76	$547,402.59
Discount Rate=35%	1	0.7407	0.5487	0.4064	0.3011	0.223	0.1652	0.1224	0.0906	0.0671	0.0497	
PVrevenues	$0.00	$0.00	$0.00	$3,982.72	$14,753.90	$13,112.40	$16,189.60	$11,995.20	$8,878.80	$6,575.80	$4,870.60	$80,359.02
PVcosts	$6,017.25	$3,085.60	$2,618.64	$2,132.89	$1,606.74	$1,229.23	$939.70	$717.78	$531.30	$393.49	$291.45	$19,564.07
NPVvalues@35%	($6,017.25)	($3,085.60)	($2,618.64)	$1,849.83	$13,147.16	$11,883.17	$15,249.90	$11,277.42	$8,347.50	$6,182.31	$4,579.15	$60,794.95
NPVvalues@30%	($6,017.25)	($3,204.33)	($2,823.85)	$2,071.96	$14,627.80	$14,350.39	$19,127.00	$14,686.44	$11,295.84	$8,688.40	$6,679.84	$79,482.25
NPVvalues@25%	($6,017.25)	($3,332.64)	($3,054.36)	$2,330.50	$17,884.68	$17,462.40	$24,194.91	$19,320.87	$15,460.38	$12,364.62	$9,895.38	$106,509.49
NPVvalues@20%	($6,017.25)	($3,471.36)	($3,313.98)	$2,634.10	$21,059.03	$21,416.35	$30,915.21	$25,715.09	$21,430.78	$17,855.91	$14,879.93	$143,103.81

Costnof prod of Soursop
Crop duration : Plant pop.density: 109

Items	Rate	Qty	Unit	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOTAL
Establishment	$													
(a) Labour														
Land-clearing	$2,000.00	1	acre	$2,000.00										$2,000.00
Peg prep&lining	$80.00	2	day	$160.00										$160.00
Hole-digging	$2.00	109	hole	$218.00										$218.00
Man/mould	$2.00	109	hole	$218.00										$218.00
Planting	$80.00	3	day	$240.00										$240.00
Herbicide appl.	$80.00		day	$0.00										
plant perm.shad	$80.00	2	day	$160.00										$160.00
(ii) Materials														
Seedling	$30.00	109	each	$3,270.00										$3,270.00
Coconut seedlng	$10.00	23	each	$230.00										$230.00
(b) Operating Costs														
Weeding	$1,000.00	1	acre	$1,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$19,000.00
Fertilizing	$80.00	1	day	$80.00	$320.00	$400.00	$400.00	$400.00	$400.00	$400.00	$400.00	$400.00	$400.00	$3,600.00
Replace seedlin	$80.00	1	day	$80.00	$0.00	$0.00								$80.00

Harvesting	$80.00		day				$480.00	$640.00	$800.00	$800.00	$800.00	$800.00	$800.00	$5,120.00
(ii)materials														
NPK8:21:32	$215.10	0.25	112lb	$53.78	$215.10	$430.20	$430.20	$430.20	$430.20	$430.20	$430.20	$430.20	$430.20	$3,710.48
amnsul	$126.45		112lb	$0.00	$113.80	$113.80	$113.80	$113.80	$113.80	$113.80	$113.80	$113.80	$113.80	$1,024.24
Sub-total (a+b)				$7,709.78	$2,648.91	$2,944.01	$3,424.01	$3,584.01	$3,744.01	$3,744.01	$3,744.01	$3,744.01	$3,744.01	$39,030.72
(c) Other Charges														
Contingency10%(a+b)				770.9775	$264.89	$294.40	$342.40	$358.40	$374.40	$374.40	$374.40	$374.40	$374.40	$3,903.07
Land charges	200	1	Acre	200	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$2,000.00
SUB-TOTAL(c)				$970.98	$464.89	$494.40	$542.40	$558.40	$574.40	$574.40	$574.40	$574.40	$574.40	$5,903.07
TOTAL COST				$8,680.75	$3,113.80	$3,438.41	$3,966.41	$4,142.41	$4,318.41	$4,318.41	$4,318.41	$4,318.41	$4,318.41	$44,933.79
Yield			lb	0	0	0	2398	2637.8	2877.6	2877.6	2877.6	2877.6	2877.6	19423.8
Price			-lb.				$6.50	$6.50	$6.50	$6.50	$6.50	$6.50	$6.50	
REVENUE							$15,587.00	$17,145.70	$18,704.40	$18,704.40	$18,704.40	$18,704.40	$18,704.40	$126,254.70
GROSS MARGIN				($8,680.75)	($3,113.80)	($3,438.41)	$11,620.59	$13,003.29	$14,385.99	$14,385.99	$14,385.99	$14,385.99	$14,385.99	$81,320.91

	YR0	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOTAL
Inflows	$0.00	$0.00	$0.00	$0.00	$15,587.00	$17,145.70	$18,704.40	$18,704.40	$18,704.40	$18,704.40	$18,704.40	$126,254.70
Outflows	$6,496.00	$2,184.75	$3,113.80	$3,438.41	$3,966.41	$4,142.41	$4,318.41	$4,318.41	$4,318.41	$4,318.41	$4,318.41	$44,933.79
Net flows	($6,496.00)	($2,184.75)	($3,113.80)	($3,438.41)	$11,620.59	$13,003.29	$14,385.99	$14,385.99	$14,385.99	$14,385.99	$14,385.99	$81,320.91
Discount Rate=35%	1	0.7407	0.5487	0.4064	0.3011	0.223	0.1652	0.1224	0.0906	0.0671	0.0497	
PVrevenues	$0.00	$0.00	$0.00	$0.00	$4,693.25	$3,823.49	$3,089.97	$2,289.42	$1,694.62	$1,255.07	$929.61	$17,775.41
PVcosts	$6,496.00	$1,618.25	$1,708.54	$1,397.37	$1,194.28	$923.76	$713.40	$528.57	$391.25	$289.77	$214.62	$15,475.81
NPVvalues@35%	($6,496.00)	($1,618.25)	($1,708.54)	($1,397.37)	$3,498.96	$2,899.73	$2,376.57	$1,760.85	$1,303.37	$965.30	$714.98	$2,299.61
NPVvalues@30%	($6,496.00)	($1,680.51)	($1,842.43)	($1,565.16)	$3,893.02	$3,501.79	$2,980.78	$2,293.13	$1,763.72	$1,356.60	$1,042.98	$5,247.91
NPVvalues@25%	($6,496.00)	($1,747.80)	($1,992.83)	($1,760.46)	$4,759.80	$4,261.18	$3,770.57	$3,016.74	$2,413.97	$1,930.60	$1,545.06	$9,700.82
NPVvalues@20%	($6,496.00)	($1,820.55)	($2,162.22)	($1,989.81)	$5,604.61	$5,226.02	$4,817.87	$4,015.13	$3,346.18	$2,788.01	$2,323.34	$15,652.58

	YR0	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOTAL
Inflows	$0.00	$0.00	$0.00	$0.00	$4,020.00	$4,420.00	$4,822.50	$4,822.50	$4,822.50	$4,822.50	$4,822.50	$32,552.50
Outflows	$10,222.00	$2,597.24	$3,124.80	$3,460.41	$3,988.41	$4,164.41	$4,340.41	$4,340.41	$4,340.41	$4,340.41	$4,340.41	$49,259.28
Net flows	($10,222.00)	($2,597.24)	($3,124.80)	($3,460.41)	$31.59	$255.59	$482.09	$482.09	$482.09	$482.09	$482.09	($16,706.78)
Discount Rate=35%	1	0.7407	0.5487	0.4064	0.3011	0.223	0.1652	0.1224	0.0906	0.0671	0.0497	
PVrevenues	$0.00	$0.00	$0.00	$0.00	$1,210.42	$985.66	$796.68	$590.27	$436.92	$323.59	$239.68	$4,583.22
PVcosts	$10,222.00	$1,923.78	$1,714.58	$1,406.31	$1,200.91	$928.66	$717.03	$531.27	$393.24	$291.24	$215.72	$19,544.73
NPVvalues@35%	($10,222.00)	($1,923.78)	($1,714.58)	($1,406.31)	$9.51	$57.00	$79.64	$59.01	$43.68	$32.35	$23.96	($14,961.52)
NPVvalues@30%	($10,222.00)	($1,997.80)	($1,848.94)	($1,575.18)	$10.58	$68.83	$99.89	$76.85	$59.10	$8.00	$34.95	($15,285.71)
NPVvalues@25%	($10,222.00)	($2,077.80)	($1,999.87)	($1,771.73)	$12.94	$83.76	$126.36	$101.10	$80.90	$64.70	$51.78	($15,549.87)
NPVvalues@20%	($10,222.00)	($2,164.28)	($2,169.86)	($2,002.54)	$15.24	$102.72	$161.45	$134.55	$112.14	$93.43	$77.86	($15,861.29)

(c) Other charges													
Contingency10%(a+b)			$1,147.20	$265.89	$296.40	$344.40	$360.40	$376.40	$376.40	$376.40	$376.40	$376.40	$4,296.30
Land charges	200	1 Acre	$200.00	$200.00	$200.00	200	200	200	200	200	200	200	$2,000.00
Sub-Total (c)			$1,347.20	$465.89	$496.40	$544.40	$560.40	$576.40	$576.40	$576.40	$576.40	$576.40	$6,296.30
TOTAL VAR.COST			$12,819.24	$3,124.80	$3,460.41	$3,988.41	$4,164.41	$4,340.41	$4,340.41	$4,340.41	$4,340.41	$4,340.41	$49,259.28
Yield		lb				4246	4670	5095	5095	5095	5095	5095	34391.00
Yield		doz				160.8	176.8	192.9	192.9	192.9	192.9	192.9	1302.10
price		Doz.				$25.00	$25.00	$25.00	$25.00	$25.00	$25.00	$25.00	
price		lb				$0.9469	$0.9469	$0.9469	$0.9469	$0.9469	$0.9469	$0.9469	
REVENUE		lb	0	0	0	$4,020.54	$4,422.02	$4,824.46	$4,824.46	$4,824.46	$4,824.46	$4,824.46	$32,564.84
REVENUE		doz	0	0	0	$4,020.00	$4,420.00	$4,822.50	$4,822.50	$4,822.50	$4,822.50	$4,822.50	$32,552.50
GROSS MARGIN		lb	($12,819.24)	($3,124.80)	($3,460.41)	$32.13	$257.62	$484.05	$484.05	$484.05	$484.05	$484.05	($16,694.45)
GROSS MARGIN		doz	($12,819.24)	($3,124.80)	($3,460.41)	$31.59	$255.59	$482.09	$482.09	$482.09	$482.09	$482.09	($16,706.78)

Costnof prod of Sweetsop
Crop duration : Plant pop.density: 193

Items	Rate	Qty	Unit	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOTAL
Establishment	$													
(a) Labour														
Landclearing	$2,000.00	1	acre	$2,000.00										$2,000.00
Peg prep	$80.00	2	day	$160.00										$160.00
Lining	$80.00	2	day	$160.00										$160.00
Hole-digging	$2.00	193	hole	$386.00										$386.00
Man/mould	$2.00	193	hole	$386.00										$386.00
Planting	$80.00	2	day	$160.00										$160.00
Herbicide appl.	$80.00		day											
(ii) Materials														
Seedling	$30.00	193	each	$5,790.00										$5,790.00
Bioganic	$59.00	20	50lb	$1,180.00										$1,180.00
(b) Operating Costs														
Weeding	$1,000.00	1	acre	$1,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$19,000.00
Fertilizing	$80.00	1	day	$80.00	$320.00	$400.00	$400.00	$400.00	$400.00	$400.00	$400.00	$400.00	$400.00	$2.00
Replace seedling	$80.00	1	day	$80.00										$80.00
Harvesting	$80.00		day				$480.00	$640.00	$800.00	$800.00	$800.00	$800.00	$800.00	$5,120.00
(ii) materials														$0.00
NPK8:21:32	$225.10	0.4	112lb	$90.04	$225.10	$450.20	$450.20	$450.20	$450.20	$450.20	$450.20	$450.20	$450.20	$3,916.74
AmmSul	$126.45		112lb		$113.80	$113.80	$113.80	$113.80	$113.80	$113.80	$113.80	$113.80	$113.80	$1,024.24
														$0.00
Sub-Total (a+b)				$11,472.04	$2,658.91	$2,964.01	$3,444.01	$3,604.01	$3,764.01	$3,764.01	$3,764.01	$3,764.01	$3,764.01	$42,962.98

REVENUE/COCOA	Box			$200.00	$400.00	$1,000.00	$2,400.00	$2,400.00	$2,400.00	$2,400.00	$2,400.00	$13,600.00
REVENUE/DRY CO	Nut	$0.00	$0.00	$0.00	$0.00	$1,512.00	$3,024.00	$3,024.00	$3,024.00	$3,024.00	$3,024.00	$16,632.00
REVENUE/JELLY	Nut	$0.00	$0.00	$0.00	$0.00	$648.00	$1,296.00	$1,296.00	$1,296.00	$1,296.00	$1,296.00	$7,128.00
REVENUE/PLANTAIN	Stem	$0.00	$1,125.00	$828.00	$549.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$2,502.00
TOTAL REVENUE		$0.00	$1,125.00	$1,028.00	$949.00	$3,160.00	$6,720.00	$6,720.00	$6,720.00	$6,720.00	$6,720.00	$39,862.00
GROSS MARGIN		($3,920.60)	($920.58)	($1,433.52)	($1,893.40)	$141.60	$3,613.60	$3,613.60	$3,613.60	$3,613.60	$3,613.60	$10,041.50

Costnof prod of Cocoa FARMERSCOSTS
Crop duration : Plant pop.densit 400

Items	Rate	Qty	Unit	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOTAL
Establishment	$													
(a) Labour														
Landclearing	$80.00	8.6	day	$685.71										$685.71
Lining	$80.00	0.6	day	$45.71										$45.71
Hole-digging	$2.00	114.3	hole	$228.57										$228.57
M&M/Plant	$80.00	0.6	day	$45.71										$45.71
Lining(shade)	$80.00	0.9	day	$68.57										$68.57
Hole-dig(shade)	$2.00	145.7	hole	$291.43										$291.43
prep/plant shade	$80.00	2.1	day	$169.14										$169.14
(ii) Materials														
Seedling	$4.00	114.3	each	$457.14										$457.14
Plantain Suckers	$4.00	114.3	each	$457.14										$457.14
Coconut Seedling	- $10.00	22.9	each	$228.57										$228.57
(b) Operating	costs													
Weeding	$80.00	5.7	day	$457.14	$914.29	$914.29	$914.29	$914.29	$914.29	$914.29	$914.29	$914.29	$914.29	$8,685.71
Fertilizing	$80.00	0.3	day	$22.86	$91.43	$91.43	$91.43	$91.43	$91.43	$91.43	$91.43	$91.43	$91.43	$845.71
Replace seedling	$80.00	1.0	day	$80.00		$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$80.00
Rat bait appl.	80	1.1	day	$91.43	$6.00	$91.43	$91.43	$91.43	$91.43	$91.43	$91.43	$91.43	$91.43	$828.86
Harvesting	$80.00		day	$0.00	$400.00	$400.00	$560.00	$720.00	$800.00	$800.00	$800.00	$800.00	$800.00	$6,080.00
(ii) Materials														
NPK16:9:18	$186.26	0.3	112lb	$53.22	$266.09	$558.78	$745.04	$745.04	$745.04	$745.04	$745.04	$745.04	$745.04	$6,093.36
ratbait	21	2.9	lb	$60.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$60.00
npk12:4:28	217.37	1.1	112lb	$248.42	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$248.42
SUB-TOTAL(a+b)				$3,382.36	$1,677.80	$2,055.92	$2,402.18	$2,562.18	$2,642.18	$2,642.18	$2,642.18	$2,642.18	$2,642.18	$25,291.36
(c) Other charges														
Contingency(10%a+b)				$338.24	$167.78	$205.59	$240.22	$256.22	$264.22	$264.22	$264.22	$264.22	$264.22	$2,529.14
Land charges	200	1	acre	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$2,000.00
SUB-TOTAL(c)				$538.24	$367.78	$405.59	$440.22	$456.22	$464.22	$464.22	$464.22	$464.22	$464.22	$4,529.14
TOTAL VAR.COST				$3,920.60	$2,045.58	$2,461.52	$2,842.40	$3,018.40	$3,106.40	$3,106.40	$3,106.40	$3,106.40	$3,106.40	$29,820.50
Yield/COCOA			Box			1	2	5	12	12	12	12	12	68.0
Yield/DRY CO			Nut					378	756	756	756	756	756	4158.0
Yield/JELLY			Nut					162	324	324	324	324	324	1782.0
Yield/PLANTAIN			Stem		250	184	122							556.0
Price/COCOA			Box			$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	
Price/DRY CO			Nut					$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	
Price/JELLY			Nut					$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	
Price/PLANTAIN			Stem		$4.50	$4.50	$4.50							

COSTS OF PROD COCONUT FARMERS' COSTS

Plant pop.density: 129

Items	Rate	Qty	Unit	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOTAL
Establishment $														
(a) Labour														
Landclearing	$80.00	12.9	day	$1,031.75										$1,031.75
Lining	$80.00	5.2	day	$417.14										$417.14
Hole-digging	$2.00	128.9	hole	$257.71										$257.71
Plant	$80.00	9.8	day	$780.41										$780.41
(ii) Materials														
Seedling	$10.00	129.0	each	$1,290.00										$1,290.00
(b) Operating Costs														
Weeding	$80.00	8.2	day	$654.60	$1,280.00	$1,280.00	$1,280.00	$1,280.00	$1,280.00	$1,280.00	$1,280.00	$1,280.00	$1,280.00	$12,174.60
Fertilizing	$80.00	3.0	day	$238.63	$680.00	$680.00	$680.00	$680.00	$680.00	$680.00	$680.00	$680.00	$680.00	$6,358.63
Harvesting	$80.00		day	$0.00	$0.00	$400.00	$400.00	$560.00	$720.00	$720.00	$720.00	$720.00	$720.00	$4,960.00
(ii) materials														$0.00
NPK15:5:35	$220.01	1.3	112lb	$289.16	$0.00	$574.23	$660.03	$660.03	$660.03	$660.03	$660.03	$660.03	$660.03	$5,483.59
SUB-TOTAL(a+b)				$4,959.40	$1,960.00	$2,934.23	$3,020.03	$3,180.03	$3,340.03	$3,340.03	$3,340.03	$3,340.03	$3,340.03	$32,753.84
(c) Other Charges														
Contingency(10%a+b)				$495.94	$196.00	$293.42	$302.00	$318.00	$334.00	$334.00	$334.00	$334.00	$334.00	$3,275.38
Land charges	200	1	acre	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$2,000.00
SUB-TOTAL (c)				$695.94	$396.00	$493.42	$502.00	$518.00	$534.00	$534.00	$534.00	$534.00	$534.00	$5,275.38
TOTAL VAR.COST				$5,655.34	$2,356.00	$3,427.65	$3,522.03	$3,698.03	$3,874.03	$3,874.03	$3,874.03	$3,874.03	$3,874.03	$38,029.22
YIELD			Nut					652	1962	1962	1962	1962	1962	10462.0
PRICE								$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	
REVENUE				$0.00	$0.00	$0.00	$0.00	$2,608.00	$7,848.00	$7,848.00	$7,848.00	$7,848.00	$7,848.00	$41,848.00
GROSS MARGIN				($5,655.34)	($2,356.00)	($3,427.65)	($3,522.03)	($1,090.03)	$3,973.97	$3,973.97	$3,973.97	$3,973.97	$3,973.97	$3,818.78

	YR0	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOTAL
Inflows	$0.00	$0.00	$0.00	$0.00	$0.00	$2,608.00	$7,848.00	$7,848.00	$7,848.00	$7,848.00	$7,848.00	$41,848.00
Outflows	$3,777.01	$1,878.33	$2,356.00	$3,427.65	$3,522.03	$3,698.03	$3,874.03	$3,874.03	$3,874.03	$3,874.03	$3,874.03	$38,029.22
Net flows	($3,777.01)	($1,878.33)	($2,356.00)	($3,427.65)	($3,522.03)	($1,090.03)	$3,973.97	$3,973.97	$3,973.97	$3,973.97	$3,973.97	$3,818.78
Discount Rate=35%	1	0.7407	0.5487	0.4064	0.3011	0.223	0.1652	0.1224	0.0906	0.0671	0.0497	
PVrevenues	$0.00	$0.00	$0.00	$0.00	$0.00	$581.58	$1,296.49	$960.60	$711.03	$526.60	$390.05	$4,466.34
PVcosts	$3,777.01	$1,391.28	$1,292.74	$1,393.00	$1,060.48	$824.66	$639.99	$474.18	$350.99	$259.95	$192.54	$11,656.81
NPVvalues@35%	($3,777.01)	($1,391.28)	($1,292.74)	($1,393.00)	($1,060.48)	($243.08)	$656.50	$486.41	$360.04	$266.65	$197.51	($7,190.47)
NPVvalues@30%	($3,777.01)	($1,444.81)	($1,394.05)	($1,560.27)	($1,233.06)	($293.55)	$823.41	$633.45	$487.21	$374.75	$288.11	($7,095.82)
NPVvalues@25%	($3,777.01)	($1,502.66)	($1,507.84)	($1,754.96)	($1,442.62)	($351.75)	$1,041.58	$833.34	$666.83	$533.31	$426.80	($6,834.99)
NPVvalues@20%	($3,777.01)	($1,565.21)	($1,636.01)	($1,983.58)	($1,698.68)	($438.08)	$1,330.88	$1,109.13	$924.34	$770.15	$641.80	($6,322.26)

	YR0	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOTAL
Inflows	$0.00	$0.00	$1,125.00	$1,028.00	$949.00	$3,160.00	$6,720.00	$6,720.00	$6,720.00	$6,720.00	$6,720.00	$39,862.00
Outflows	$2,677.71	$1,551.30	$2,045.58	$2,461.52	$2,842.40	$3,018.40	$3,106.40	$3,106.40	$3,106.40	$3,106.40	$3,106.40	$30,128.92
Net flows	($2,677.71)	($1,551.30)	($920.58)	($1,433.52)	($1,893.40)	$141.60	$3,613.60	$3,613.60	$3,613.60	$3,613.60	$3,613.60	$9,733.08
Discount Rate=35%	1	0.7407	0.5487	0.4064	0.3011	0.223	0.1652	0.1224	0.0906	0.0671	0.0497	
PVrevenues	$0.00	$0.00	$617.29	$417.78	$285.74	$704.68	$1,110.14	$822.53	$608.83	$450.91	$333.98	$5,351.89
PVcosts	$2,677.71	$1,149.05	$1,122.41	$1,000.36	$855.85	$673.10	$513.18	$380.22	$281.44	$208.44	$154.39	$9,016.15
NPVvalues@35%	($2,677.71)	($1,149.05)	($505.12)	($582.58)	($570.10)	$31.58	$596.97	$442.30	$327.39	$242.47	$179.60	($3,664.26)
NPVvalues@30%	($2,677.71)	($1,193.26)	($544.71)	($652.54)	($662.88)	$38.13	$748.74	$576.01	$443.03	$340.76	$261.99	($3,322.45)
NPVvalues@25%	($2,677.71)	($1,241.04)	($589.17)	($733.96)	($775.54)	$45.69	$947.12	$757.77	$606.36	$484.94	$388.10	($2,787.43)
NPVvalues@20%	($2,677.71)	($1,292.70)	($639.25)	($829.58)	($913.19)	$56.91	$1,210.19	$1,008.56	$840.52	$700.32	$583.60	($1,952.34)

stnof prod of COFFEE — FARMERS' COSTS
op duration : — Plant pop.density: 1000

ems tablishment	Rate $	Qty	Unit	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOT
) Labour														
ndclearing	$80.00	15	day	$1,200.00										$1,200
g prep	$80.00	1.5	day	$120.00										$120
ning	$80.00	8	day	$640.00										$640
le-digging	$2.00	630	hole	$1,260.00										$1,260
Manure	$2.00	630	day	$1,260.00										$1,260
ant	$80.00	9	day	$720.00										$720
ning(shade)	$80.00	3	day	$240.00										$240
le-dig(shade)	$3.00	200	hole	$600.00										$600
ep/plant shade	$80.00	4	day	$320.00										$320
														$0
i) Materials														$0
edling	$5.00	1000	each	$5,000.00										$5,000
antain Sucker	$4.00	200	each	$800.00										$800
conut Seedling	$10.00	80	each	$800.00										$800
i) Operating Costs														
eding	$80.00	16	day	$1,280.00	$3,200.00	$3,200.00	$3,200.00	$3,200.00	$3,200.00	$3,200.00	$3,200.00	$3,200.00	$3,200.00	$30,080
rtilizing	$80.00	3	day	$240.00	$480.00	$480.00	$480.00	$480.00	$480.00	$480.00	$480.00	$480.00	$480.00	$4,560
place seedling	$80.00	2	day	$160.00		$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$160
tbait appl	80	6	day	$480.00	$480.00	$480.00	$480.00	$480.00	$480.00	$480.00	$480.00	$480.00	$480.00	$4,800
rvesting	$80.00		day	$0.00	$0.00	$400.00	$400.00	$560.00	$720.00	$0.00	$720.00	$720.00	$720.00	$4,240
i) Materials														
K15:5:35	$220.01	2	112lb	$440.02	$0.00	$660.03	$880.04	$880.04	$880.04	$880.04	$880.04	$880.04	$880.04	$7,260
tbait	21	15	lb	$315.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$315
JB-TOTAL (a+b)				$15,560.02	$4,160.00	$5,220.03	$5,440.04	$5,600.04	$5,760.04	$5,040.04	$5,760.04	$5,760.04	$5,760.04	$56,060
:) Other charges														
ntingency(10%a+b)				$1,556.00	$416.00	$522.00	$544.00	$560.00	$576.00	$504.00	$576.00	$576.00	$576.00	$6,406
nd charges	200	1	acre	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$2,000

JB-T (c)		56.0C	616.	$72:	$7	bO	6.00	b4.0(	776.	$77(	$7	
)TAL VAR.COST		$17,316.02	$4,776.00	$5,942.03	$6,184.04	$6,360.04	$6,536.04	$5,744.04	$6,536.04	$6,536.04	$6,536.04	$72,466
ield/COFFEE	Box			10	20	24	33	33	33	33	33	21
ield/DRY CO	Nut					378	756	756	756	756	756	415
ield/JELLY	Nut					162	324	324	324	324	324	178
ield/PLANTAIN	Stem		125	92	61							27
rice/COFFEE	Box			$450.00	$450.00	$450.00	$450.00	$450.00	$450.00	$450.00	$450.00	
rice/DRY CO	Nut					4	4	4	4	4	4	
rice/JELLY	Nut					4	4	4	4	4	4	
rice/PLANTAIN	Stem		4.5	4.5	4.5							
VENUE/COFFEE	Box			$4,500.00	$9,000.00	$10,800.00	$14,850.00	$14,850.00	$14,850.00	$14,850.00	$14,850.00	$98,550
VENUE/DRY CO	Nut	$0.00	$0.00	$0.00	$0.00	$1,512.00	$3,024.00	$3,024.00	$3,024.00	$3,024.00	$3,024.00	$16,632
VENUE/JELLY	Nut	$0.00	$0.00	$0.00	$0.00	$648.00	$1,296.00	$1,296.00	$1,296.00	$1,296.00	$1,296.00	$7,128
VENUE/PLANTAIN	Stem	$0.00	$562.50	$414.00	$274.50	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$1,251
TAL REVENUE		$0.00	$562.50	$4,914.00	$9,274.50	$12,960.00	$19,170.00	$19,170.00	$19,170.00	$19,170.00	$19,170.00	$123,561
OSS MARGIN		($17,316.02)	($4,213.50)	($1,028.03)	$3,090.46	$6,599.96	$12,633.96	$13,425.96	$12,633.96	$12,633.96	$12,633.96	$51,094

	YR0	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOTAL
Inflows	$0.00	$0.00	$562.50	$4,914.00	$9,274.50	$12,960.00	$19,170.00	$19,170.00	$19,170.00	$19,170.00	$19,170.00	$123,561.00
Cutflows	$12,960.00	$3,916.00	$4,776.00	$5,942.03	$6,184.04	$6,360.04	$6,536.04	$5,744.04	$6,536.04	$6,536.04	$6,536.04	$72,026.34
Net flows	($12,960.00)	($3,916.00)	($4,213.50)	($1,028.03)	$3,090.46	$6,599.96	$12,633.96	$13,425.96	$12,633.96	$12,633.96	$12,633.96	$51,534.66
Discount Rate=35%	1	0.7407	0.5487	0.4064	0.3011	0.223	0.1652	0.1224	0.0906	0.0671	0.0497	
PVrevenues	$0.00	$0.00	$308.64	$1,997.05	$2,792.55	$2,890.08	$3,166.88	$2,346.41	$1,736.80	$1,286.31	$952.75	$17,477.48
PVcosts	$12,960.00	$2,900.58	$2,620.59	$2,414.84	$1,862.02	$1,418.29	$1,079.75	$703.07	$592.17	$438.57	$324.84	$27,314.72
NPVvalues@35%	($12,960.00)	($2,900.58)	($2,311.95)	($417.79)	$930.54	$1,471.79	$2,087.13	$1,643.34	$1,144.64	$847.74	$627.91	($9,837.25)
NPVvalues@30%	($12,960.00)	($3,012.19)	($2,493.13)	($467.96)	$1,081.97	$1,777.37	$2,617.76	$2,140.10	$1,548.92	$1,191.38	$915.96	($7,659.82)
NPVvalues@25%	($12,960.00)	($3,132.80)	($2,696.64)	($526.35)	$1,265.85	$2,129.81	$3,311.36	$2,815.42	$2,119.98	$1,695.48	$1,356.89	($4,621.01)
NPVvalues@20%	($12,960.00)	($3,263.20)	($2,925.85)	($594.92)	$1,490.53	$2,652.52	$4,231.11	$3,747.18	$2,938.66	$2,448.46	$2,040.38	($195.13)

Cost of Prod of Ackee

crop duration Plant pop density: 109

Items	Rate	Qty	Unit	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOTAL
Establishment														
(a)Labour														
Landclearing	$2,000.00	1	acre	$2,000.00										$2,000.00
Peg prep&Linin	$80.00	2	day	$160.00										$160.00
Hole-digging	$2.00	109	hole	$218.00										$218.00
Man/mould	$2.00	109	hole	$218.00										$218.00
Planting	$80.00	1	day	$80.00										$80.00
(ii)Materials														
Seedling	$30.00	109	each	$3,270.00										$3,270.00
Boganic	$59.00	11.4	50lb	$672.60										$672.60
(b)Operating costs														
Weeding	$1,000.00	1	acre	$1,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$19,000.00
Fertilizing	$80.00	1	day	$80.00	$160.00	$160.00	$160.00	$160.00	$160.00	$160.00	$160.00	$160.00	$160.00	$1,520.00
Harvesting	$80.00		day			$320.00	$480.00	$800.00	$960.00	$960.00	$960.00	$960.00	$960.00	
(ii)Materials														
NPK8:21:32	$225.10	0.25	112lb	$56.28	$225.10	$450.20	$450.20	$450.20	$450.20	$450.20	$450.20	$450.20	$450.20	$3,882.98
Ammsul	$126.45	0.25	112LB	$31.61	$94.84	$94.84	$94.84	$94.84	$94.84	$94.84	$94.84	$94.84	$94.84	$885.15
SUB-TOTAL (a+b)				$7,786.49	$2,479.94	$3,025.04	$3,185.04	$3,505.04	$3,665.04	$3,665.04	$3,665.04	$3,665.04	$3,665.04	$38,306.73
(c)Other charges														
Contingency(10%a+b)				$778.65	$247.99	$302.50	$318.50	$350.50	$366.50	$366.50	$366.50	$366.50	$366.50	$3,830.67
land charges	200	1	acre	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$2,000.00
SUB-TOTAL (c)				$978.65	$447.99	$502.50	$518.50	$550.50	$566.50	$566.50	$566.50	$566.50	$566.50	$5,830.67
TOTAL VARIABLE COST				$8,765.14	$2,927.93	$3,527.54	$3,703.54	$4,055.54	$4,231.54	$4,231.54	$4,231.54	$4,231.54	$4,231.54	$44,137.40
Yield			Doz			908.3	5450	8175	13625	13625	13625	13625	13625	82658.3
Yield			box			32.4	194.6	292	486.6	486.6	486.6	486.6	486.6	2952.0
Price			box			$75.00	$75.00	$75.00	$75.00	$75.00	$75.00	$75.00	$75.00	
REVENUE			box			$2,430.00	$14,595.00	$21,900.00	$36,495.00	$36,495.00	$36,495.00	$36,495.00	$36,495.00	$221,400.00
GROSS MARGIN				($8,765.14)	($2,927.93)	($1,097.54)	$10,891.46	$17,844.46	$32,263.46	$32,263.46	$32,263.46	$32,263.46	$32,263.46	$177,262.60

	YR0	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOTAL
Inflows	$0.00	$0.00	$0.00	$2,430.00	$14,595.00	$21,900.00	$36,495.00	$36,495.00	$36,495.00	$36,495.00	$36,495.00	$221,400.00
Outflows	$6,618.60	$2,146.54	$2,927.93	$3,527.54	$3,703.54	$4,055.54	$4,231.54	$4,231.54	$4,231.54	$4,231.54	$4,231.54	$44,137.40
Net flows	($6,618.60)	($2,146.54)	($2,927.93)	($1,097.54)	$10,891.46	$17,844.46	$32,263.46	$32,263.46	$32,263.46	$32,263.46	$32,263.46	$177,262.60
Discount Rate=35%	1	0.7407	0.5487	0.4064	0.3011	0.223	0.1652	0.1224	0.0906	0.0671	0.0497	
PVrevenues	$0.00	$0.00	$0.00	$987.55	$4,394.55	$4,883.70	$6,028.97	$4,466.99	$3,306.45	$2,448.81	$1,813.80	$28,330.83
PVcosts	$6,618.60	$1,589.94	$1,606.56	$1,433.99	$1,115.14	$904.39	$699.05	$517.94	$383.38	$283.94	$210.31	$15,362.82
NPVvalues@35%	($6,618.60)	($1,589.94)	($1,606.56)	($446.04)	$3,279.42	$3,979.31	$5,329.92	$3,949.05	$2,923.07	$2,164.88	$1,603.49	$12,968.01
NPVvalues@30%	($6,618.60)	($1,651.12)	($1,732.46)	($499.60)	$3,813.10	$4,805.51	$6,684.99	$5,142.80	$3,955.50	$3,042.44	$2,339.10	$19,281.67
NPVvalues@25%	($6,618.60)	($1,717.23)	($1,873.88)	($561.94)	$4,461.14	$5,758.41	$8,456.25	$6,765.65	$5,413.81	$4,329.76	$3,465.10	$27,878.46
NPVvalues@20%	($6,618.60)	($1,788.71)	($2,033.16)	($635.15)	$5,252.95	$7,171.69	$10,805.03	$9,004.73	$7,504.48	$6,252.66	$5,210.55	$40,126.48

cost of Prod of Avocado
crop duration Plant pop density: 70

Items	Rate	Qty	Unit	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOTAL
Establishment	$													
(a) Labour														
Landclearing	$2,000.00	1	acre	$2,000.00										$2,000.00
Peg prep&Lining	$80.00	1.3	day	$104.00										$104.00
Hole-digging	$2.00	70	hole	$140.00										$140.00
Man/mould	$2.00	70	hole	$140.00										$140.00
Planting	$80.00	1	day	$80.00										$80.00
Herbicide appl.	$80.00	2.5	day											$0.00
(ii) Materials														
Seedling	$30.00	70	each	$2,100.00										$2,100.00
Bioganic	$59.00	7	50lb	$413.00										$413.00
Daconater Herbi	$382.50	2.5	gal	$956.25										$956.25
(b)Operating costs														
Weeding	$1,000.00	1	acre	$1,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$19,000.00
Fertilizing	$80.00	1	day	$80.00	$160.00	$160.00	$160.00	$160.00	$160.00	$160.00	$160.00	$160.00	$160.00	$1,520.00
Replace seedlin	$80.00	0.5	day	$40.00										$40.00
Harvesting	$80.00		day				$560.00	$720.00	$800.00	$800.00	$800.00	$800.00	$800.00	$5,280.00
inputs														
NPK8:21:32	$225.10	0.2	112lb	$45.02	$168.83	$281.38	$281.38	$281.38	$281.38	$281.38	$281.38	$281.38	$281.38	$2,464.85
NPK16:9:18	$186.26	0.5	112lb	$93.13										$93.13
SUB-TOTAL(a+b)				$7,098.27	$2,328.83	$2,441.38	$3,001.38	$3,161.38	$3,241.38	$3,241.38	$3,241.38	$3,241.38	$3,241.38	$34,238.10

(c)Other charges													
Contingency(10%a+b)			$709.83	$232.88	$244.14	$300.14	$316.14	$324.14	$324.14	$324.14	$324.14	$324.14	$3,423.81
Land charges	200	1 acre	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$2,000.00
SUB-TOTAL (c)			$909.83	$432.88	$444.14	$500.14	$516.14	$524.14	$524.14	$524.14	$524.14	$524.14	$5,423.81
TOTAL VARIABLE COST			$8,008.10	$2,761.71	$2,885.51	$3,501.51	$3,677.51	$3,765.51	$3,765.51	$3,765.51	$3,765.51	$3,765.51	$39,661.90
Yield		Doz				150	200	240	240	240	240	240	1550.00
Price		Doz				$72.00	$72.00	$72.00	$72.00	$72.00	$72.00	$72.00	$504.00
REVENUE						$10,800.00	$14,400.00	$17,280.00	$17,280.00	$17,280.00	$17,280.00	$17,280.00	$111,600.00
GROSS MARGIN			($8,008.10)	($2,761.71)	($2,885.51)	$7,298.49	$10,722.49	$13,514.49	$13,514.49	$13,514.49	$13,514.49	$13,514.49	$71,938.10

Inflows	$0.00	$0.00	$0.00	$0.00	$10,800.00	$14,400.00	$17,280.00	$17,280.00	$17,280.00	$17,280.00	$17,280.00	$111,600.00
Outflows	$5,933.25	$2,167.98	$2,761.71	$2,885.51	$3,501.51	$3,677.51	$3,765.51	$3,765.51	$3,765.51	$3,765.51	$3,765.51	$39,755.03
Net flows	($5,933.25)	($2,167.98)	($2,761.71)	($2,885.51)	$7,298.49	$10,722.49	$13,514.49	$13,514.49	$13,514.49	$13,514.49	$13,514.49	$71,844.97
Discount Rate=35%	1	0.7407	0.5487	0.4064	0.3011	0.223	0.1652	0.1224	0.0906	0.0671	0.0497	
PVrevenues	$0.00	$0.00	$0.00	$0.00	$3,251.88	$3,211.20	$2,854.66	$2,115.07	$1,565.57	$1,159.49	$858.82	$15,016.68
PVcosts	$5,933.25	$1,605.82	$1,515.35	$1,172.67	$1,054.31	$820.09	$622.06	$460.90	$341.16	$252.67	$187.15	$13,965.41
NPVvalues@35%	($5,933.25)	($1,605.82)	($1,515.35)	($1,172.67)	$2,197.57	$2,391.11	$2,232.59	$1,654.17	$1,224.41	$906.82	$671.67	$1,051.27
NPVvalues@30%	($5,933.25)	($1,667.61)	($1,634.10)	($1,313.49)	$2,555.20	$2,887.57	$2,800.20	$2,154.21	$1,656.88	$1,274.42	$979.80	$3,759.82
NPVvalues@25%	($5,933.25)	($1,734.38)	($1,767.49)	($1,477.38)	$2,989.46	$3,460.15	$3,542.15	$2,833.99	$2,267.73	$1,813.64	$1,451.46	$7,446.07
NPVvalues@20%	($5,933.25)	($1,806.58)	($1,917.73)	($1,669.85)	$3,520.06	$4,309.37	$4,526.00	$3,771.89	$3,143.47	$2,619.11	$2,182.59	$12,745.09

ostnof prod of Cocoa
rop duration : Plant pop.density: 435

tems stablishment $	Rate	Qty	Unit	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOTAL
a) Labour														
andclearing	$2,000.00	1	acre	$2,000.00										$2,000.00
eg prep	$80.00	2	day	$160.00										$160.00
ining	$80.00	4	day	$320.00										$320.00
ole-digging	$2.00	435	hole	$870.00										$870.00
lan/mould	$2.00	435	hole	$870.00										$870.00
lanting	$80.00	3.2	day	$256.00										$256.00
erbicide appl	$80.00	1	day	$80.00										$80.00
ining(shade)	$80.00	3	day	$240.00										$240.00
ole-dig(shade	$2.00	515	hole	$1,030.00										$1,030.00
rep/plant sha	$80.00	5.4	day	$432.00										$432.00
lant perm.sha	$80.00	2	day	$160.00										$160.00
ii) Materials														
eedling	$4.00	435	each	$1,740.00										$1,740.00
ioganic	$59.00	43	50lb	$2,537.00										$2,537.00
aconater Herb	$382.50	1.3	gal	$497.25										$497.25
lantain Sucke	$4.00	435	each	$1,740.00										$1,740.00
oconut Seedli	$10.00	80	each	$800.00										$800.00
uradan nemati	$2,148.49	0.4	55lb	$859.40										$859.40
b) Operating Costs														
eeding	$1,000.00	1	acre	$1,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$19,000.00
ertilizing	$80.00	2	day	$160.00	$640.00	$960.00	$960.00	$960.00	$960.00	$960.00	$960.00	$960.00	$960.00	$8,480.00
eplace seedli	$80.00	1	day	$80.00										$80.00
arvesting	$80.00				$400.00	$320.00	$400.00	$640.00	$800.00	$1,200.00	$1,200.00	$1,200.00	$1,200.00	
ii) materials														
PK16:9:18	$186.26	1	112lb	$186.26	$745.04	$1,117.56	$1,490.08	$1,490.08	$1,490.08	$1,490.08	$1,490.08	$1,490.08	$1,490.08	$12,479.42
PK14:28:14	$217.37	4	112lb	$869.48										$869.48
mmoni.	$126.45		112LB		$252.90	$252.90	$252.90	$252.90	$252.90	$252.90	$252.90	$252.90	$252.90	$2,276.10
UB-TOTAL(a+b)				$16,887.39	$3,785.04	$4,397.56	$4,850.08	$5,090.08	$5,250.08	$5,650.08	$5,650.08	$5,650.08	$5,650.08	$62,860.55
c)Other charges														
ontingency(10%a+B)				$1,688.74	$378.50	$439.76	$485.01	$509.01	$525.01	$565.01	$565.01	$565.01	$565.01	$6,286.05

and charge	200	1 acre	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$2,000.00
UB-TOTAL (c)			$1,888.74	$578.50	$639.76	$685.01	$709.01	$725.01	$765.01	$765.01	$765.01	$765.01	$8,286.05
OTALVAR.COST			$18,776.12	$4,363.54	$5,037.32	$5,535.09	$5,799.09	$5,975.09	$6,415.09	$6,415.09	$6,415.09	$6,415.09	$71,146.60
ield/Cocoa					2	4	10	25	40	40	40	40	201
ield/Plantain				544	408	272							1224
ield/Dry Co							840	1680	2100	2100	2100	2100	10920
ield/Jelly							360	720	900	900	900	900	4680
rice/Cocoa					$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	
rice/Plantain				$4.50	$4.50	$4.50							
rice/Dry Co							$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	
rice/Jelly							$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	
evenue/Cocoa			$0.00	$0.00	$400.00	$800.00	$2,000.00	$5,000.00	$8,000.00	$8,000.00	$8,000.00	$8,000.00	$40,200.00
evenue/Plantain			$0.00	$2,448.00	$1,836.00	$1,224.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$5,508.00
evenue/Dry Co			$0.00	$0.00	$0.00	$0.00	$3,360.00	$6,720.00	$8,400.00	$8,400.00	$8,400.00	$8,400.00	$43,680.00
evenue/Jelly			$0.00	$0.00	$0.00	$0.00	$1,440.00	$2,880.00	$3,600.00	$3,600.00	$3,600.00	$3,600.00	$18,720.00
OTAL REVENUE			$0.00	$2,448.00	$2,236.00	$2,024.00	$6,800.00	$14,600.00	$20,000.00	$20,000.00	$20,000.00	$20,000.00	$108,108.00
ROSS \RGIN/Cocoa			($18,776.12)	($4,363.54)	($4,637.32)	($4,735.09)	($3,799.09)	($975.09)	$1,584.91	$1,584.91	$1,584.91	$1,584.91	($30,946.60)

rice/Cocoa			$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	
rice/Plantain		$4.50	$4.50	$4.50							
rice/Dry Co					$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	
rice/Jelly					$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	
evenue/Cocoa	$0.00	$0.00	$400.00	$800.00	$2,000.00	$5,000.00	$8,000.00	$8,000.00	$8,000.00	$8,000.00	$40,200.00
evenue/Plantain	$0.00	$2,448.00	$1,836.00	$1,224.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$5,508.00
evenue/Dry Co	$0.00	$0.00	$0.00	$0.00	$3,360.00	$6,720.00	$8,400.00	$8,400.00	$8,400.00	$8,400.00	$43,680.00
evenue/Jelly	$0.00	$0.00	$0.00	$0.00	$1,440.00	$2,880.00	$3,600.00	$3,600.00	$3,600.00	$3,600.00	$18,720.00
OTAL REVENUE	$0.00	$2,448.00	$2,236.00	$2,024.00	$6,800.00	$14,600.00	$20,000.00	$20,000.00	$20,000.00	$20,000.00	$108,108.00
ROSS MARGIN/Cocoa	($18,776.12)	($4,363.54)	($4,637.32)	($4,735.09)	($3,799.09)	($975.09)	$1,584.91	$1,584.91	$1,584.91	$1,584.91	($30,946.60)
OTAL G. MARGIN	($18,776.12)	($1,915.54)	($2,801.32)	($3,511.09)	$1,000.91	$8,624.91	$13,584.91	$13,584.91	$13,584.91	$13,584.91	$36,961.40

	YR0	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOTAL
Total Inflows	$0.00	$0.00	$2,448.00	$2,236.00	$2,024.00	$6,800.00	$14,600.00	$20,000.00	$20,000.00	$20,000.00	$20,000.00	$108,108.00
Total Outflows	$14,591.65	$2,295.74	$4,363.54	$5,037.32	$5,535.09	$5,799.09	$5,975.09	$6,415.09	$6,415.09	$6,415.09	$6,415.09	$69,257.86
Net Flows	($14,591.65)	($2,295.74)	($1,915.54)	($2,801.32)	($3,511.09)	$1,000.91	$8,624.91	$13,584.91	$13,584.91	$13,584.91	$13,584.91	$38,850.14
Discount rate=35%	1	0.7407	0.5487	0.4064	0.3011	0.223	0.1652	0.1224	0.0906	0.0671	0.0497	
PVCosts	$14,591.65	$1,700.45	$2,394.28	$2,047.17	$1,666.61	$1,293.20	$987.08	$785.21	$581.21	$430.45	$318.83	$26,796.13
PVrevenue	$0.00	$0.00	$1,343.22	$908.71	$609.43	$1,516.40	$2,411.92	$2,448.00	$1,812.00	$1,342.00	$994.00	$13,385.67
NPV flows@35%	($14,591.65)	($1,700.45)	($1,051.06)	($1,138.45)	($1,057.19)	$223.20	$1,424.84	$1,662.79	$1,230.79	$911.55	$675.17	($13,410.46)
NPVvalues@30%	($14,591.65)	($1,765.88)	($1,133.43)	($1,275.16)	($1,229.23)	$269.55	$1,787.08	$2,165.43	$1,665.51	$1,281.06	$984.91	($11,841.81)
NPVvalues@25%	($14,591.65)	($1,836.59)	($1,225.95)	($1,434.27)	($1,438.14)	$328.00	$2,260.59	$2,848.76	$2,279.55	$1,823.10	$1,459.02	($9,527.59)
NPVvalues@20%	($14,591.65)	($1,913.04)	($1,330.15)	($1,621.12)	($1,693.40)	$402.27	$2,888.48	$3,791.55	$3,159.85	$2,632.76	$2,193.96	($6,080.49)

Costnof prod of Coconut
Crop duration : Plant pop.density: 135

Items	Rate	Qty	Unit	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOTAL
Establishment $														
(a) Labour														
Landclearing	$2,000.00	1	acre	$2,000.00										$2,000.00
Peg prep	$80.00	1	day	$80.00										$80.00
Lining	$80.00	2	day	$160.00										$160.00
Hole-digging	$2.00	109	hole	$218.00										$218.00
Plant&Mould	$80.00	6	day	$480.00										$480.00
Herbicide appl	$80.00	3.6	day	$288.00										$288.00
(ii) Materials														
Seedling	$10.00	135	each	$1,350.00										$1,350.00
NPK14:28:14	$217.37	0.2	112lb	$43.47										$43.47
Daconater Herb	$382.50	0.6	gal	$229.50										$229.50
(b)Operating Costs														
Weeding	$1,000.00	1	acre	$1,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$2,000.00	$19,000.00
Fertilizing	$80.00	2	day	$160.00	$240.00	$320.00	$320.00	$320.00	$320.00	$320.00	$320.00	$320.00	$320.00	$2,960.00
Replace seedling			day											$0.00
Harvesting	$80.00		day					$240.00	$320.00	$400.00	$400.00	$400.00	$400.00	$2,160.00
(ii) materials														
NPK12:4:28	$181.25	0.5	112lb	$90.63	$362.50	$543.75	$543.75	$543.75	$543.75	$543.75	$543.75	$543.75	$543.75	$4,803.13
AmmSul	$126.45	0.3	112lb	$37.94	$63.23	$63.23	$126.95	$63.23	$63.23	$63.23	$63.23	$63.23	$63.23	$670.69
SUB-TOTAL(a+b)				$6,137.53	$2,665.73	$2,926.98	$2,990.70	$3,166.98	$3,246.98	$3,326.98	$3,326.98	$3,326.98	$3,326.98	$34,442.78
(c)Other charges														

contingency(10%a+8)			$613.75	$266.57	$292.70	$299.07	$316.70	$324.70	$332.70	$332.70	$332.70	$332.70	$3,444.28
land charge	200	1 acre	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$2,000.00
SUB-TOTAL(c)			$813.75	$466.57	$492.70	$499.07	$516.70	$524.70	$532.70	$532.70	$532.70	$532.70	$5,444.28
TOTAL VAR.COST			$6,951.29	$3,132.30	$3,419.67	$3,489.77	$3,683.67	$3,771.67	$3,859.67	$3,859.67	$3,859.67	$3,859.67	$39,887.06
Yield		unit					11.8	35.7	35.7	35.7	35.7	35.7	190.30
		nut					1304	3924	3924	3924	3924	3924	20924.00
price		unit					$205.00	$205.00	$205.00	$205.00	$205.00	$205.00	$1,230.00
REVENUE							$2,419.00	$7,318.50	$7,318.50	$7,318.50	$7,318.50	$7,318.50	$39,011.50
GROSS MARGIN			($6,951.29)	($3,132.30)	($3,419.67)	($3,489.77)	($1,264.67)	$3,546.83	$3,458.83	$3,458.83	$3,458.83	$3,458.83	($875.56)

	YR0	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	GRANDTOTAL
Total Inflows	$0.00	$0.00	$0.00	$0.00	$0.00	$2,419.00	$7,318.50	$7,318.50	$7,318.50	$7,318.50	$7,318.50	$39,011.50
Total Outflows	$6,137.53	$813.75	$3,132.30	$3,419.67	$3,489.77	$3,683.67	$3,771.67	$3,859.67	$3,859.67	$3,859.67	$3,859.67	$39,887.06
Net Flows	($6,137.53)	($813.75)	($3,132.30)	($3,419.67)	($3,489.77)	($1,264.67)	$3,546.83	$3,458.83	$3,458.83	$3,458.83	$3,458.83	($875.56)
Discount Rate=35%	1	0.7407	0.5487	0.4064	0.3011	0.223	0.1652	0.1224	0.0906	0.0671	0.0497	
PVCosts	$6,137.53	$602.75	$1,718.69	$1,389.75	$1,050.77	$821.46	$623.08	$472.42	$349.69	$258.98	$191.83	$13,616.96
PVrevenue	$0.00	$0.00	$0.00	$0.00	$0.00	$539.44	$1,209.02	$895.78	$663.06	$491.07	$363.73	$4,162.09
NPVflows @35%	($6,137.53)	($602.75)	($1,718.69)	($1,389.75)	($1,050.77)	($282.02)	$585.94	$423.36	$313.37	$232.09	$171.90	($9,454.86)
NPVvalues@30%	($6,137.53)	($625.94)	($1,853.38)	($1,556.63)	($1,221.77)	($340.58)	$734.90	$551.34	$424.05	$326.17	$250.76	($9,448.61)
NPVvalues@25%	($6,137.53)	($651.00)	($2,004.67)	($1,750.87)	($1,429.41)	($414.43)	$929.62	$725.32	$580.39	$464.17	$371.48	($9,316.94)
NPVvalues@20%	($6,137.53)	($678.10)	($2,175.07)	($1,978.96)	($1,683.12)	($508.27)	$1,187.83	$965.36	$804.52	$670.32	$558.60	($8,974.42)

NOTES

NOTES


FECHA DE DEVOLUCION
IICA
PM-A2/JM-94-10
Autor
Título Costs and returns under diffe
rent technology packages for ..
Fecha Devolución
Nombre del solicitante

This publication is a product of the "Improving Watershed Management and Increasing Socio-economic Well-being through Farming System Research and Development", a sub-project of the Hillside Agriculture Project funded jointly by the Government of Jamaica, the United States Agency for International Development, and the Inter-American Institute for Cooperation on Agriculture.