TECHNICAL REPORT
OF THE
PRELIMINARY FINDINGS
OF THE
INFORMAL SURVEY, 1989 – 90

HILLSIDE AGRICULTURE
SUB-PROJECT

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PREFACE

Since the last quarter of 1989, the Informal Survey has been carried out in the North - Eastern hillsides of St. Catherine. Consequently, this report presents the preliminary findings of the exercise as well as implications for the project implementation activities.

The report is comprised of five sections: (1) the Survey Process, (2) Presentation of Actual Findings, (3) Examination of Main Trends, (4) Conclusion and Recommendations and (5) the Appendices.

In section I, the various components of the initial planning stage and the data collection/processing exercises are outlined . Emphasis is placed on the explanation of the survey's objectives, methodology and administration.

In section II, there is an outline of the survey's results. They are given in a summary form, with the information grouped in the following categories, Farmer Social Characteristics, Land Resources, Agricultural Support Services, Crop Production Systems and Farming Problems.

A more detailed statistical analysis of these preliminary findings can be found in the third section. The information is grouped along similar lines as in the previous section.

Conclusions are drawn in Part IV, based on the preliminary findings presented earlier in the report. Also, recommendations for implementation strategies, (particularly in reference to the On-Farm Trials) are given.

Supplementary material, primarily, Project Area Maps, sample questionnaire as well as a glossary of the technical terms are included in the final section, the Appendices.

1. Background

The main goals of the Hillside Agriculture Sub-Project are embodied within its official title, 'Improving Watershed Management and Increasing Socio-economic Well Being through Farming Systems Research and Development'. [1]

The project's activities have been aimed at creating economically viable hillside agricultural production systems, increased sustainable small farmer income, rational resource conservation as well as strengthened farmer organizations for the residents of the Northern Rio Cobre Watershed. [2]

The Informal Survey launched the implementation phase in Mid-October, 1989. Although, planned originally as a two week Reconnaissance exercise, it has become an on-going data collection tool. Challenges faced during the initial stages included the unfamiliarity of the project staff to the terrain, gradual addition of new staff, difficulty in locating farmers and on-going simultaneous activities (project promotion and formation of twelve Farmers Action Committee Teams).

Despite these difficulties, the initial target of completing two hundred and fifty (250) questionnaires was surpassed. In fact, over three hundred (300) farmers had been interviewed.

2. Survey Objectives

The objectives were two-fold in nature. Firstly, to provide a diagnosis of the local farming environment and constraints. Such information would be later analyzed and published for the benefit of the Sub-Project.

Secondly, it was a pilot study or rather, a pre-runner to the formal Baseline Survey (as required by the project document). Hence, project planners would get a realistic idea, pertaining to : deadlines, cost estimates and personnel requirements, associated with the execution of Surveys in the area.

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[1] HASP is executed by the Research and Development Division, Ministry of Agriculture with USAID funds, which are administered by the Inter-American Institute for Cooperation on Agriculture (IICA).

[2] The area is composed of five Extension Areas bounded by Seafield in the North, Troja in the East, Riversdale in the South and Redwood in the West.

3. Methodology

The absence of a probability sample gave the survey its informal nature . The original sampling frame, the Ministry's Farmers Register proved to be inadequate in terms of current information on the location and distribution of farmers. Many had died, migrated or just could not be found.

Consequently, a modified format, a combination of Area and Quota Sampling was instead used. The Project Area Map [3] then became the frame. Enumeration was carried out in the districts and sub-districts of the three Administrative Areas [4], Golden Grove, Troja and Riversdale.

Also, the data collection officers [5] were not restricted to the confines of any particular sub-division. However, they were each required to fulfill daily targets.

Interviews were pre-arranged through the newly formed Farmers Action Committee Teams (FACTs groups) in each of the twelve districts. This strategy overcame the difficulty of locating farmers on their holdings.

Questionnaire Design

As shown in Appendix II, this structured schedule was designed to obtain a basic Agro-socio-economic overview of the farming community as well as the availability of support services in the area.

The questions were mostly pre-coded/closed, in order to facilitate future electronic data processing. However, a few were left open-ended, to generate qualitative data on certain aspects, specifically on Soil Conservation and Farm Record-keeping, which the project hoped to develop within the next 4 years.

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[3] See Appendix I for a copy of the Map.

[4] **Golden Grove** Administrative Area contains the districts:-
Golden Grove, Crawle II, Seafield, Ham Walk, Jubilee Town, Redwood, Dover Castle, Airy Mount, and
Troja:- Troja, Rose Hill, Facey, Top Mountain, Pear Tree Grove
Riversdale is comprised of Crawle I, Riversdale, Hampshire, Harewood, Gobay, Berry Hill, Sandy, Gut, Williamsfield and Darling Spring.

[5] The Data Collection Officers consisted of the project staff, Agronomists (3), Assistant Agronomist (1), Rural Development Officer (1) and Economist (1).

Common terms and concepts associated with the wording of the
schedule, are presented in Appendix III. They are quite
useful in aiding the reader's understandings of the Survey's
findings

5. Processing and Analysis

Editing, Coding and Data Entry Operations were performed by
the project's staff. Actual processing activities were
divided into two phases, manual and electronic. The latter
would give more elaborate detailed analysis of the trends.

The main purposes of Data editing were to ensure that crop
acreages matched physical farm acreages, as well as the
conversion of various production measures to a single
standard unit, the pound.

Coding involved assigning four digit identification numbers
to individual questionnaires to facilitate sorting
procedures. Additional single digit codes were given to
holdings (principally, the Main Parcel [6]) located in one of
the three administrative areas.

The information was entered initially, on Master Sheets by
hand. From this basic database, tables were constructed and
later integrated within the preliminary report. At the end
of March 1990, approximately two hundred and fifty five (255)
questionnaires were processed in this manner.

The rationale for the use of Master Sheets was its timeliness
in processing a relatively small survey. In other words, it
would enable easier and faster Data Entry activities, in
contrast to the time involved in the design and development
of a customized Electronic Data Processing environment.

On the other hand, the Master Sheets might generate less
accurate results as there would be more room for human
intervention throughout all stages of the Entry and
Processing operations. Additionally, The Master Sheets do
not readily lend themselves to more elaborate and complex
analysis.

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[6] See Appendix III for explanation.

This section contains a brief outline of the results derived
from the Survey. They included the following:-

1. SOCIAL CHARACTERISTICS OF THE FARMER(S)

a. Age

- Only 15.6% of the farmers were less than 39 years old

b. Gender

- Women farmers comprised 8.2% of all the farmers.

- the median age range for women was 39 - 48, but for men,
it was the 59 - 68 age category.

c. Membership in Farmer Organizations

- 45.8% of the farmers were members of farmer
organizations.

- 60.7% of the farmers were members of the Jamaica
Agricultural Society (JAS).

- the second most popular grouping was the Cocoa
Cooperative with 30.8% of the farmers.

- Only 4.3% of the farmers were members of the Coffee
Cooperative.

d. Membership and Age

- Only 9.3% of the farmers in all the organizations were
under 39 years.

e. Record-Keeping

- Only 12 farmers out of the sample (225) kept some form
of records.

2. LAND RESOURCES

a. Farm Size

- the overall average farm size was 8.3 acres.

- 40.5% of the farms fell into the 5 to less than 10 acre category.

- 29.8% of the farms were between 2 to less than 5 acres in size.

- less than 10% of the farms were less than 2 acres in size.

- 19.8% of the farms were over 10 acres in size.

b. Farm Fragmentation

- 72.6% of the farmers had 2 or more parcels.

- 35.6% of the sample was more likely to have only 2 parcels.

c. Tenure by Parcel

- 40.4% of the parcels were owned and this proportion accounted for 52.7% of the total farm area.

- 36% of the parcels were held by family members. This accounted for 27.4% of the total farm area.

- 7.4% of the parcels were rented while 7.8% was leased.

d. Land Utilization

- 52.4% of the total farm area was under some form of cultivation, with 39.8% in Tree Crop production and the remaining 12.6% devoted to other crops.

- 41.6% of the total farm acreage was in a Ruinate State.

e. Soil Conservation

- 32.9% of the farmers practiced some form of Soil Conservation.

- Over 73.7% of the farmers involved in this activity, was over 49 years.

- 52.8% of the farmers had Contour Barriers on their land.

- 46.2% of the farmers reported Trenches on their land.

3. AGRICULTURAL SUPPORT SERVICES

3.1. Marketing

a. Outlets and Agents

- Higglers were the main marketing agents for 54.1% of the farmers.

- Commodity Boards handled the produce of 28.6% of the farmers.

- Nearly 10% of the farmers marketed their own produce directly.

- 7% of the farmers reported their female family members as their main marketing agents.

b. Transportation for Agents

- 51.9% of the farmers reported that Trucks carried their produce to the selling point.

- 37% of the farmers reported Human means as their main form of transportation.

c. Farmstore Distance

- 44.5% of the farmers had to travel between 11 and 15 miles to their usual farmstore.

- 30.5% travelled between 6 to 10 miles to the farmstore.

- Only 14.5% of the farmers travelled less than 6 miles to the farmstore.

3.2. Extension Services

- 42.3% of Cocoa farmers were visited by the Cocoa Industry Board.

- 44.3% of the Coffee farmers were visited by their respective Commodity Boards.

4. CROP PRODUCTION SYSTEMS

4.1. Tree Crop Distribution

- Cocoa could be considered the most cultivated Tree Crop. It was grown by 76.9% of the sample and covered 51.7% of the total tree crop acreage.

- 38% of the sample grew Coffee. 8.5% of the tree crop acreage was devoted to its production.

- Coconut and Citrus farmers accounted for less than 40% of the sample and 11.9% of the tree crop area.

- Banana was grown by 74.9% of the sample and accounted for 25.4% of the total tree crop area.

- Plantain, as a Main 'Tree Crop was grown by 16.9% of the sample and was planted on 2.5% of the total tree crop area.

4.2. Tree Crop Production, 1989-90

- Roughly 970.6 boxes or 56,294.8 pounds of Cocoa (wet) were produced in this crop year.

- Approximately 133 boxes or 7,980 pounds of Coffee were produced in this crop year.

- About 409,915 pounds of Banana were produced in the year.

- 58,214 pounds of Coconut, 74,234.15 pounds of Citrus and 33,385 pounds of Plantain were produced in this crop year.

4.3. Cash Crop Distribution and Production, 1989-90

- 70 farmers reported reaping a total of 119,899.5 pounds of Eating Cane, the second highest of all production figures.

- 49 farmers reported reaping 25,046 pounds of Yam in this Crop year.

- Other popular cash crops included Pumpkin, Pineapple, Cocoe and Sweet Potato.

4.4. Cultural Practices for Tree Crops
a. Shade

- 78% of Cocoa farmers and 73% of Coffee farmers used Shade Tree for their crops.

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- Guango was the most common Shade Tree for both Cocoa and
  Coffee. 38% of Cocoa and 44.5% of Coffee farmers
  reported the use of this tree.

- Breadfruit and Mango, were the next popular Shade Trees
  for both Cocoa and Coffee. 43.4% of Cocoa and 27.8% of
  Coffee farmers used Breadfruit. 24.5% of Cocoa and
  16.5% of Coffee farmers used Mango trees.

b. **Pruning**

- 47% of Cocoa and 40.2% of Coffee farmers reported
  Pruning.

- 23% of Citrus farmers, 15% of Banana farmers and 6% of
  Coconut farmers pruned.

c. **Use of Chemical Inputs**

- Only 11.7% of Cocoa and 18.5% of Coffee farmers
  fertilized their trees.

- 20% of Citrus, 10.3% of Coconut and 7.3% of Banana
  farmers fertilized their crops.

- 2% of Cocoa and 9.3% of Coffee farmers sprayed their
  trees.

- Only one Citrus farmer and 3 Banana farmers used
  Pesticides on their trees.

5. FARMING PROBLEMS

- 28.7% of the responses claimed the lack of funds was one of
  their three main farming problems.

- 14.3% reported Labour Unavailability as one of their three
  main problems.

- 13.2% reported Input Unavailability as one of the three
  main problems.

- 10.8% of the responses listed high labour costs, while 8%
  reported Road/Transport deficiencies as one of their three
  main problems.

Part III
Analysis of Main Trends

This section has been devoted to an indepth analysis of the trends, presented in the preceding section.

1. SOCIAL CHARACTERISTICS OF THE FARMER

a. Age

Based on the table below, there seemed to be an aging farming community in the project area. Approximately 65.3% of the farmers were over 49 years, with 17.2% of that amount over the age of 69. Such an age structure could affect the rate of adoption for new agronomic practices.

Table 1
Age and Gender Distribution of Project Area Farmers

Gender	19-28	29-38	39-48	49-58	59-68	69+	Total	Total in %
Male	7	28	38	44	65	41	223	91.8
Female	1	2	8	3	5	1	20	8.2
Total	8	30	46	47	70	42	243	100.0
Total in %	3.3	12.3	18.9	19.3	28.8	17.2	100.0	

On the other hand, the small percentage of farmers under the age forty would suggest some form of outward migration. Hence, one measure of the project's success could be the number of youth remaining as farmers in the community.

b. Gender

The predominance of male farmers reinforced the notion of the gender division of labour on the farms. In other words, men tend to be more involved in production activities and women in marketing.

The female minority of 8.27% would suggest the limited impact of specialized support services on them. However, more research is needed to determine their influence on Farm Management decisions.

c. Age and Gender

The male age distribution reflected the national Farming
tendency, with a peak in the 59 - 68 range. This contrasted
with the typical age of the female farmer, which fell into
the 39 - 48 category.

d. Membership in Farmer Organization

As mentioned earlier in Part II, 45.8% of the farmers were in
farmer organizations. As shown in Table 2, the most popular
was the Jamaica Agricultural Society (JAS) with approximately
60.7% of the farmers were JAS members, followed by 30.8% in
the Cocoa Cooperatives.

Table 2
Membership Levels in the Farmer Organization by Age

Organization	19-28	29-38	39-48	49-58	59-68	69+	Total	Total in %
JAS	1	9	9	12	22	19	71	60.7
Cocoa Cooperative	-	1	6	10	6	13	36	30.8
Coffee Cooperative	-	-	1	2	1	1	5	4.3
Citrus Growers Assn.	-	-	-	-	3	1	4	3.4
Coconut Growers Assn.	-	-	-	1	-	-	1	0.8
Total	1	10	16	25	32	34	117	100.0
Total in %	0.8	8.5	13.7	21.4	27.3	29.0	100.0	

The high percentage of farmers in the Cocoa Cooperative
suggest some local specialization in Cocoa production.
Hence, collaboration with the two main groupings, would form
important institutional linkages.

Age distribution in all these groups was skewed in favour of
the older farmers. In fact, 29% of all members were over 69
years. However, 31% of the JAS members were in the 59 - 68
age range but 36% of the Cocoa Cooperative members were over
69 years.

This reinforces the necessity of a group approach by the
project staff, as an effective way of dissemination
information to the farmers. However, an alternate strategy
might be needed to reach the youth.

e. Record-Keeping

From the figures available in Table 3, only twelve (12)
farmers kept any form of records. This figure was developed
from a sample of 255 farmers.

Table 3
Number of Farmers who Keep Some Form of Records

Age Group (Years)	Number
19 – 28	–
29 – 38	1
39 – 48	5
49 – 58	2
59 – 68	2
69 +	2
Total	12

As shown the farmers who most likely kept records were in the
39 – 48 age range. This might be the most receptive group of
farmers to the proposed scheme. In the view of this, the
project staff would face quite a challenge when introducing
the programme to farmers.

2. Land Resources

a. Farm Size

From table 4, 40.5% of the farms were in the 5 -9.9 acre
category. This was in contrast to national tendency with a
prevalence of farms under 5 acres. In fact, 39.7% of the
farms in the area was under 5 acres. As a result, the
overall farm size average was 8.38 acres. There was a lower
average for the most popular category, being 7.5 acres.

Table.4
Farm Size Distribution in the Project Area

Farm Size (Acres)	Number of Farms	Number by %	Area (Acres)	% of Farmland	Average Size(Ac)
Less than 1	2	0.8	1.25	0.1	0.62
1 to < 2	23	9.1	31.40	1.5	1.36
2 to < 5	75	29.8	235.50	11.1	3.14
5 to < 10	102	40.5	765.15	36.2	7.50
10 to < 20	36	14.3	521.95	24.7	14.50
20 and over	14	5.5	557.35	26.4	39.80
Total	252	100.0	2112.60	100.0	-

This suggest that land might be readily available for possible expansion in the future. Also, there would be sufficient land area to develop the tree cropping component on most of the farms.

b. **Farm Fragmentation**

As shown in Table 5, there was a great incidence of fragmentation in the area. Approximately 72.6% of the farmers operated over two parcels of land. However, 35.6% of the said amount had only two (2) parcels.

Table 5
Parcel Distribution for Project Area Farmers

No. of Parcels	No. of Farmers	Farmers by %
1	69	27.9
2	88	35.6
3	56	22.0
4	34	13.0
4+	5	2.0
Total	247	100.0

This might be a possible constraint to agricultural
development in the area, as there would be limited acreages
for the establishment of Fruit Tree Orchards. The situation
could be more complicated if the distance between parcels was
significant. Farm Management decisions such as the choice of
crops, might also be affected.

c. **Tenure**

As the holdings were so fragmented, it was not possible to
have a single tenurial status. Table 6 confirmed that most
parcels had separate tenurial conditions.

Table 6
Tenurial Status by Parcel

Tenure	No. of Parcels	No. of Parcels by %	Area (Acres)	% Acreage
Own	261	40.4	1,054.15	52.7
Rent	48	7.4	113.60	5.7
Lease	45	7.8	135.25	6.7
Rent-Free	59	9.1	149.25	7.5
Family	233	36.1	548.70	27.5
Total	646	100.0	2,000.95	100.0

Roughly, 40.4% of the parcels were owned, and accounted for
52.7% of the total farm area. Family held land was the
second most popular. It accounted for 36.1% of the parcels
as well as 27.4% of the land area. The high incidence of
permanent tenurial status, would imply an eligibility of most
farms for project participation.

d. **Land Utilization**

Approximately 52.4% of the land area was under some form of
cultivation. A high proportion, of some 39.8%, as shown in
Table 7, was under Tree Crop production with the remaining
12.6% devoted to other crop production.

Table 7
Land Use in Project Area

Land Use	Area (Acres)	% Acreage
Main Tree Crops	812.78	39.8
Other Crops	256.53	12.6
Fallow	12.87	0.6
Pasture	76.97	3.8
Ruinate	850.48	41.6
Other	33.56	1.6
Total	2043.19	100.0

The specialization in Tree Crop production could also be inferred from tables on farm size distribution, and parcel tenure. The high degree of farm fragmentation would indicate Tree Cropping as one of the farmers' more popular means of dealing with such a problem.

Since 12.6% of the area was under the cultivation of other crops, intensive land use might also be inferred. The quantity of Cash Crops as shown in Table 15B would imply established inter-cropping and multiple cropping systems.

A disturbing situation was that high proportion of land resources, some 41.6% in ruinate, an amount equivalent to that under Tree Crop production. Casual observation might suggest poor soil/slope conditions as one possible cause.

However, further information from related tables [7] suggested more defined reasons, of a social nature. The underlying factors consisted of the high proportion of aging farmers, as well as farm fragmentation.

e. Soil Conservation

From Table 8, 32.9% of the sample had some form of soil conservation on their holdings. This would suggest a ready pool of farmers which could be developed and expanded.

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[7] Table 1, 5, & 19.

Table 8
Number of Farmers Who Practice Soil Conservation by Age

Age Group (Years)	Number of Farmers	% of Farmers
19 - 28	1	1.2
29 - 38	10	12.2
39 - 48	11	13.1
49 - 58	17	20.2
59 - 68	18	21.4
69 & Over	27	32.1
Total	84	100.0

However, this awareness seemed to be confined to the older farmers. In other words, 73.7% of the farmers who conserved the soil were over 49 years. The most likely farmers were 69 and over. The younger farmers should be targeted for such Extension activities.

Table 9
The Various Soil Conservation Methods
Used by Project Area Farmers

Soil Conservation Methods	Number of Farmers	% of Farmers
Trench	49	46.2
Contour Barrier	56	52.8
Terrace	1	1.0
Total	106	100.0

The most popular method reported was the Contour Barrier construction. This accounted for 46.2% of the farmers. Qualitative responses on the questionnaire also listed Dead (log, stone) and Live (grass, tree) barriers, with the latter being more common.

Trenching was also popular, as reported by 46.2% of the farmers. The low percentage for Terracing suggested the farmers' preference for economical and simpler conservation measures.

3. AGRICULTURAL SUPPORT SERVICES

3.1. Marketing

a. Outlets and Agents

As indicated in Table 10, there was a dualistic marketing structure in the area. In other words, the distribution agents and outlets were distinct, as determined by the nature of the crop. The Commodity Boards served the Export crops such as Coffee, Cocoa and Citrus while the Higglers supplied domestic food crops to the Parochial/Curbside markets.

Table 10
Main Marketing Agents for Project Area Farmers

Marketing Agents	Number of Responses	% of Responses
Higgler	193	54.1
Commodity Board	102	28.6
Farmer	35	9.8
Female Family Member	25	7.0
Factory Officer	2	0.5
Total	357 [8]	100.0

From Table 10, 54.1% of the sample listed Higglers as one of their main marketing agents. This implied sizeable quantities of domestic food crops were traded on the local market. However, nearly 10% of the farmers were directly responsible for both the marketing and production of crops.

Approximately 28.6% of the farmers reported the Commodity Boards, as being responsible for the distribution of their tree [9] crops. Hence, any increase in the production of crops, due to the project influence, could be readily absorbed by these boards.

b. Transport

From Table 11 below, farmers and their marketing agents relied on mechanized means of Transportation. Trucks were the predominant mode and accounted for 52% of the responses. Buses and Taxis were the popular choice for the minority.

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[8] This table was based on the responses given to a multi-part question, where many answers were possible. Hence, the number of responses would exceed the number of farmers in the sample.
[9] Qualitative answers from the Question 6 on the questionnaire .

Table 11
Most Common Means of Transport

Transport	Responses	% Responses
Trucks	135	51.9
Bus/Taxi	29	11.1
Human	96	37.0
Total	260 [10]	100.0

Roughly 37% of the farmers reported Human means of transport. In other words, they had to walk to their various destinations. Such a situation suggests a possible production constraint as there would be limits to the quantity of produce and inputs transported from the farmstore to the farm.

c. Farmstore Distance

The average farmstore could be considered the main market place for inputs, particularly farm chemicals. Hence, it could be assumed that there is a relationship between farmstore distance and selected input usage on hillside farms.

From Table 12, approximately 44.5% of the farmers travelled between eleven (11) to fifteen (15) miles to the store. The second most cited distance was between six (6) to ten (10) miles.

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[10] Although the sample size was 255, many of the questionnaires had multiple responses to this question.

Table 12
Farmstore Distance from Main Parcel [11]

Miles	Farmers	% Farmers
less than 1	5	2.8
1 - 5	21	11.7
6 - 10	55	30.5
11 - 15	80	44.5
16 - 20	13	7.2
21 - 25	6	3.3
Over 25	-	-
Total	180	100.0

These popular distances could possibly affect input costs
incurred by the farmers and subsequently, Crop Production
costs. It could also affect the Farmers' decision-making
behaviour, in terms of the allocation of resources among the
various crops. On the other hand, lower prices and better
product availability might characterize the more distant
farmstores .

3.2. Extension Services

During Survey Design, Extension services were defined in
terms of technical advice offered by the officers of
Commodity Boards. The underlying premise was the local
specialization in export-oriented tree crops.

Hence, Information and Technology flows were measured as farm
visits from the officers. A direct relationship was assumed
between the frequency of visits and the state of the farmer
knowledge of recent practices.

Table 13
Number of Cocoa and Coffee Farmers
Visited by Extension Officers of Commodity Boards

FARMERS	CROPS	
	Cocoa	Coffee
Number with crop	196	97
Number visited	83	43
% of crop farmers visited	42.3	44.3

[11] See Appendix III for explanation of term.

From Table 13, almost half the number of Cocoa and Coffee
farmers were visited by Officers from both Commodity Boards.
However, these results were inconclusive as the frequency of
the visits as well as farmer satisfaction with the service
were not documented. In spite of these omissions, these
results suggest a need for collaboration with these agencies.

4. CROP PRODUCTION SYSTEMS

4.1. Tree Crop Distribution

Based on Table 14, Cocoa was cited as the most cultivated
tree crop in the area, with 51.7% of the total tree crop
area. It accounted for 76.9% of the farmers in the sample.
Coffee was second, with 8.5% of the acreage and 38% of the
sample farmers.

Table 14
Main Tree Crop Cultivation by Farmers and Area

Tree Crop	Farmers with Crop	Crop Farmer % of Sample	Area Cultivated (Acres)	% Acreage
Cocoa	196	76.9	451.52	51.7
Coffee	97	38.0	69.51	8.5
Coconut	68	26.6	49.66	6.1
Citrus	30	11.8	47.35	5.8
Banana	191	74.9	206.99	25.4
Plantain	43	16.9	20.54	2.5
Pimento	15	5.9	15.56	1.9
Total	–	–	815.57	100.0

However, these figures were substantially less for Coconut
and Citrus. Roughly, 26.6% of the sample had Coconut and 12%
had Citrus. The acreage devoted to both crops was less than
12%. This might imply that the project area was not major
areas for Coconut, Citrus or Coffee cultivation.

Pimento was cultivated as a main Tree Crop by only a small
minority, approximately 5.9% of the sample. The total land
area devoted to its cultivation was also minimal, in contrast
to the other Tree Crop acreages. In other words, it utilized
some 1.9% of the total Land area which was in Tree Crop
production.

Although Banana and Plantain could not be considered true
Tree crops, they were listed among the most popular farmer
responses. Banana was the second only to Cocoa, with 25.4%
of the total Tree Crop area and cultivated by 74.9% of the
sample. Plantain was grown on a much smaller scale, by only
16.9% of the sample and covered. 2.5% of the tree crop area.

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4.2. Tree Crop Production

At the outset of the Survey, the intention was to use the
data generated from Question 6(b) on the Crop Acreages reaped
for the computation of the various Productivity figures.
With the lack of Farmer responses for this section, the basis
for this measurement had to be changed. Consequently, Crop
productivity is now determined by the total production
divided by the Crop Acreage planted (instead of Crop Acreages
Reaped). The implicit assumption here, is that the Farmers
reap from the total area planted for that particular crop,
irrespective of Parcel distribution.

Table 15A
Volume of Tree Crop Production
For Last Crop Year, 1989 - 90

Tree Crop	Farmers who Reaped	% ot Farmers with Crop	Total Production (lbs)	Production Per Acre (lbs)
Cocoa	150	76.5	970 Boxes or 56,294.80	2.15 Boxes or 124.68
Coffee	33	34.0	133 Boxes or 7,980.00	1.91 Boxes or 114.80
Coconut	41	60.2	58,214.00	1,172.25
Citrus	15	50.0	74,234.65	1,567.78
Banana	191	100.0	409,915.00	1,980.36
Plantain	43	100.0	33,385.00	1,625.36
Pimento	13	85.7	5,483.00	349.90
Breadfruit	43	-	20,072.00	-

As shown in Table 15A, most of the sampled farmers cultivated
Cocoa and Coffee, both of which had the lowest productivity
figures among the main reported Perennials. The difference
between these figures was rather small, as Production Per
Acre could be rounded off to 2 boxes, respectively. However,
these findings should not be too surprising, if one takes
into account the low level of crop care and maintenance,
inferred from the preceding tables.

Regardless of the differences in total Production between the two other popular crops, Coconut and Citrus, both productivity levels are over 1,000 pounds of produce per acre. In fact, Citrus has the greater edge, with a difference of nearly 400 pounds. These levels are significant as both crops have smaller Crop acreages and less Farmers than both Cocoa and Coffee.

Although the Project area is no longer a Banana export zone , its total production and general productivity levels still remained high. In fact, it was the highest of all the crops. It showed that farmers had not discontinued cultivation. Their reliance on the regular income no doubt played an important part in the cash flow situation of the farms.

Despite the small number of crop farmers and limited acreage, the production level for Plantain was approximately 33,385 pounds. However, its productivity figure was approximately 14 times that of Coffee.

Given the project's emphasis on Tree crops such as Pimento, its present production levels were disappointingly low. As shown in Table 15A, there was greater productivity than the other popular crops such as Cocoa and Coffee. However, there is the real need to increase its production levels in the area.

There is a sizable production of Breadfruit in the area, with reported figures of some 20,072 lbs. As it mainly provided shade for Cocoa and Coffee, individual Crop acreages were hardly reported. As such, its productivity figures could not be computed.

4.3. Cash Crop Production

It should be noted that Yield data could not be obtained from most of the Farmers as they were unable to estimate the area reaped and also, the individual acreages planted were not differentiated on the Questionnaire (see Question 5(e) in Appendix B). Hence, productivity measures for the various Cash Crops could not be determined. The production data presented in Table 15B, are for Crop Production per farmer . As such, it is not known whether these figures came from only one parcel of land or the whole farm.

Table 15B
Volume of main Cash Crop Production
for Crop Year, 1989 - 90

Main Cash Crop	Farmers Who Reaped	% of Sample	Total Production (lbs)
Eating Cane	70	27.5	119,899.50
Yam	49	19.2	25,046.00
Pumpkin	13	5.1	10,305.00
Pineapple	13	5.1	7,199.00
Cocoe	13	5.1	1,908.00
Sweet Potato	13	5.1	1,706.00

As shown in the table above, the project area could be considered to be a Sugar Cane area. It had the highest production levels, four times that of the nearest crop, Yam. Yam was another important Cash crop for nearly 20% of the farmers. It had the second highest total production figures of all the reported Cash crops. The remaining 21,118 pounds of Cash crop produce were distributed among Pumpkin, Cocoe Pineapple and Sweet Potato. Therefore, they could be considered minor cash crops in the typical crop mix.

4.4. Cultural Practices

Farmer responses for the knowledges of cultural practices for the two major tree crops, Cocoa, and Coffee were sufficient enough for detailed analysis. On the other hand, inadequate reports were received for the other tree crops, Coconut and Citrus. As such, results for them could be considered to be inconclusive.

a. Shade

Based on Table 16A, less than a quarter of both Cocoa and Coffee farmers had no shade for their crops. This was one of the few practices for which farmers followed the recommending guidelines by the Commodity Boards.

Table 16A
Number of Cocoa and Coffee Farmers
With Shade Trees

Crop	Farmers	
	No with Shade	%
Cocoa	154	78.6
Coffee	71	73.2

Supplementary data from Table 16B, would imply that farmers considered shade in permanent terms. It also highlighted the use of economic trees as shade.

Table 16B
Permanent Shade Trees for Cocoa and Coffee(Number of Farmers)

Permanent Shade Trees	Cocoa Farmers with Shade	% of all Cocoa Farmers	Coffee Farmers with Shade	% of all Coffee Farmers
Guango	99	50.5	45	46.4
Breadfruit	85	43.4	27	27.8
Mango	48	24.5	16	16.5
Ackee	14	7.1	6	6.2
Cedar	10	5.1	3	3.1
Apple	4	2.0	4	4.1

Guango was used as the most popular shade by 50.5% of Cocoa and 46.4% of Coffee farmers. However, this tree was once considered an undesirable shade tree for Cocoa.

Breadfruit was the second most popular, as it was used by 43.4% and 27.8% of Cocoa and Coffee farmers, respectively. Mango, one of the project proposed Fruit Tree was used by 24.5% of the Cocoa and 16.5% of the Coffee farmers. There were other less popular shade trees such as Ackee, Cedar and Apple.

b. Pruning
As shown in Table 17, approximately half of Cocoa and Coffee farmers reported doing this exercise. This proportion was in contrast to the other crops, where the reported incidence was significantly lower.

Table 17
Cultural Practices on Main Tree Crops
(Number of Farmers)

Tree Crop	CULTURAL PRACTICES					
	No. who Prune	% of Farmers	No. who Fertilize	% Crop Framers	No. who Spray [13]	% Crop Farmers
Cocoa	92	47.0	23	11.7	4	2.0
Coffee	39	40.2	18	18.5	9	9.3
Coconut	4	5.9	7	10.3	–	–
Citrus	7	23.3	6	20.0	1	3.3
Banana	27	15.0	14	7.3	3	1.7

There are other factors (not captured by the Survey,) which could influence the effect of this farming activity on the state of the fields. They could include, the regularity and last date of Pruning. Qualitative responses in another project forum [14], suggested pruning was done on an irregular basis.

c. Use of Chemical Inputs

Only a minority of the tree crop farmers reported the use of chemical inputs. Farmers were more likely to use fertilizer on their crops, rather than pesticides. From Table 17, 20% of Citrus farmers applied Fertilizers to their crop. This was the highest proportion of farmers for all the Tree crops, who performed this exercise. Coffee farmers, was the second most likely group to fertilize their trees. The worst case was for Banana, where only 7.3% used fertilizers.

Coffee farmers were also the most likely group of farmers to use Pesticides. This figure of 9.3% was still very low. However, 2% of all Cocoa and 3% of all Banana and only one Citrus farmer did any form of spraying on their crops.

Therefore, one could conclude that cash expenses for the maintenance of these crops were at best minimal. It should be no surprise if the crop yields were lower than recommended levels.

5. FARMING PROBLEMS

Based on the Project's Farming Systems approach, the farmers participation should be included in all phases of its implementation. Such an omission would handicap its effectiveness. Plans would be based solely from an outsider's view, therefore problems and solutions may be totally different from an insider's perspective.

Hence, Table 19 is included to capture the farmers' perception of his/her Agro-Socio-Economic environment. It is shown on the following page.

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[13] The number who use Pesticides on their crops.
[14] HASP Training Day for farmers in Jubilee on March 15, 1990. It dealt with Cocoa Pruning and Fertilizing Techniques.

Table 19
Main Problems Faced by Project Area Farmers

Main Problems	Number of Responses	% of Responses
Land too steep	1	0.1
Poor soil quality	–	–
Lack of funds	202	28.7
Lack of water	5	0.7
Weeds	22	3.1
Input unavailability	93	13.2
High cost of inputs	43	6.1
Labour unavailability	101	14.3
High cost of labour	76	10.8
Distance from market	5	0.7
Inadequate market	1	0.1
Poor product price	12	1.7
Pest and disease	42	6.0
Low yield per acre	2	0.3
Praedial larceny	43	6.2
Roads/transport	56	8.0
Total	704[15]	100.0

As shown in the table above, the farmers suffer from a
scarcity of production resources, namely, Credit, Material
inputs and Labour. However, the main concerns was the lack
of funds. It was cited by 28.7% of the sample as one of the
three main problems. 14.3% reported labour unavailability
and 13.2% reported input scarcity. Another 10.8% of the
sample were offset by high labour costs.

Although outsiders might have listed Praedial Larceny and
Pest/Disease among the three most common problems, only 8% of
farmers viewed them as such. They regarded the poor state of
roads and transport as more serious problems.

In concluding, Credit, Labour and Input scarcities appeared
to be the main constraints, internal to the typical farming
system. The success of the project would depend on its
ability to deal with these problems.

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[15] It would seem that the number of responses exceeded the
sample size. However, these results were based on a
three part question. The answers were aggregated,
therefore 3 x 255 (sample) would give a maximum limit of
765 responses for this section.

Infrastructural deficiencies, particularly, the state of
public roads and transport seemed to be external constraints,
impinging on the farm environment. Project staff would also
be compelled to accept these conditions. However, these long
run constraints could improve if the project succeeds in
increasing the socio-economic well being of the farmers in
the area.

6. CRITERIA FOR FARMER PARTICIPATION IN ON-FARM TRIALS

From Table 20, most of the farmers seemed willing to
participate in the project. However, a reduction of nearly
6% of the farmers who could supply land, time and labour to
the project, mirrored the extent of the farmers' ability to
cope with the increased labour demands associated with the
trials.

Table 20
Number of Farmers Willing to Participate
in Projects' On-Farm Trials (OFTs)

Selection Criteria	Number of Farmers	Response % of Sample
Land	237	92.9
Time and Labour	225	88.2
Land, Time and Labour	222	87.0

Approximately 92.9% of the sample was most willing to provide
land for the demonstration sites. This was not surprising,
given the high proportion of ruinate land in the area.

Farmers were more reluctant to give of their time and labour.
This came against a background of reported labour shortages,
high labour costs as well as high degree of land
fragmentation. All of these factors represented an increased
strain on the farmers' ability to get their routine tasks
done.

SUB-PROJECT AREA MAP

1

North

Seafield

Airy Mount

Golden Grove

Dunkeld

Crawle

Rosehill

Ham Walk

Hartford

Rio Magno

Redwood

Troja

Cedar Valley

Darling Spring Halt

Hampshire

Harewood

Williamsfield

Riversdale

A-1   Scale: 1:50,000 (Metric Edition)
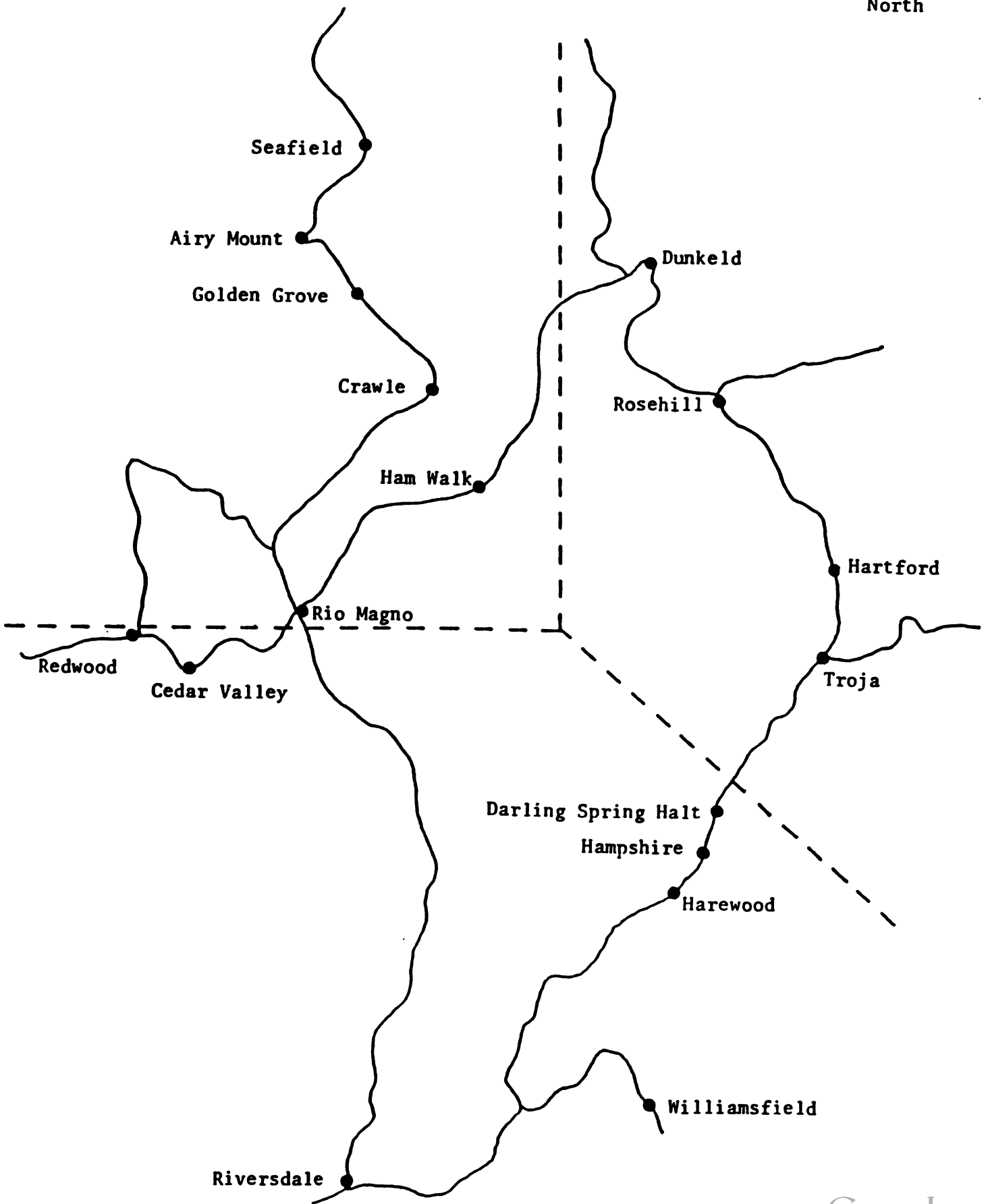
ID. NO. ☐☐☐☐☐

ADMIN. AREA ☐

1. NAME ....

2. ADDRESS ....

3. LOCATION OF MAIN PARCEL ....

   .... 4. NO. OF PARCELS ☐☐

5. PARCEL INFORMATION

(a) NO.OF PAR-CELS	(b) TEN-URE CODE	(c) ACREAGE		LAND UTILIZATION										
				(d) TWO MAIN TREE CROPS CURRENTLY GROWING						(e) OTHER CROPS	ACREAGE			
											(f)	(g)	(h)	(i)
		AC.	SQ.	NAME	ACREAGE		NAME	ACREAGE						
					SQ.	NO.OF TREES		SQ.	NO.OF TREES	ACRE-AGE	FAL-LOW	PAS-TURE	RUI-NATE	OTH-ER
1														
2														
3														
4														

TENURE CODE: OWNED = 1; RENTED IN = 2; LEASED IN = 3;
USED RENT FREE = 4; FAMILY LAND = 5

6. ACREAGE AND PRODUCTION OF CROP LAST SEASON

NAME OF CROP	CROP ACREAGE REAPED	NO. OF PLANTS	PRODUCTION (LB.)						TOTAL LB.	AVEG. FARM GATE PRICE /LB
			SOLD	CONSUMED	GIVEN AWAY	SPOILT	FED TO ANIMAL	STOLEN		

7. WHAT ARE YOUR MAIN MARKETING OUTLETS?

    (a) HIGGLER ☐   (b) FARMGATE ☐   (c) IN PROJECT AREA ☐

    (d) COMMODITY BOARDS ☐   (e) EXPORTERS ☐   (f) JAS ☐

    (g) OTHER SPECIFY...................   (h) OTHER SPECIFY...............

8. (a) DO YOU KEEP RECORDS?   YES ☐   NO ☐

    (b) IF YES, WHAT TYPE OF RECORDS? ....

9. DO YOU BELONG TO ANY OF THE FOLLOWING FARMERS' ORGANIZATION?

    (a) JAS ☐   (b) COCOA CO-OP ☐   (c) COFFEE CO-OP ☐

    (d) OTHER SPECIFY...................   (e) OTHER SPECIFY...............

10. WHAT TYPE OF SOIL CONSERVATION DO YOU PRACTICE?

    ....

11. WHAT PERCENTAGE OF YOUR EARNING IS DERIVED FROM:-

    (a) FARMING ☐   (b) OVERSEAS FARM WORK ☐   (c) GIFTS ☐

    (d) OFF FARM EMPLOYMENT ☐   (e) FAMILY MEMBERS ☐

12. WHAT ARE YOUR THREE MOST IMPORTANT PROBLEMS IN FARMING?

    (a) LAND TOO STEEP TO FARM ☐   (b) POOR QUALITY SOIL ☐

    (c) LACK OF FUNDS TO DEVELOP LAND ☐   (d) LACK OF WATER ☐

    (e) PROBLEMS WITH WEEDS ☐   (f) UNAVAILABILITY OF INPUTS ☐

    (g) HIGH COST OF INPUTS ☐   (h) UNAVAILABILITY OF LABOUR ☐

    (i) HIGH COST OF LABOUR ☐   (j) DISTANCE FROM MARKET ☐

    (k) INADEQUATE MARKET ☐   (l) LOW PRICE FOR PRODUCE ☐

    (m) PROBLEMS WITH PEST AND DISEASE ☐   (n) VERY LOW YIELD PER ACRE ☐

    (o) PRAEDIAL LARCENY ☐   (p) OTHER ☐

13. ARE YOU WILLING TO MAKE YOUR FARM AVAILABLE FOR A DEMONSTRATION?

    YES ☐   NO ☐

14. TREE CROP DATA

CROP NAME	TYPE OF SHADE TREES			CULTURAL PRACTICES						CONDITION OF FIELD			SERVED BY COMM.BD	
				PRUNING		FERT.USED				GD.	FR:	PR.	YES	NO
				YES	NO	YES	NO							

15. DISTANCE FROM MAIN PARCEL TO FARMSTORE ☐☐ MILES

16. MEANS OF TRANSPORTING PRODUCE TO SELLING POINT

    (a) TRUCK ☐☐   (b) PICK-UP ☐☐   (c) BUS ☐☐

    (d) ANIMALS ☐☐   (e) HUMAN ☐☐   (f) OTHER.......... ☐☐

17. ARE YOU WILLING TO CONTRIBUTE YOUR TIME AND LABOUR TO THE CULTURAL PRACTICES OF THIS PROECT?

          YES ☐☐   NO ☐☐

18. GENERAL OBSERVATIONS: _____

_____

_____

_____

_____

_____

_____

_____

SIGNED BY................................... DATE...................

APPENDIX III

A Glossary of Technical Terms
and Definitions

This section has been devoted exclusively to defining and explaining the technical jargon associated with the Survey Design and Implementation as well as the actual wording of the questionnaire. Terms and concepts have been organized in alphabetical order (regardless of discipline) for ease of reference.

Area Reaped	–	the area of land from which crops are harvested.
Area Sampling	–	a type of sample in which the sampling units are individual land areas (segments) which can be defined on a map. The segments cover the entire area to be included in the Survey; the segments do not overlap and in most applications, the boundaries of each segment must be clearly defined so that they can be recognized by enumerators in the field.
Closed Questions	–	these kind of questions offer a choice of alternation, which may be simple alternatives such as ´yes´ or ´no´ or ´I don´t know´. This method of data collection is quicker since all possible answers are already included on the response schedule and all the interviewer has to do is to identify the category in which the response fits.
Crop Acreage	–	the actual physical area of land occupied by the crop, bearing in mind the spacing between plants.
Fallow	–	land which is being rested for the purpose of improving productivity.
Farm	–	land forming or holding or part of a holding but situated in a single parish. Where as the holding is the overall agricultural production regardless of parish location, the farm refers to that part confined to a single parish.
Farming Systems	–	the management of farming enterprises according to the dictates of the biological, socio-economic environment and the resources, goals and preferences of rural farm families.
Farmer	–	an individual rearing one cow or its equivalent of other livestock or cultivating one or more crops on a portion of land not less than half (1/2) an acre for a livelihood.

Holding	–	unit of agricultural production operated under a single management. This may consist of more than one parcel of land and may be scattered over more than one parish.
Interviewer	–	person who will be asking the questions to fill the questionnaire.
Land Tenure	–	conditions under which the holder operates the land i.e., owned, leased in, rented in, rent-free or family land.
Location of Holding	–	a holding may only be located in one administrative area, that is, wherever the main parcel is located.
Main Parcel	–	the portion of land on which the farmer earns most of his/her income and spends most of his/her time.
Other Land Uses	–	land occupied by dwelling/farm houses, idle land and other non-agricultural uses.
Parcel	–	a continuous area of land, unbroken by land operated by someone else. A parcel is a part of a sub-division of a holding.
Pasture	–	cultivated or uncultivated grassland used for grazing.
Precoded Questions	–	see Closed Questions
Probability of Selection	–	the chance each unit has of being included in the sample.
Probability Sample	–	a sample in which each element in the population has a known probability of selection.
Questionnaire	–	see Structured Schedule
Quota Sampling	–	selection is done on a non-random basis. Once the general characteristics within each stratum are decided, a quota assignment is allocated to each interviewer. It is the interviewer's responsibility to choose the actual sample units to fit the characteristics.

Respondent	–	all qualified farmers who supply the information to fill the questionnaire.
Ruinate		land which has been used in the past but not presently used over a period of one year due to the lack of resources.
		Land which is grown with shrubs, etc., over a long period due to poor soil and steep slopes.
Sample	–	a part of a population, or a subset from a set of units, which is usually provided by random but sometimes deliberate selection, with the object of investigating properties of the parent population or set.
Sampling Frame	–	a complete list (or specifications that would establish a complete list) of sampling units that cover a population. It provides access to a population in ways that enable probability sampling.
Sampling Units	–	units in which a survey population is divided for sampling purposes. They are units subject to random selection.
Survey	–	an examination of a sample of units, usually human beings, animals or institutions, to estimate characteristics of the total.
Shade	–	any tree that is deliberately planted for the primary purpose of providing cover for another or one that inadvertently provides cover for the cultivated crop.
Survey population	–	the population actually sampled (or completely enumerated). It is defined by the sampling frame and the procedure for using it.
Structured Schedule	–	it consists of a form with a series of questions, which implies uniformity of questions put to respondents.

Target Population   –   the population, which, given full freedom of choice, one might wish to survey, for practical reasons the population actually surveyed could be different from the target population.

Total Physical Acreage   –   total area of land that is under the farmers' control. This is the sum of the acreage of all the parcels.

Yield   –   total production obtained per crop acreage of land reaped.

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FECHA DE DEVOLUCION

IICA
PM-A2/JM-91-07

Autor

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minary findings of the
informal survey ...

Fecha Devolución	Nombre del solicitante