PN-AE-199

13

AGRICULTURAL DEVELOPMENT SUPPORT II
HAITI

University of Arkansas,
Fayetteville

TECHNICAL ASSISTANCE IN STRATIFICATION OF DEPARTEMENT DU SUD, HAITI FOR FRAME VERIFICATION AND SAMPLING

Report #13

1

TECHNICAL ASSISTANCE IN STRATIFICATION

OF

DEPARTEMENT DU SUD, HAITI

FOR

FRAME VERIFICATION AND SAMPLING

U.S. Department of Agriculture

Statistical Reporting Service

Paul W. Blackwood, Survey Statistician

Jim Davies, Mathematical Statistician

June 17-30, 1985

ADS-II Report #13

I. General

Paul Blackwood and Jim Davies arrived in Port-au-Prince, Haiti on June 17, 1985. We were picked up at the airport by Mike Bertelsen, National Survey Economist, with the ADS-II project. Lodging had been arranged at the Guest House (Turgeau Apartments) operated by the projects of Winrock International through the University of Arkansas.

The following materials were hand carried and turned over to Mike Bertelsen for the Project:

1 - Intra Graphics light table

1 - Copy of USDA, SRS/AID Project Agreement

2 - Copies of SRS No. 21 (A Training Course in Sampling Concepts for Agricultural Surveys - English and French versions)

We were picked up at the apartment on Tuesday, June 18 by Wilson, a project driver, and met Richard Swanson at USAID. While waiting for Richard to finish a meeting, I introduced Jim Davies to Vincent Cusumano. Richard's meeting ended, and we went with Richard into the office of Abdul Wahab, acting for John Lewis, the rural development officer at AID. Wahab was associated with the project in the beginning stages. He prepared letters of request for temporary commissary privileges to Harley Smith at the American Embassy. We asked for transportation to/from lodging to work each day. Wahab had to clear this request with the executive officer, Harry Lightfoot. The request was denied; however, we did get a jeep at 20.5 cents per mile from Saturday am June 22 to am of Tuesday June 25. Monday, June 24 was an AID/Haitian holiday. Actually the jeep was used more for work on the project. We kept maps and planimeter with us over the long weekend and worked at the apartment or Mike Bertelsen's house near Laboule.

Tuesday afternoon and Wednesday (June 18 and 19) were spent at Damien. Jim Davies was introduced to Ernest Dupont, Head of Statistics. We also met Leonard Malczynski, a short-term computer specialist with the ADS-II project. Also, we went to the agriculture building and looked at the proposed new quarters and met Lionel Richard, the project director. The remainder of the day Tuesday and Wednesday, we reviewed the stratification and talked about problems which had to be worked out. Plans were laid for a day trip to the area around Aquin.

II. Field Review

On Thursday June 20, Bertelsen, Davies, Malczynski, Dupont, Harrod and Blackwood went to an area in the mountain strata northeast of Aquin. This area had previously been delineated from the photography was approximately 1.25 square kilometers. The problem to observe in the field was the tedious task of boundary identification and segment size. We walked the entire boundary of the segent. Boundaries were identifiable if careful attention was paid to orientation and interpretation of the photographs. Earlier, several Haitian personnel (one being Harrod)

has spent about 4 days in the area. The segment was identified, crop delineations were made on the photograph, and a listing of the resident farm operators were made. There were about 55 operators living in the segment. Boundaries of the segment were roads, trails, water beds, and ravines. After having reviewed the the mountain area, we identified a one square kilometer area in a nearby plains area. The objective was only to assure ourselves that boundaries could be located on the photography and be found in the field to locate segments. We were satisfied that this could be accomplished if close attention was paid to details and photo interpretation. To orient Davies with the up to 60 degree slopes being farmed, we drove toward Jacmel. The diversity of small fields and mixed corps were clearly understood. On Saturday, June 22, we went up the mountain out of Port-au-Prince towards Kenscoff and observed the slope agriculture in the area around the Baptist Mission.

III. Work Review

Bertelsen pointed out several concerns when we arrived. The biggest concern was the lack of speed with which things progressed - measurement of count units were not complete, and work was more sloppy than Mike would have liked. Enthusiasm and leadership by Haitian counterparts had not been as predominant as would really be desired. The latter is definitely a driving proponent if the project and methodology being developed is to be long lasting.

Review of the stratification and count unit construction was fairly uniform with basically good boundaries. Size restrictions as originally laid out had been used. Bertelsen and Swanson both now feel that the original proposed segment sizes cannot be met. Jim and myself agree. Boundaries cannot be located to identify the smaller segments. Another problem was the number of parcels of land and operators which would show up in the segments. A decision was made to only go with the open segment estimator. We doubled the segment size for strata 10, 11, 15, 20, and 25. See Appendix A-1 for revised sizes. Stratum 12 for sugar cane was deleted. The speed of measurement was progressing slow. Only the digital planimeter had been used. We began using the polar arm planimeter to get the work done before our departure. It was very slow and difficult to use the polar arm unit with the poor instructions that came with it. We strongly recommend another digital for Haiti. We helped measure count units over the weekend since Monday was a holiday. As soon as a strata was complete, we started allocating sample and selecting segments. The original count units were combined to coincide with the doubled segment size.

IV. Sampling

Upon arrival in Haiti it was decided to consider only the "open" segment approach. Resident farm operators (RFOs) would be listed upon determining segment boundaries in the field for the selected segment. This procedure requires that all information for the operation, regardless of where located be associated with the unit.

Because this approach was selected and because of difficulty in determining segment boundaries, the original proposed segment sizes were doubled in all strata in Departement du Sud except for stratum 32 (urban/village).

STRATUM, AREA, AND ALLOCATION FOR DEPARTEMENT DU SUD: PILOT STUDY

Stratum	Area Km_2	Preliminary Segment Size km_2	Final Adjusted km_2	N_h	n_h	P_i	R_{ij}
10 Intensive Plains	400.45	0.5	1.0	402	12	4	3
11 Rice	44.31	0.5	1.0	44	8	4	2
15 Extensive Plains	45.93	1.0	2.0	24	4	2	
20 Intensive Mountains	1165.16	0.5	1.0	1160	15	5	3
25 Extensive Mountains	783.98	1.0	2.0	391	8	4	2
32 Urban/Village	2.28	0.1	0.1	23	8		
	2442.11			2044	55		

N_h = Universe population of SU's

n_h = Number of samples selected

P_i = Number of Paper Strata used

R_{ij} = Number of replications used

A) Relative costs per stratum were used in allocation.

B) `Demings` non parametric variance estimator was used: right triangle S = (.24) x (range).

The open segment approach using RFOs as listed for each selected segment will continue to provide probability estimates if the following assumptions hold true.

<u>Assumption #1</u>. This procedure assumes a 100% complete listing of RFOs can be obtained.

<u>Assumption #2</u>. This procedure assumes a sampling unit can be located through the use of the name since the resident location is the sampled

unit, not the name.

Assumption #3. As "New" huts (RFOs) are built within the segment boundaries or huts are abandoned or removed from existence, the proper adjustments are made in the segment listing. If sampling (after pilot survey) is utilized in the segment a new within segment sample and appropriate expansion factor is necessary.

Assumption #4. All "land use" stratum have been identified and broken down into count units, count units measured in Km^2, a random sample with specified number of replicate and paper strata selected, sample units properly located on photography, and segments completely identified in the field during survey.

Assumption #5. Information can be collected in a pilot survey, analyzed and survey sample sizes (segments and RFOs within segments) can be determined for all other Departements. Types of analyses to be performed are specified later in this report.

Stratum Sampling of Count Units

The sample for the pilot study was allocated using the formulas identified in Appendix D-1.

In each land use stratum a sample for the pilot study was allocated to a specified number of replicates and paper stratum. For each land use stratum one additional replicate was selected, so sampling materials could be prepared for the second survey. An increase in sample size could result following analyses of the pilot study. If a reduction in sample size in a land use stratum is necessary a replicate can be dropped with no loss in randomness of remaining sample. A minimum of 2 replicates must remain in each stratum to be able to compute variance. See Appendix C-1 for example of selection of count units.

Selection of Segment Within Selected Count Unit

Appendix E-1 is the table of random numbers generated by an in-country micro-computer. The random number table was utilized to randomly select the segments within the selected count units. The selected segments for the pilot survey will be utilized for more than one year.

The sample allocation procedure was to identify one additional replication within each stratum that would be available for increasing the sample size or for rotation in later years.

Stratum	Pilot Study Replicates	Additional Replicate
10	1, 2, 3	4
11	1, 2	3
15	1, 2	3
20	1, 2, 3	4
25	1, 2	3
32	1, 2	3

Summarization

The direct expansion estimator (Appendix B-1, B-2) assumes that the data will be properly edited and coded at the farm operator level. The expansion factor allows for refusals and inaccessibles. The entire questionnaire representing a farm operation will need to be treated as incomplete if any part is missing. Blanks must be treated differently than a zero.

A questionnaire coding scheme must be prepared and followed while editing the completed questionnaires. Machine editing after entered into the computer should also be part of the editing procedure.

Subsampling of RFOs for Parcel Measurement

To verify the farmer reported the correct area for his parcels by commodity, the survey design requires identifying a subsample of RFOs and measuring the reported parcels. The recommended procedure is to subsample within segments at the following rates.

# of RFOs/Segment	Rate	# of RFOs/Segment	Rate
1-10	all	101-110	1/11
11-20	1/2	111-120	1/12
21-30	1/3	121-130	1/13
31-40	1/4	131-140	1/14
41-50	1/5	141-150	1/15
51-60	1/6	151-160	1/16
61-70	1/7	161-170	1/17
71-80	1/8	171-180	1/18
81-90	1/9	181-190	1/19
91-100	1/10	191-200	1/20

i.e. maximum number of RFOs to select of field measurement in a segment would be 10.

Subsampling of RFOs for Yield Measurement

The ideal process would be to complete this sampling process after all the information has been entered into the computer. However, this is probably unrealistic in the pilot study. Since the time frame between listing, enumeration, field measurement and the yield measurement is not

unlimited, the final sample for yield should be determined as follows.

1) Determine crop to measure for yield.

2) From the collection of survey documents identify on the original listing all RFOs who have the crop concerned.

3) Select a sample of 10 segments geographically distributed across the Departement Du Sud.

4) Within each of the 10 segments select 15 RFOs and obtain yield for all necessary crops for all parcels for each operator.

5) Since the selection process will provide operators who have the crop, an expected 150 operators will provide yield information on their crops.

V. Recommendation of Work to Follow

The pilot survey in Departement du Sud will provide considerable information for determining sample size for future expansion into the other 8 Departements to develop national survey estimates.

A. Survey Analysis

1) Provide estimates of variances of several characteristics.

2) Determine number of RFOs needed per segment with the possibility of RFO subsampling.

3) Determine relationships between several characteristics of the farmers.

B. Frame Development after July 1, 1985

1) Select a second Departement and develop frame materials.

2) Improve data collection procedures for second survey in Spring of 1986.

C. Pilot Study Preparation for Fall 1985

1) Develop survey segment photos and maps.

2) Develop questionnaires for all phases of pilot study.

3) Develop training manuals.

4) Select and train enumerators in areas of selected segments.

D. Summarization Preparation

1) Prepare data entry formats.

2) Follow formulation in Appendix B-1, B-2 in preparation of data summary.

3) Develop test data and check summary procedures.

4) Prepare summary table headings so proper items are summarized at each land use stratum and Departement level.

APPENDIX A-1

Revised Count Unit Sizes*

	Stratum	Color	Seg Size	Minimum	Desired	Maximum
Int. Plains	10	Red	1.0 km^2	2 km^2	6 km^2	12 km^2
Rice	11	Brown	1.0 km^2	2 km^2	6 km^2	12 km^2
Ext. Plains	15	Light Blue	2.0 km^2	4 km^2	8 km^2	16 km^2
Int. Mtns.	20	Orange	1.0 km^2	2 km^2	6 km^2	12 km^2
Ext. Mtns.	25	Purple	2.0 km^2	4 km^2	8 km^2	16 km^2
City	31	Green	.1 km^2	.1 km^2	.6 km^2	1 km^2
Urban/Village	32	Purple	.1 km^2	.1 km^2	.6 km^2	1 km^2
Non-Ag	50	Brown	4 km^2	8 km^2	32 km^2	40 km^2
Water	60	Dark Blue	N/A	-	-	-

* Revised 6/85

APPENDIX A-2

Revised* -- AREA FRAME STRATA FOR HAITI - PILOT

STRATUM	COLOR	DESCRIPTION
31	Green	CITY - Inner City, very intense population or industrial area, no livestock or agriculture expected. Minimum size .1 km^2.
32	Purple	URBAN/VILLAGE - Urban area surrounding and including villages. High population density. Maybe a few scatter agricultural plots and scattered livestock. Minimum size .1 km^2.
10	Red	PLANES, INT. - Basically crop production areas of very intense agriculture in low lying or flat areas. Cultivated areas are 50 percent or more for the stratified area and dispersed uniformly. Few scattered livestock. Minimum size 2 km^2.
15	L. Blue	PLANES, EXT. - Crop production areas in low lying or flat areas with agricultural intensity less than 50 percent. Fields are more scattered. Possibility of more livestock. Minimum size 4 km^2.
20	Orange	MOUNTAINS, INT. - Very intense crop production areas located in mountain areas. Cultivated areas are 50 percent or more for the stratified area. Few scattered livestock. (Same as Planes, Intensive except in mountains). Minimum size 2 km^2.
25	Purple	MOUNTAINS, EXT. - Crop production areas in the mountains with less than 50 percent of the area having cultivation present. Fields are more scattered. Possible for more livestock. Minimum size 4 km^2.
11	Brown	RICE - Production areas which are predominately producing rice. Fields are small with a cross-hatch pattern showing on photos. Located in low lying, flat areas. Minimum size 2 km^2.
50	Brown	NON-AG - Areas of no agricultural production and very few or no livestock. This may be predominately state lands such as forest, parks, military zones, etc. Minimum size 8 km^2.
60	D. Blue	WATER - Areas greater than 1 km^2. These areas may include marsh, especially salt marsh areas. Will not be sampled.

* Revised 6/85

APPENDIX B-1

Estimators for Departement Du Sud

$$Y = \sum_{i=1}^{S} \sum_{j=1}^{P_i} \sum_{K=1}^{R_{ij}} Y'_{ijk}$$

S = number of land use strata.

P_i = number of paper strata in the ith land use stratum.

R_{ij} = number of replicates in the jth paper stratum in the ith land use stratum.

e_{ijK} = expansion factor the Kth segment in the jth paper stratum in the ith land use stratum.

$$= \frac{N_h}{n_h}$$

y_{ijKl} = the value of the survey item for the lth Resident Farm Operator (RFO) in the Kth segment in the jth paper stratum in the ith land use stratum.

g_{ijK} = the number of sampled RFO's in segment K per paper stratum j per land use stratum i.

e'_{ijKl} = expansion factor for the lth operator within segment K in paper stratum j in land use stratum i (if subsampling within segment K).

$$Y'_{ijK} = e_{ijK} \sum_{l=1}^{g_{ijK}} y_{ijKl} \quad \text{if } g_{ijK} > 0$$ (1 or more RFO in seg and no subsampling, refusals or inaccessibles)

= 0 if no operators in segment

if we subsample RFOs in a segment in future because of large #RFOs in segment or we have refusals or inaccessibles.

$$Y'_{ijK} = e'_{ijK} \sum_{l=1}^{g_{ijK}} Y_{ijKl}$$

where $e'_{ijK} = e_{ijk} \times \frac{\text{RFO's in segment}}{\text{RFO's in sample}}$

$$\text{Var } \hat{Y} = \sum_{i=1}^{S} \sum_{j=1}^{P_i} \sum_{K=1}^{R_{ij}} \frac{(1 - \frac{1}{\bar{e}_{ij}})}{(1 - \frac{1}{r_{ij}})} \left[Y'_{ijK} - \bar{Y}_{ij} \right]^2$$

$$\bar{Y}_{ij} = \sum_{K=1}^{R_{ij}} \frac{Y'_{ijK}}{R_{ij}} \quad \text{and} \quad \bar{e}_{ij} \sum_{K=1}^{R_{ij}} \frac{e'_{ijK}}{R_{ij}}$$

APPENDIX B-2

Recommended ID Format

Departement	X
Stratum	XX
Paper Stratum	X
Replicate	X
Segment Number	XXXX
Farm ID #	XXX

Paper Stratum	1, 2, 3, 4, 5, etc.
Replicate	1, 2, 3, 4, 5
Stratum	10, 11, 12, 15, 20, 25, 31, 32, 50, 60
Departement	1, 2, 3, 4, 5, 6, 7, 8, 9

1) Variance is computed at the paper stratum level across replicates.

2) Variance is added across paper strata to the land use stratum level.

3) Variance is added across land use level to the Departement level.

STEPS

1) Accumulate information for all RFOs in a segment.

2) Expand by expansion factor.

3) Accumulate expanded data across replicate within a paper stratum.

4) Compute variance at paper stratum level.

5) Accumulate expanded data and variances across paper stratum.

6) Accumulate expanded data and variances across land use stratum to Departement level.

APPENDIX C-1

Rice Example

Paper Stratum	Replicates			Interval
	1	2	3	
1	7.11	3.32	6.86	0-11.00
2	16.57	13.15	20.73	11.01-22.00
3	31.64	30.26	25.82	22.01-33.00
4	43.08	38.81	36.42	33.01-44.00

Stratum 11

$Km^2 = 44.31$

$n_{11} = 8$
Replicates = 2
Paper Strata = 4

$N_{11} = 44$

Interval = 11.00 = $\frac{N_{11}}{\text{Paper Strata}} = \frac{44}{4}$
Replicates in Pilot = 1 & 2
Rotation = #3 for #1

Random Selection of CU's

A) Steps to select random numbers between 0 and 11.00.
   1. Random #1 (7.11) represents sample #1 in paper strata #1 in replicate #1.
   2. Random #2 (3.32) represents sample #2 in paper strata #1 in replicate #2.

B) Select random numbers between 11.01 and 22.00 and sequentially place in paper strata #2, replicate 1, 2, and 3 respectively.

C) Follow step A and B for paper strata 3 and 4 using Intervals 22.01 to 33.00 and 33.01 to 44.00 respectively.

D) Transfer random numbers to count unit sheet to identify count units selected in sample.

Samples to Use

E) Use replicates 1 and 2 in pilot study.

F) In 1986 add replicate #3 if necessary or drop #2.

G) If replicate #3 is not needed in 1986 (or later) save for rotation to replace replicate #1.

APPENDIX D-1

Sample Allocation

$$n_h = \frac{N_h S_h}{\Sigma N_h S_h} \cdot n$$ not cost data

$$n_h = \frac{N_h \frac{S_h}{\sqrt{C_h}}}{\Sigma N_h \frac{S_h}{\sqrt{C_h}}} \cdot n$$ using cost information

where

$$n = \frac{|\Sigma N_h S_h|^2}{S^2 + \Sigma N_h S_h^2}$$

where S = (C.V. desired)(population estimate of characteristics)

N_h = population number of segments in the land use stratum h

S_h = estimate of standard error for land use stratum h

h = land use stratum

C_h = cost per segment for land use stratum h

Σ = summation symbol

Random Number Table

APPENDIX E-1

12	02	05	11	10	09	10	12	02	02	06	12	01	01	04	07	11	01	04	03
02	08	12	02	11	11	10	04	02	11	08	11	11	11	03	08	05	02	12	08
05	11	08	11	04	11	12	07	12	11	05	12	11	04	09	01	04	12	10	02
07	05	09	09	02	05	12	02	08	10	10	01	10	07	08	08	05	09	07	05
11	07	03	10	01	01	07	05	12	11	09	01	04	11	05	09	04	06	07	11
09	11	10	10	06	11	01	03	04	10	11	12	07	09	02	04	01	11	08	10
03	09	10	05	12	03	12	07	01	05	02	11	12	01	08	09	05	12	03	12
08	01	08	11	02	12	12	05	10	12	03	03	09	11	04	02	07	11	09	10
04	01	11	12	12	05	09	05	03	08	06	10	09	05	09	05	03	08	10	01
08	09	10	12	06	10	06	04	11	12	02	09	06	09	11	05	09	08	09	02
09	12	01	12	04	08	06	11	05	05	03	03	03	05	08	05	07	12	03	12
09	06	07	02	11	02	07	01	03	03	05	04	10	08	09	10	02	06	01	10
05	07	07	03	09	04	07	05	06	11	03	05	07	03	03	03	10	08	12	04
07	05	06	11	09	01	12	09	11	05	06	11	05	12	06	11	05	11	02	01
02	03	05	03	01	10	01	12	11	06	05	05	06	07	04	10	07	07	04	09
01	12	01	11	03	02	05	06	03	07	12	09	04	10	01	09	09	09	12	01
03	09	03	11	03	01	04	04	08	12	07	07	08	01	03	02	06	07	01	03
08	12	10	10	07	03	10	03	01	12	09	07	08	11	06	11	12	10	07	06
05	08	01	08	01	12	11	02	01	03	12	07	10	10	05	09	06	04	02	07
09	03	09	01	01	01	11	08	12	08	01	12	08	12	01	02	03	07	04	12
03	09	12	02	12	12	03	04	04	07	01	04	11	08	06	07	07	02	09	11
01	01	09	11	11	12	05	11	06	05	04	11	08	06	11	06	09	08	11	03
04	11	11	04	11	06	02	11	03	11	07	03	03	12	02	04	11	08	10	09
10	09	11	08	09	12	09	11	02	05	03	05	11	03	08	02	08	12	10	12
07	03	09	10	06	08	04	04	08	06	01	10	06	01	08	11	10	05	12	05
05	05	09	10	02	09	06	12	04	06	02	05	11	05	12	12	01	10	12	04
10	04	02	01	06	02	10	06	06	01	05	09	12	04	12	06	10	12	10	08
03	02	03	02	03	10	11	06	02	01	07	12	11	10	04	11	10	07	07	11
11	12	03	12	06	09	04	01	01	09	02	12	03	04	11	07	06	10	01	10
04	01	03	01	04	07	10	10	02	03	10	02	11	02	11	11	07	11	12	08
08	02	09	03	08	12	09	12	11	12	08	08	10	02	10	01	04	10	02	09
07	02	02	07	11	10	05	01	11	03	11	02	05	12	07	04	11	02	08	06
10	03	08	06	11	02	06	12	06	09	06	04	04	07	12	05	11	09	12	05
01	12	02	10	08	06	03	08	07	03	02	03	12	03	05	01	03	05	09	01
01	05	08	04	11	07	07	11	02	05	11	05	12	12	11	08	02	10	11	04
07	09	01	05	07	12	05	10	08	04	03	10	04	12	05	09	10	03	01	01
08	03	05	07	12	10	12	08	05	08	11	03	08	12	06	11	07	06	11	08
02	04	04	10	07	08	06	09	11	07	01	12	04	03	04	07	07	12	11	01
07	04	11	12	12	10	10	11	07	10	01	06	09	08	01	06	04	05	06	10
03	09	06	05	09	10	02	07	03	10	07	08	03	10	06	10	03	02	02	11
10	02	12	01	06	12	04	10	04	04	02	07	07	04	07	02	12	05	05	12
07	07	03	12	01	03	09	09	02	02	06	01	04	02	12	11	06	03	09	08
07	08	10	05	04	12	10	07	04	01	04	02	01	07	09	09	07	03	12	12
10	01	03	10	09	03	08	01	04	04	05	03	11	06	11	03	10	11	01	12
02	11	09	12	10	12	09	01	11	01	06	12	05	07	06	03	01	11	07	08
04	11	03	07	06	05	06	07	01	12	08	06	04	03	05	11	02	05	09	08
06	02	02	04	09	11	08	12	02	08	04	01	12	04	09	02	07	10	04	02
04	04	09	08	12	09	02	12	01	06	11	12	06	08	04	11	09	07	10	05
09	03	01	12	08	01	01	02	07	05	12	03	11	02	11	10	09	04	03	04
01	10	01	02	05	05	04	10	05	09	09	05	03	02	04	01	02	12	07	12

THE FOLLOWING PAGES DENOTES THE ACTUAL SAMPLE SELECTION OF COUNT UNITS BY STRATUM

STRATUM 10

STRATUM	CU #'S	Km^2 Area	EXP SU'S	CUM Km^2	Replicates 1	2	3	4
10	19/20/21	7.90	8	7.90				
	22/23	5.38	6	13.28				
	24/25	6.91	7	20.19		15.3		
	30/31/32	8.74	9	28.93				
	36	2.73	3	31.66				
	53	2.22	2	33.88				
	69/71	8.34	8	42.22				
	72/73	6.39	6	48.61				
	74/86	7.87	8	56.48	56.1			
	87/88	7.00	7	63.48				
	101/102	6.54	7	70.02				
	103/104	7.97	8	77.99				70.8
	105/122	8.30	8	86.29		82.2		
	120/121	7.89	8	94.18				
	124/133	6.38	6	100.56				
	125/132	5.49	5	106.05				
	126/127	6.32	6	112.37				
	136/137	7.40	7	119.77				
	139/140	6.61	7	126.38				
	181/190	7.82	8	134.20	132.5			
	189/201	5.91	6	140.11				
	191/192/200	8.75	9	148.86				143.0
	199	6.03	6	154.89		149.8		
	216/217	6.93	7	161.82				
	223	2.05	2	163.87				
	234	3.25	3	167.12				
	236/253	5.74	6	172.86				
	288/528/529	8.44	8	181.30				
	320	1.58	2	182.88				
	466/467	5.85	6	188.73			185.1	
	482	1.55	2	190.28				
	509/510	7.25	7	197.53				
	511/512	7.67	8	205.20	204.0			
	513/525	6.67	7	211.87				
	514/522	7.09	7	218.96			215.8	
	515/521	6.37	6	225.33				
	516/517	9.22	9	234.55				
	518/538	7.77	8	242.32				237.3
	519/520	7.42	7	249.74				
	523/524	4.77	5	254.51				
	526/527	7.88	8	262.39				
	530/553	5.59	6	267.98				
	531/550	5.25	5	273.23		269.6		
	532/533	6.34	6	279.57				
	534/535	8.32	8	287.89				
	536/544/545	6.78	7	294.67				
	537/539/542	7.35	7	302.02				
	540/541	9.23	9	311.25				

STRATUM 10

STRATUM	CU #'S	Km^2 Area	EXP SU'S	CUM Km^2	Replicates 1	2	3	4
10	543/561	6.69	7	317.94				
	547/548/549	7.55	8	325.49			321.5	
	551/555/557	8.31	8	333.80				
	552/554	4.66	5	338.46				
	562/563/566	7.71	8	346.17				
	564/565	6.98	7	353.15				347.6
	567/578/579	10.04	10	363.19	359.8			
	568/577	6.86	7	370.05				
	569/570	7.04	7	377.09				
	571/560	5.29	5	382.38				
	580/581/582/583	10.53	11	392.91		386.3		
	584/585/586	7.54	8	400.85				
	60		402					

STRATUM 11

STRATUM	CU #'S	Km^2 Area	EXP SU'S	CUM Km^2	Replicates 1	2	3
11	260	3.93	4	3.93		3.32	
	264/265	2.33	2	6.26			
	290	6.88	7	13.14	7.11		6.86
	316	2.00	2	14.14		13.15	
	365	5.20	5	20.34	16.57		20.73
	556/572	6.54	7	26.88			25.82
	558/559	5.10	5	31.98	31.64	30.26	
	573/576	4.97	5	36.95			36.42
	574/575	7.36	7	44.31	43.08	38.81	
	9	44.31	44				

STRATUM 15

STRATUM	CU #'S	Km^2 Area	EXP SU'S	CUM Km^2	Replicates 1	2	3
15	70	9.48	5	9.48	5		1
	72	6.84	3	16.32		8	
	325	7.20	4	23.52			
	326	6.45	3	29.97	13		15
	327	7.02	4	36.99			
	329	8.94	5	45.93		20	
	6	45.93	24				

STRATUM 20

STRATUM	CU #'S	Km^2 Area	EXP SU'S	CUM Km^2	Replicates 1	2	3	4
20	1/14	7.45	7	7.45				
	6/7/89	7.57	8	15.02				
	8/11	5.88	6	20.90				
	9/10	6.22	6	27.12				
	12/99	5.82	6	32.94				
	13/17	7.57	8	40.51				
	15/16	7.46	7	47.97				
	18/27	8.39	8	56.36				
	26/100	7.04	7	63.40				
	28/29	6.24	6	69.64				
	33/37	8.56	9	78.20				72
	34/35	8.96	9	87.16	84			
	38/39	6.75	7	93.91				
	40/56	6.64	7	100.55				
	41/42	9.62	10	110.17				
	45/46	7.16	7	117.33				
	47/48	8.69	9	126.02				
	57/58	6.61	7	132.63				
	59/60	6.26	6	138.89				
	61/62	6.27	6	145.16				
	63/79	7.08	7	152.24				
	64/65	8.76	9	161.00				
	66/67	7.42	7	168.42				
	75/76	6.99	7	175.41				
	77/85	9.31	9	184.72	177			
	78/84	5.95	6	190.67				
	80/81	6.47	6	197.14				
	82/83	5.35	5	202.49				
	90/91/92	10.95	11	213.44			210	
	93/94	6.48	6	219.92				
	95/106	6.98	7	226.90				
	97/98	6.28	6	233.18				
	107/108	5.94	6	239.12				
	109/115	7.20	7	246.32				
	111	2.68	3	249.00				
	113/114/141	10.30	10	259.30	257			
	116/117	5.93	6	265.23				
	118/119	7.56	8	272.79				
	128/129	7.61	8	280.40				
	134/135	8.37	8	288.77				
	142/143	7.71	8	296.48				
	144/145	6.21	6	302.69				
	147/148	7.68	8	310.37				
	155/156	6.17	6	316.54				
	157/158	7.19	7	323.73	321			
	159/160	6.20	6	329.93				
	161/162	7.30	7	337.23				
	163/164	5.22	5	342.45				
	165/166	7.24	7	349.69			344	

STRATUM 20

STRATUM	CU #'S	Km^2 Area	EXP SU'S	CUM Km^2	Replicates 1	2	3	4
20	167/173	6.06	6	355.75				351
	168/169	6.56	7	362.31				
	171/195	8.06	8	370.37				
	172/174	5.98	6	376.35				
	175/176	7.86	8	384.21				
	177/178	6.61	7	390.82				
	179/180	5.26	5	396.08				
	182/185	6.36	6	402.44				
	186/187	6.29	6	408.73				
	188/203	7.85	8	416.58				
	193/194	7.11	7	423.69				
	196/197	7.40	7	431.09				
	198/292	7.98	8	439.07				
	202/206	5.86	6	444.93				
	204/219	6.99	7	451.92				
	205/221	8.31	8	460.23				
	207/214	6.18	6	466.41				
	208/209	7.48	7	473.89				
	210/211	5.95	6	479.84				
	213/215	6.32	6	486.16				
	218/235	6.48	6	492.64	487			
	220/233	6.41	6	499.05				
	222/232	6.72	7	505.77				
	226/227	5.74	6	511.51				
	228/229	7.48	7	518.99				
	230/261	5.52	6	524.51				
	237/238	6.56	7	531.07				
	239/240	6.53	7	537.60				
	241/242	6.87	7	544.47				
	243/244	7.34	7	551.81				
	246/275/276	7.68	6	559.49				
	247/248	6.85	7	566.34				
	249/274	6.14	6	572.48				
	250/272	7.58	8	580.06				
	251/252	7.48	7	587.54				
	254/255	8.18	8	595.72				
	256/271	7.49	7	603.21			600	
	257/258	5.99	6	609.20				
	259/270	6.79	7	615.99				
	262/268/269	8.08	8	624.07				
	273/277	5.79	6	629.86				627
	278/285/286	6.57	7	636.43				
	279/280	7.31	7	643.74				
	281/282	6.77	7	650.51				
	283/284	5.85	6	656.36				
	287	4.08	4	660.44				
	293/315	6.53	7	666.97				
	294/295	5.82	6	672.79				

STRATUM 20

STRATUM	CU #'S	Km^2 Area	EXP SU'S	CUM Km^2	Replicates 1	2	3	4
20	296/312/313	10.11	10	682.90	673			
	306/321	4.45	4	687.35				
	307/335	5.82	6	693.17				
	308/309	5.77	6	698.94				
	310/311	6.86	7	705.80				
	314	4.19	4	709.99				
	317/318	7.01	7	717.00				
	319/338	8.01	8	725.01				
	322/323	7.76	8	732.77				
	324/330	8.53	9	741.30				
	331A/331B	5.42	5	746.72				
	332A/332B/352	9.60	10	756.32				
	333/334	8.06	8	764.38				
	336/351	8.37	8	772.75			768	
	337	7.10	7	779.85				
	339/340	5.54	6	785.39				
	341/342	8.40	8	793.79				
	343/344	6.92	7	800.71				
	345/346/347	8.37	8	809.08				
	348/349	9.02	9	818.10				
	353/354	7.78	8	825.88				
	355/356	4.95	5	830.83				
	361/362/363	8.54	9	839.37				
	364/366	6.53	7	845.90				
	367/375	8.27	8	854.17				849
	370/384	8.28	8	862.45				
	371/372	7.75	8	870.20				
	373/374	5.54	6	875.74				
	376/377	7.78	8	883.52				
	378/379	6.77	7	890.29				
	380/381	9.45	9	899.74		894		
	382/385	6.20	6	905.94				
	383	4.89	5	910.83				
	386/387	6.33	6	917.16				
	388/389/390	7.81	8	924.97				
	391/398	5.93	6	930.90	928			
	392/395	6.14	6	937.04				
	393/394	6.88	7	943.92				942
	396/397	6.22	69	950.14				
	399/400/409	8.07	8	958.21			955	
	401/402	5.77	6	963.98				
	403/404/405	8.04	8	972.02				
	406/407/417	9.25	9	981.27				
	410/411/412	9.68	10	990.95				
	413/414	6.77	7	997.72				
	415/416	8.20	8	1005.92				
	418/419	6.81	7	1012.73		1012		
	420/421/427	7.48	7	1020.21				
	422/423	7.69	8	1027.90				

STRATUM 20

STRATUM	CU #'S	Km^2 Area	EXP SU'S	CUM Km^2	Replicates 1	2	3	4
20	424/433	6.37	6	1034.27				
	425/426	6.42	6	1040.69				
	428/429	5.47	5	1046.16				
	430/431	7.98	8	1054.14				
	432/436	6.23	6	1060.37				
	434/435	8.86	9	1069.23				
	437/438	5.80	6	1075.03				
	465	5.68	6	1080.71				
	474/475	10.78	11	1091.49				
	476/479	10.26	10	1101.75				
	477/478	9.46	9	1111.21				
	480/481	10.34	10	1121.55				
	483	3.89	4	1125.44				
	487/488	6.88	7	1132.32	1130			
	492/493	6.99	7	1139.31				
	587/588/594/595/598	9.30	9	1148.61				
	589/590/591	9.16	9	1157.77				
	592/593	7.39	7	1165.16				
	164	1165.16	1160					

STRATUM 25

STRATUM	CU #'S	Km^2 Area	EXP SU'S	CUM Km^2	Replicates 1	2	3
25	43/54	17.01	8	17.01			
	44/52	15.85	8	32.86			
	49/130	15.46	8	48.32			
	50/51	15.40	8	63.72			25
	55/68	16.48	8	80.20	38		
	96/153	12.59	6	92.79			
	110/112	19.47	10	112.26			
	131/152	15.04	8	127.30		63	
	146/225	15.63	8	142.93			
	149	3.50	2	146.43			
	150/151	14.66	7	161.09			
	154/224	15.08	8	176.17			
	170	7.37	4	183.54			
	183/184	17.14	8	200.68			
	231	7.83	4	208.51			
	263	8.35	4	216.86			
	266	5.73	3	222.59			
	297/298	15.83	8	238.42			
	299/300	17.37	8	255.79			
	301/439	13.90	7	269.69			
	302/459	11.45	6	281.14		138	
	303/304	12.13	6	293.27			
	328/471	17.85	8	311.12	151		
	357/360	15.81	8	326.93			
	358/485	16.94	8	343.87			
	359/491	15.64	8	359.51			179
	366/369	14.02	7	373.53			
	440/441	17.49	8	391.02			
	442/443	15.42	8	406.44			
	444	11.98	6	418.42	207		
	445/446	18.77	10	437.19			
	447/448	21.09	10	458.28			
	449A/494	16.18	8	474.46			
	449B/450	16.30	8	490.76			
	451/464	9.03	4	499.79			
	452/453	17.39	8	517.18			
	454/463	17.03	8	534.21			
	455/462	17.29	8	551.50			266
	456/461	13.88	7	565.38			
	457/458	17.80	9	583.18			
	460/470	17.69	9	600.87		289	
	468/469	16.71	8	617.58			
	472/473	19.00	10	636.58			
	484/486	15.79	8	652.37			
	489/490	16.18	8	668.55		326	
	495/502	19.97	10	688.52			
	496/501	15.52	8	704.04			347
	497/498	15.36	8	719.40			

STRATUM 25

STRATUM	CU #'S	Km^2 Area	EXP SU'S	CUM Km^2	Replicates 1	2	3
25	499/500	17.02	9	736.42			
	503/504	17.01	9	753.43			
	505/506	13.34	7	766.77			
	507/508	17.21	9	783.98	387		
	52	783.98	391				

STRATUM 32

STRATUM	CU #'S	Km^2 Area	EXP SU'S	CUM Km^2	Replicates 1	2	3
32	123	.28	3	.28	.22		
	138	.53	5	.81	.79	.53	.41
	218A	.08	1	.89		.83	
	267	.11	1	1.00			.90
	291	.61	6	1.61	1.17	1.49	1.35
	598	.08	1	1.69			
	599	.12	1	1.81			
	600	.11	1	1.92		1.89	
	601	.15	2	2.07	1.99		
	602	.10	1	2.17			
	603	.11	1	2.28			2.26
	11	2.28	23				

Following is questionnaires and summaries being considered as part of the survey instruments.

REPUBLIQUE D'HAITI

FACULTE D'AGRONOMIE ET DE MEDECINE VETERINAIRE

CENTRE DE RECHERCHE ET DE DOCUMENTATION AGRICOLES
(CRDA)

Direction CRDA

No 19

Damien, le 18 Février 1985.

A tous ceux que la question intéresse:

La préparation des tableaux suivants a pour but de faciliter la tâche aux principaux utilisateurs des données statistiques agricoles pour leur permettre d'apporter des observations critiques et d'évaluer des données sur l'agriculture, l'élevage et d'autres variables socio-économiques. Nous sommes encore au stade préparatoire en ce qui a trait à un nouveau programme au niveau national, pour les données agricoles, qui pourrait permettre une meilleure planification de travail en Haiti.

Nous aimerions donc solliciter votre aide en nous faisant savoir si nous avons inclus tous les types de données qui vous interesseraient le plus pour des besoins de planification. Si nous n'avons pas inclus ces données dans nos tableaux, veuillez décrire d'une façon précise ce dont il vous faudrait besoin et nous essayerons, si possible, de les inclure dans l'enquête nationale qui débutera probablement, au niveau d'une phase pilote, dans le département du Sud en juillet 1985. Nous espérons lancer l'enquête nationale en janvier 1986.

Pour le Volet Economie Rurale FAMV/CRDA/ADS-II

Georges WERLEIGH
Responsable Volet

Richard A. SWANSON,
Chef d'Equipe del'Assistance Technique
University of Arkansas/Winrock International
FAMV/CRDA/ADS-II

MARNDR/CRDA/ERS 1985, Questionnaire #EN1 : Recensement Général sur les Ménages.

Départ. [ ][ ] Arrond. [ ][ ] Commune [ ] Section Rurale [ ][ ] Habitation [ ][ ] Ménage [ ][ ] Segment [ ]

Accès (O/N) à: Charrue T. Animal [ ] Sarcloir T. animal [ ] Traction moteur [ ] Charette-Cabrouet [ ] Citerne [ ]

Membres du Ménage Nom/Prénom	Code du Membre	Age	Sexe	Lien de Parenté avec C M	Condition Matrimoniale	Savoir lire ou écrire O/N	Niveau d'Etudes	Occupation Principale	Occupation Secondaire	Pendant cette année, est-ce que vous avez: Participé en association de travail (colonne) O/N	Travaillé comme ouvrier agricole O/N	Récu du crédit institutional ou d'un organisme	Crédit récu pour Production(1), commerce(2), autre	Quantité de chaque espèce En Propriété ou en Gardiennage (R): Volaille P	Volaille R	Chèvre P	Chèvre R	Mouton P	Mouton R	Boeuf P	Boeuf R	Ane P	Ane R	Mulet P	Mulet R	Cheval P	Cheval R	Porc P	Porc R	Abeilles P	Abeilles R	Membre d'un Groupement Communautaire ou Coopérative O/N
C.de M.=	01																															
	02																															
	03																															
	04																															
	05																															
	06																															
	07																															
	08																															
	09																															
	10																															
	11																															

31

... Recensement des Jardins exploités par les Membres du Ménage

part. [ ][ ] Arrond. [ ][ ] Commune [ ] Sec. Rurale [ ][ ] Habitation [ ][ ] Ménage [ ][ ]

Segment [ ]

mbre du Ménage qui est sponsable du Jardin		No. de Jardin	Topographie	Mode de faire valoir	Superficie en Cx. (paysan)	Irriguée O/N	~~Dans ... ADS-II~~ O/N	1ère Saison Agricole 1985 — Culture(s) trouvé dans la parcelle: Céréales	Légumes	Tubercules	Autres (1)	Engrais Utilisé O/N	Pulvérisation Utilisée O/N	2ème Saison Agricole 1985 — Culture(s) trouvé dans la parcelle: Céréales	Légumes	Tubercules	Autres (1)	Engrais Utilisé O/N	Pulvérisation Utilisée O/N	Superficie: Cultivée	Jachère	Emploi de Main-d'oeuvre
ef de Ménage, Nom, Prénom:																						
		*1																				
		2																				
		3																				
		4																				
		5																				
		6																				
		7																				
		8																				
		9																				
		10																				
		11																				
		12																				
		13																				

*Commencez par le jardin de cour (autour ou à coté de la maison) s'il y en a u

(1) Autres

Questionnaire V2B

Caractéristiques du Ménage/Famille

Département [ ][ ] Arrondissement [ ] Commune [ ] Section Rurale [ ][ ] Habitation [ ][ ]

Chef du Ménage Nom, Prénom				Résidents			Actifs Agricoles			Accès (Oui/Non)					Utilise dernière saison O/N		Carreaux de Terres Exploitées par tous les Membres du Ménage								
	# de Ménage	Sexe C. M.	Age C. M.	Hommes	Femmes	Enfants (- de 15 ans)	Hommes	Femmes	Enfants (- de 15 ans)	Charrue T. animale	Sarcloir T. animale	Traction moteur	Charette - Cabrouet	Citerne	Pulvérisateur	Engrais	Qté de Parcelles exploitée par .de Mén.	Carreaux reçus en métayage, moitié	Carreaux, reçus en location	Carreaux en propriétaire	Indivisé/ Héritage	Carreaux donnés en métayage, moitié	Carreaux donnés en Location	Occupant de Parcelle sans titre	Reçu en location de l'Etat
	1																								
	2																								
	3																								
	4																								
	5																								
	6																								
	7																								
	8																								
	9																								
	10																								
	11																								
	12																								
	13																								

Tableau 1: PRODUCTION ET SUPERFICIES PLANTEES DES CULTURES PREDOMINANTES SELON LES 9 DEPARTEMENTS GEOGRAPHIQUES, 1986

DEPARTMENTS:	OUEST			NORD		
	SUPERFICIE en hectares	KGS./HA.	PRODUCTION tonnes/metriques	SUPERFICIE en hectares	KGS./HA.	PRODUCTION tonnes/metriques
CULTURES						
MAIS (M)* — mono-culture						
MAIS (A)* — associated						
SORGHO (M)						
SORGHO (A)						
RIZ (P)						
HARICOTS (M)						
HARICOTS (A)						
ARACHIDES (M)						
ARACHIDES (A)						
POIS CONGO (M)						
POIS CONGO (A)						
POIS INCONNU (M)						
POIS INCONNU (A)						
PATATES (M)						
PATATES (A)						
MANIOC (M)						
MANIOC (A)						
IGNAME (A)						
BANANES						
CANNE-A-SUCRE						
CAFE						
CACAO						
COTON						

Land w/o [illegible]

M = mono-culture

A = culture [illegible]

TABLEAU 2: DISTRIBUTION DU BETAIL SELON 12 TYPES INVESTIGUES, 1986

DEPARTEMENTS:	OUEST		NORD		NORD-EST		NORD-OUEST		SUD		SUD-EST	
	NOMBRE	%	NOMBRE	%	NOMBRE	%	NOMBRE	%	NOMBRE	%	NOMBRE	%
TYPES DE BETAIL												
BOEUFS												
CHEVAUX												
MULETS												
BOURRIQUES												
MOUTONS												
CABRIS												
PORC												
POULES												
CANARDS												
DINDES												
LAPINS												
ABEILLES (RUCHES)												

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] SIGNIFICANCE					
[illegible]	[illegible]				
	[illegible]				
	[illegible]				
	1.65-2.57 ha.				
	2.58-6.45 ha.				
	6.46 + ha.				
[illegible]	0 - .64 ha.				
	.65-1.28 ha.				
	1.29-2.57 ha.				
	2.58-6.45 ha.				
	6.46 + ha.				
NORD-EST	0 - .64 ha.				
	.65-1.28 ha.				
	1.29-2.57 ha.				
	2.58-6.45 ha.				
	6.46+ ha.				
NORD-OUEST	0 - .64 ha.				
	.65-1.28 ha.				
	1.29-2.57 ha.				
	2.58-6.45 ha.				
	6.46+ ha.				
SUD	0 - .64 ha				
	.65-1.28 ha.				
	1.29-2.57 ha.				
	2.58-6.45 ha.				
	6.46 + ha.				
SUD-EST	etc.				
GRAND-AXE					
OUEST					
ATLANTIC					

Best Available Document

TABLEAU -: SUPERFICIE (HA.) CULTIVABLE, CULTIVEE, IRRIGUÉE EN PLAINE, PLATEAU, ET MONTAGNE SELON LES 9 DEPARTEMENTS GEOGRAPHIQUES, 1986

DEPARTEMENTS:	OUEST	NORD	NORD-EST	NORD-OUEST	SUD	SUD-EST	GRANDE ANSE	CENTRE	ARTIBONITE
Les Superficies:									
Plaine: Cultivable									
Cultivée (non irriguée)									
Irriguée									
Plateau: Cultivable									
Cultivée (non-irriguée)									
Irriguée									
Montagne: Cultivable									
Cultivée									
Irriguée									

Best Available Document

Tableau 5: STRATIFICATION DES MENAGES AGRICOLES SELON LEURS SUPERFICIES CULTIVABLES DISPONIBLES PAR RAPPORT AVEC CERTAINES VARIABLES SOCIO-ECONOMIQUES ET SELON LES 9 DEPARTEMENTS GEOGRAPHIQUES, 1986.

DEPARTEMENTS	OUEST						NORD
Var. Soc.-Economiques	0 - .64 ha.	.65 - 1.28 ha.	1.29 - 2.57 ha.	2.58 - 6.45 ha.	6.46+ ha.	TOTAL	
# Les Ménages Agricoles							
$\bar{X}$ Residents/Ménage							
$\bar{X}$ Actif Agricole/Ménage							
$\bar{X}$ Ha. Cultivés/Ménage							
# de Jardins							
% Utilisant Engrais							
% Utilisant Pulvérisateur							
% Membre de Groupement Communautaire							
% Ayant reçu credit agricole							
% qui emploi la main-d'oeuvre							
% qui utilise l'irrigation pour leurs jardins							
% possédant une citerne							