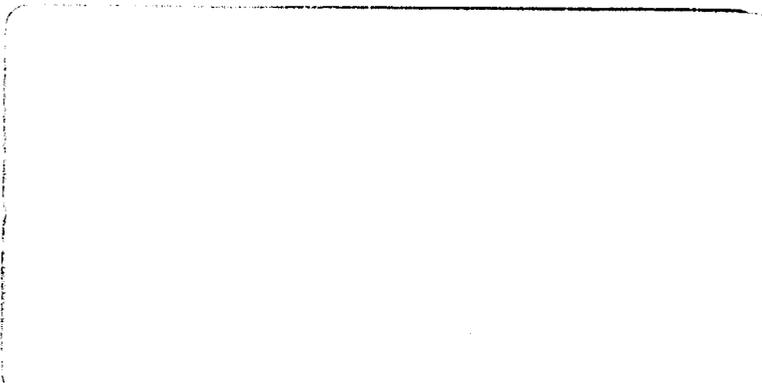


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**AGRICULTURAL DEVELOPMENT SUPPORT II
HAITI**



**University of Arkansas,
Fayetteville**

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TECHNICAL ASSISTANCE IN STRATIFICATION OF
DEPARTEMENT DU SUD, HAITI FOR
CONSTRUCTION OF AREA SAMPLING FRAME

Report #11

TECHNICAL ASSISTANCE IN STRATIFICATION
OF
DEPARTEMENT DU SUD, HAITI
FOR
CONSTRUCTION OF AREA SAMPLING FRAME

U.S. Department of Agriculture
Statistical Reporting Service
Paul W. Blackwood, Survey Statistician

April 8-20, 1985

ABS-II Report # 11

I. GENERAL

Arrived Port-au-Prince, Haiti on April 8, 1985. I was picked up at the Airport by Ernest Dupont, Head of Statistics; Richard Swanson, Chief of Party; and Mike Bertelson, National Survey Economist with the ADS-II project. Lodging had been arranged at the Guest House operated by the projects of Winrock International through the University of Arkansas. Mike and I began making plans for pursuing the work at hand. On Tuesday, April 9 we went to the ADS-II project office next to L'Institute of Agriculture and checked materials and maps I had brought to be used on the construction of the area sampling frame. These materials were:

- 1 roll 5 mill acetate
- 15 sheets 7 mill acetate
- 2 dozen each of 7 colors of grease pencils
- 2 dozen each of 7 colors of soft lead pencils
- 1 dozen lead pencils
- 2 rolls drafting tape
- 12 6 inch rulers in metric
- 1 18 inch rulers
- 3 magnification lenses
- 1 polar arm type planimeter
- 1 digital electronic planimeter (Planix)
- 3 pairs scissors
- 12 pencil sharpeners
- 12 pink pear erasers
- 6 plastic erasers
- 12 permanent marking pens
- 2 color blenders
- 3 sets of 1:50,000 maps for the entire area from Port-au-Prince to the w

These materials were turned over to Richard Swanson and Mike Bertelson. The supply should be adequate to complete the frame construction for the pilot.

Went by USAID and met Vincent Consumano. We were searching for the possibility of additional mapping materials. John Lewis, USAID Project Director, was out until April 12. We returned on April 12 and met with John and discussed the project, especially the out dated photography. The project agreement with SRS was reviewed and modifications of additional technical assistance incorporated.

II. Assessment of Materials

A. Maps

Three sets of 1:50,000 DMA (Defense Mapping Agency) maps were delivered to Mike Bertelson. They covered the entire area from Port-au-Prince and west. The pilot study area was delineated to be a much smaller area than earlier expected. The maps are approximately 1965 vintage. Nothing more up-to-date has been found which could be used. This map series was available in the country already, but they were probably cheaper by being we purchased by SRS.

A series of 1:250,000 maps were picked up from Lionel Richard, Project Director. This series came from Cartographic Thematique D'Haiti. They are:

1. L'Occupation De L'Espace
2. Potentialites Des Sols
3. Erosion
4. Les Eaux De Surface
5. Repartition De L'Habitat
6. Les Voies De Communication

These maps can possibly be produced at any scale. They may be beneficial in the actual photo interpretation to some degree. This is most important in identification of political or production areas below the departement.

When comparing mapping materials to the photographs, many roads are missing; therefore, the quality of the mapping materials are not the best but is workable if handled properly.

B. Photos

Aerial photography provided by the French made in 1978 was available at 1:40,000 scale. This scale is not adequate for boundary identification and stratification in Haiti enlargements were ordered for 89 contacts at 1:20,000 scale on Kodak AZO-E2 double weight, matte paper. This paper was not available in Haiti. It was ordered from Arkansas by Richard Swanson. Upon arrival in Haiti it was up held by customs until April 18. On April 19, we delivered it to Department Geodesie and a price was renegotiated since the paper was furnished. Initially the enlargements were to be \$12 each, but the price was established at \$6.00 with the paper being furnished. One problem was discovered - half of the shipment was gloss print paper - instead of matte. We made the decision to go ahead with the split to keep from delaying the project any longer. Additional paper was ordered on April 19 to have for the segment enlargements.

Much change has occurred in Haiti since the 1978 photography. Many roads have been build and new trails are present. It would be very desirable to have more up-to-date photographs. Infrared negatives were also in the country, but we could not get copies of them.

II. Evaluation of Field Site

The Jacmel area was visited one day to get an orientation to Haitian agriculture. It was confirmed with Mike and Richard the importance of using both aerial photography and maps to locate yourself in the field. The importance of this was stressed for data collection. The Jacmel area is not in the pilot study area but is representative of the area. Fields are very small but have a lot of variation in size. A farmer's fields are scattered over the country side - not all of them are together. Intensive agriculture does occur in both the mountains and

planes. Both can be determined with the photography. The intensity of cultivation was set to be 50 percent or greater and less than 50 percent. This percentage was set to eliminate a 3 level breakdown which was desired. Boundaries were not evident in the field to accomplish anything different.

IV. Data Needs and Stratification Scheme

Much discussion with statistics personnel, ADS-II personnel and USAID personnel was established before beginning to establish firm data needs and strata. We drove down to the Jacmel area one day to get a feeling of the dispersion of the small field, mountain, and plane types of agriculture. Field sizes are very small and interspersed. It was strongly felt that smaller segment sizes are definitely desirable if boundaries can be located. If not, segment sizes will at least double - thereby increasing data collection time and cost considerably. Data is planned on being published at the departement level and broken into some fashion with statements concerning mountain and planes type operations. See attached proposed summary.

V. Training

A. Overview of Area Frame Sampling

Area frame sampling is a method for acquiring agricultural data to estimate all types of agricultural products as well as economic items like labor, income, expenses, etc. The estimates prepared can have a calculated degree of reliability. This is possible because the data came from a random sample of land areas that are representative of the total land area and has a known probability of selection. The data from the area sampling can complement data collected from a list source.

Statistical Reporting Service involves itself domestically and in developing countries with construction of area sampling frames based on the grouping of large areas of land into predetermined categories of land use. Each of these categories is called a stratum. The most important aspect of the construction of an area sampling frame is the urgent need for using physical, identifiable boundaries. This is required because each piece of land in the frame has a probability of selection. Any piece of land which is selected is visited by someone to collect data. This someone, called an enumerator, must be able to positively identify the bounds of the land area for which the data is to be collected. The large blocks of land called strata are further divided into count units (sometimes referred to as primary sampling units or PSU). This allows for multi-stage sampling and eliminates work which would otherwise be necessary if this methodology was not used.

Training in stratification was provided to the following:

Mike Bertelson, National Survey Economist
Ernest Dupont, Director of Statistics
Ariene Bonnet, Statistician
Arrod Baptiste, Statistician

Areas of training included overview, purpose, and delineation of strata. Emphasis was placed on location and use of good identifiable boundaries. A workshop type approach was used in training. Five glossy print 1:20,000 aerial photographs were the only thing obtainable in time for training. These were surrounding the area of Le Cayes. Stratification was completed on at least one of these along with the construction of count units. The use of the maps along with photography was demonstrated for bench marking and finding boundaries. Reviews were made with appropriate discussions of why they were necessary. Boundaries from at least one of the photographs were transferred to the 1:50,000 frame maps. Questions were raised as to why photographs had to be used for stratification - some previous experience in frame construction apparently only used maps and did not emphasize photography. I attempted to show that stratification based on land use involved intensity of cultivation which could only be determined from photography. Maps must be used for frame construction because it provides a uniform scale with a desired degree of accuracy from which measurements are obtained and to ensure that there is no duplication or omission of land area in the frame.

VI. Summary and Recommendations

Basically I feel that the objectives of the trip were met:

- Area frame methodology was explained and discussed with the staff.
- Definitions for selected strata were assembled to correspond to basic types of agriculture.
- Size limits were set for segments and count units.
- Boundaries were explained and demonstrated.
- Delineation of strata on selected photos available.
- Demonstrated and transferred strata to map sheets paying careful attention to detail in proper scale.
- Divided strata into count units.
- Suggested areas for quality control checks and reviews.
- Measured count units with digital planimeter.

I feel that with proper guidance, that work can progress on the pilot area frame. Estimated sample size for pilot was projected to be 75-125.

I strongly recommend that the following be considered:

- Eliminate any and all crop specific strata (i.e. rice and sugar cane as proposed).
- Change segment sizes in the intensive areas to 1 km².
- Change segment sizes in the extensive areas to 2 km².

I do not feel that adequate boundaries can be found to delineate the small segment sizes desired. I realize that the population counts in some of the segments may be large.

Before the next trip for the stratification review, sample allocation and sampling to begin. Count units must be measured and a listing by stratum with area measurement of each count unit should be ready.

Some basic statistical information on Haiti for future concerns when sampling, etc. has to be accomplished:

- Population: over 6.1 mill' people
- Pop. density: 535 per square miles
- Land area: 10,714 square miles (approximate size of Maryland)
- 2/3 of area is mountains
- Remainder is semiarid
- Major crops for which they initially wish to estimate are coffee, rice, sugar cane, sorghum, maize, beans.
- Most of rice and sugar cane will be stratified in the intensive planes areas.
- Other crops are scattered.

EXHIBIT 1

Count Unit Sizes

Stratum	Color	Seg Size	Minimum	Desired	Maximum
10	Red	.5 km ²	1 km ²	3 km ²	5 km ²
11	Brown	.5 km ²	1 km ²	3 km ²	5 km ²
12	Dark Blue	2 km ²	4 km ²	14 km ²	20 km ²
15	Light Blue	1 km ²	2 km ²	8 km ²	10 km ²
20	Orange	.5 km ²	1 km ²	3 km ²	5 km ²
25	Purple	1 km ²	2 km ²	8 km ²	10 km ²
31	Green	.1 km ²	.1 km ²	.6 km ²	1 km ²
32	Purple	.1 km ²	.1 km ²	.6 km ²	1 km ²
50	Brown	4 km ²	8 km ²	32 km ²	40 km ²
60	Dark Blue	N/A	-	-	-

EXHIBIT 2 -- AREA FRAME STRATA FOR HAITI - PILOT

<u>STRATUM</u>	<u>COLOR</u>	<u>DESCRIPTION</u>
31	Green	<u>CITY</u> - Inner City, very intense population or industrial area, no livestock or agriculture expected. Minimum size .1 km ² .
32	Purple	<u>URBAN/VILLAGE</u> - 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	<u>PLANES, INT.</u> - 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 1 km ² .
15	L. Blue	<u>PLANES, EXT.</u> - 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 2 km ² .
20	Orange	<u>MOUNTAINS, INT.</u> - 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 1 km ² .
25	Purple	<u>MOUNTAINS, EXT.</u> - 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 2 km ² .
11	Brown	<u>RICE</u> - 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 1 km ² .
12	D. Blue	<u>SUGAR CANE</u> - Production areas which are predominately producing sugar cane. Fields are much larger than rice fields but also appear in planes areas mostly. Minimum size 1 km ² .
50	Brown	<u>NON-AG</u> - 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 2 km ² .
60	D. Blue	<u>WATER</u> - Areas greater than 1 km ² . These areas may include marsh, especially salt marsh areas. Will not be sampled.



REPUBLIQUE D'HAÏTI

FACULTE D'AGRONOMIE ET DE MEDECINE VETERINAIRE

CENTRE DE RECHERCHE ET DE DOCUMENTATION AGRICOLES
(CRDA)

CRDA

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 Haïti.

Nous aimerions donc solliciter votre aide en nous faisant savoir si nous avons inclus tous les types de données qui vous intéresseraient 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,
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Technique
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