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ASSESSMENT OF REQUIREMENTS FOR DESIGNING AND IMPLEMENTING A NATIONAL AGRICULTURAL SURVEY IN HAITI

Report #8

ASSESSMENT OF REQUIREMENTS FOR DESIGNING AND IMPLEMENTING A NATIONAL AGRICULTURAL SURVEY IN HAITI

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I. INTRODUCTION AND SUMMARY OF RECOMMENDATIONS

The purpose of this report is to lay out for AID, the Ministry of Agriculture and the Agricultural Development Support (ADS-II) staffs the requirements for designing, implementing and processing a continuous national agricultural survey in Haiti. Specifically, the report presents:

- the survey sampling methodology based on a household frame and the advantages of this approach to collect agricultural production and livestock data vis-a-vis an area frame approach;

- the staffing needs for carrying out the first phase, or pilot phase, of the survey as well as some indication of field staff required for the national survey;

- the type of short- and long-term technical assistance recommended for each survey activity, by type of staff and level of effort required in person-weeks;

- the training needs for ADS-II project staff;

- a list of survey instruments required for implementing the work including preliminary table outlines, questionnaires and supporting manuals;

- a detailed calendar of survey activities and;

- a budget for short-term technical assistance.

It should be understood that this report is only a starting point toward the goal of establishing within the Ministry of Agriculture a viable statistical unit capable of carrying out a continuous agricultural survey at the national level in Haiti. It should be read with the caveat that it is not the final word on how the survey should be designed and implemented but instead a collection of firm suggestions based on findings from a 3-week trip to Port-au-Prince and past experiences working in other developing countries.

This section summarizes the principal recommendations which are described in more detail and justified in the sections that follow.

A. Sample Design

- Two mutually exclusive sampling frames should be used for the National Agricultural Survey: a farm household frame based on census enumeration areas and a list frame of large farms.

- The sample for the agricultural survey would be based on a two stage design, with census enumeration areas selected at the first sampling stage and housing units with farm households selected at the second stage. All the large farms in the list frame would be included in the sample with certainty.

- Data from the 1982 Haiti Population Census and the Agricultural Supplement administered to the farm households during the census would be used for stratification purposes and to determine measures of size to improve the efficiency of the sample design for the survey.

- The sample design would first be implemented in the South and Southeast departments for the pilot phase of the survey. The results of the pilot survey will be used to estimate sampling errors and examine nonsampling error considerations in order to finalize the sample design for the national survey.

B. Data Collection Methodology

- Farm size and crop area should be measured objectively; that is, fields and plots should be measured using tape and compass or a similar method.

- Crop area should be measured once every cropping season.

- Crop production should be collected at the farm level. Two methods for collecting the information should be tested: farmers' recall of the quantity of particular crops harvested over the reference period and objective measurements for crop production.

- Crop production data should be collected at least twice a month over the cropping cycle, but processed on a quarterly basis and tabulated every 6 months.

- Livestock data should be collected once every 6 months to measure the change in inventory.

- Information on basic household characteristics should be collected during the initial visit to the farm household.

C. Survey Instruments

- Development of preliminary output tables should be done during the early planning stages of the survey.

- Questionnaires should be designed with the collaboration of a data processor. Precoded response items should be used as much as possible. The forms developed should be thoroughly pretested.

- Survey manuals should be comprehensive with all tasks or elements included arranged in a logical sequence. The manuals should also have illustrations and other aids to accompany text and instructions.

D. Training

- Training of the field staff for the listing operation should last 1 week. For measuring crop area and recording crop production,

the training should be 2 weeks in duration. Both training sessions should include field exercises.

- Office coders/editors should receive a 3-day training on coding and editing and their work should be verified 100 percent during the first week following the training.

- Two survey statisticians and one mathematical statistican should be encouraged to participate in the short-term training programs offered at the Census Bureau in Washington, D.C.

E. Specifications for Data Processing

- Computer edit specifications (range and consistency) should be developed as soon as the final versions of the questionnaires are ready.

- Tabulation specifications should be ready before the fieldwork begins.

F. Technical Assistance

- Short-term technical assistance is highly recommended for key survey activities, consisting of 29 person-weeks to assist in sample design and 46 person-weeks for survey planning and implementation.

- A long-term data processing advisor is recommended to develop the computer programs and to assist in the processing of the data.

II. OBJECTIVES OF THE AGRICULTURAL SURVEY

The priority of the Ministry of Agriculture, as expressed by the Minister, Monsieur Frantz Flambert, is to have reliable and up-to-date agricultural data to support sound policy formulation. At present, no such data exist and agricultural planning takes place in a virtual information vacuum.

The basic goal of the Rural Economics and Agricultural Statistics Component of the ADS-II project is to fill that information vacuum by creating within the Ministry of Agriculture a viable statistical unit capable of gathering and processing agricultural data on an on-going basis.

The Minister of Agriculture, the staff of ADS-II and USAID agreed that the primary objective of the proposed Agricultural Survey should be to obtain estimates of total crop area and production and number of livestock at the national and department levels. There is also an interest in obtaining data on socioeconomic characteristics of farmers as well as other variables related to agricultural production. Another objective would be to collect basic information on environmental trends; for example, characterization of soil erosion combined with information on soil protection. Adding a quick-test measure of soil erosion similar to the one implemented in Rwanda by Larry Lewis of Clark University is, however, beyond the scope of the proposed agricultural survey.

Although the Minister wants to establish a viable statistical unit within the Ministry of Agriculture, he feels that institutionalization of the survey capability should be secondary to the objective of generating as expeditiously as possible the agricultural data for which there is such a need.

As the agricultural survey is designed to collect data only at the farm level, little can be said about the use of land in Haiti not under cultivation or pasture. For example, questions concerning the potential for bringing land in unsettled areas of the country under cultivation cannot be addressed through household survey techniques. There have been talks however of adding a remote sensing component to the project which would provide more macro level data on land use.

III. Sample Design

A. Introduction

The sample for the agricultural survey will be designed to obtain estimates of total crop area and production and number of livestock, as well as basic farm household characteristics and environmental trends related to agricultural plots, at the national and department levels. The sample design will initially only be implemented in two departments (South and Southeast) for the pilot survey. The agricultural supplement to the 1982 population census will probably not be processed in time to use this data for the stratification of areas for the pilot survey, but supplement data is expected to be available in time to refine the stratification for the sample design of the national survey. Also, the data from the pilot survey can be used to estimate sampling errors so that the sample size can be adjusted for the national survey. In this way the results of the pilot survey will serve to refine the sample design and data collection methodology for the national survey as well as provide baseline data for the ADS-II farming systems project areas. In addition, it will provide valuable experience for the technical and field staff who will be responsible for the national survey.

There are two basic alternative sampling frames which could be used for the agricultural survey: a household frame based on areas defined for census enumeration or an area frame based on aerial photography. Either frame can be used to obtain estimates of

agricultural area and production as well as farm household characteristics. There are many factors which affect the relative efficiency of each frame in meeting these objectives, such as the location of the farmers' houses in relation to their plots and the nature of response problems. A brief description of the sampling methodology based on each frame is presented in this section. The advantages and disadvantages of each frame in meeting the major survey objectives under different situations are indicated in terms of sampling error, nonsampling error and operational considerations. Preliminary guidelines are provided for the sample design based on the household frame. Corresponding guidelines for the sample design based on the area frame will be developed by a USDA consultant in February 1985 to complement this report.

Since the Minister of Agriculture expressed interest in survey estimates at the department level, the sample design described in this report is based on obtaining survey estimates at this level of disaggregation. However, there was also an indication that for planning purposes the country is now being divided into 4 planning regions consisting of 2 to 3 departments each. If it is determined that estimates are only needed at the planning region level, the sample size could be reduced accordingly, but the sampling methodology would remain the same. The proposed sample design does not depend on the data from the agricultural supplement to the 1982 census, since these data may not be processed in time for the pilot survey sample selection. However, these data could be used to

improve the sample design for the national survey once they are available.

B. Administrative/Political Subdivisions of Haiti

Haiti is divided into nine departments, which are further subdivided into "arrondissements" and "communes." Each commune is divided into "quartiers" (which are semi-urban in nature) and "sections rurales." The "Chef-lieu" or capital in each commune is considered urban. The "sections rurales" are subdivided into "habitations" and there may be "localites" within "habitations." The following table shows the number of "arrondissements," "communes," "quartiers" and "sections rurales" within each department.

Republic of Haiti

Summary of Administrative Subdivisions by Department

Department	Arrondissements	Communes	Quartiers	Sections Rurales
Total	41	189	54	560
Nord	7	19	9	82
Nord'Est	4	13	5	36
Centre	4	11	5	35
L'Ouest	5	16	6	112
Nord-Ouest	3	10	2	38
Artibonite	5	14	7	61
Sud	5	18	6	69
Sud-Est	3	10	5	48
Grande-Anse	5	18	9	79

C. Resources available for Developing Sampling Frame

1. Cartographic Materials

The following maps are available at the Secretairerie d'Etat du Plan (SEP), the Service de Geodesie et Cartographie (SGC) and the Institut Haitien de Statistique et Informatique (IHSI).

Land Use Map, 1:250,000 (SEP)
Population Density Map, 1:250,000 (SEP)
Surface Water Map, 1:250,000 (SEP)
Soil Potential Map, 1:250,000 (SEP)
Erosion Map, 1:250,000 (SEP)
Marketing and Communication Lines Map, 1:250,000 (SEP)
Political Maps, 1:50,000 (SGC), available for entire country
Political Maps, 1:25,000 (SGC), available for the North and West of the country
"Ville" Maps, 1:2,000 or 1:4,000 (IHSI), available for each urban "ville" in the country, except for Port-au-Prince (a total of 133 "villes")
"Section d'Enumeration" sketch maps, various scales, available for each census enumeration area in the country (ISHI)

2. Aerial Photographs

Aerial photographs at a scale of 1:40,000, developed in 1978, are available for the entire country at the SGC.

3. Census Data

A manual tabulation of the number of households enumerated in the 1982 population census is available for each "section d'enumeration." Preliminary results from the 1982 census data were tabulated by the IHSI based on a 2.5 percent sample. The remainder of the census data is now being keyed; it is estimated that this work will require about 4 months. Farm households are identified on the population census form. Each farm household was administered an agricultural supplement form at the time of the census. This form includes information on farm size, number of animals and crops grown. The keying of the agricultural supplement data will begin soon and it is also estimated to require about 4 months to process.

D. Sampling Methodology Based on Household Frame

The household frame for the agricultural survey would be based on cartographic materials and data from the most recent population census, which was conducted in 1982. For the purpose of organizing the fieldwork for the 1982 census, Haiti was divided into about 4,730 enumeration areas, or "sections d'enumeration" (SE's) with about 200 to 250 households each. These SE's would be ideal to be used as first-stage sampling units for a survey conducted at the household level, since there is a control on the variability of size (number of households) per SE. Measures of size are available from the census data which can be used for the selection of SE's with probability proportional to size (pps) in order to increase the

efficiency of the sample design and facilitate the control of enumerator workload per area.

The sampling methodology based on the household frame involves stratifying the SE's within each department by ecological zone and other geographic criteria, and perhaps by predominant crop. Within each stratum a sample of SE's would be selected with pps. A listing would be carried out in each sample SE to identify all the farm households within the SE boundaries and the farm size of each. At the second stage the farm households within each sample SE would be post-stratified by farm size and a sample of farm households would be selected within each farm size stratum. Given the major objective of obtaining estimates of total crop area and production and the total number of livestock, an independent list frame of large farms would be compiled; these large farms would be included with certainty in the survey.

Data on the area and production in different crops would be collected for all plots (or a subsample) operated by each sample household in order to estimate the total crop area and production. Environmental characteristics such as level of erosion can also be obtained for each field operated by a sample farm household. Other data such as number of livestock and socioeconomic characteristics of farmers would be obtained at the household level.

E. Sampling Methodology Based on Area Frame

The area frame is developed based on aerial photography and is designed specifically to produce estimates of land use and crop production. Mosaics from the most recent aerial photographs are used along with other cartographic materials to divide the country into different land-use strata. Separate strata may be created for predominant crops, pasture land, forest areas, etc. In the case of the area frame in the Dominican Republic, five land-use strata were initially defined for the area frame; it was later refined to include seven land-use-strata.

Within each land-use stratum, a two-stage design is normally used to select a self-weighting sample of area segments of approximately equal size. The designated sample size and sampling rates vary by land-use stratum.

The following land-use stratification and segment sizes were recommended by Raymond Boyecker (USDA) in Annex G-2 to the ADS-II Project Paper.

Proposed Size of Sampling Unit (Land Segment) in Each Land Use Stratum

Segment Size	Land Use Stratum
1/10 km^2	1. Populated areas - 11 Metropolitan Centers plus all villages with over 2,000 population (total 35)
List	2. Plantations or farms with large capital investments (sisal, cafe, cacao)
$2km^2$	3. Rice paddies and irrigated areas
	4. Cultivated land
$2km^2$	a. Flat lands, valleys
$1km^2$	b. Identifiable slopes under cultivation
$4km^2$	5. Woods, brushland, forest
$2km^2$	6. "Savane" areas or pasture

Once the sample segments are selected, an aerial photo enlargement is obtained for each and a marker is used to clearly identify the segment boundaries. The photos serve as an aid in the data collection to identify plots within the boundaries of the sample segment.

The area frame methodology for obtaining crop area and production data involves the "closed segment" approach, where data are collected for each plot within the segment boundaries. Livestock and other household-level data can be obtained through the "open segment" approach, which involves interviewing each household living within the boundaries of a sample segment. For a farm household within the segment boundaries, data are collected for all items. For a farm household located outside the segment, but with land

within the boundaries of the segment, only crop area and production data are collected. The household frame also uses this "open segment" approach in sample SE's, although it provides more control over sample size and variability.

F. Comparison of Household Frame and Area Frame for Agricultural Survey

1. Sampling Error Considerations

Based on sampling error considerations alone, an area frame based on aerial photography is normally more efficient for obtaining estimates of land-use and crop production, while a household frame is more efficient for estimates of livestock, socioeconomic characteristics of farm households and any farm-level variables. The areas defined for the household frame are designed to control the variability in the number of households, while those defined for the area frame are designed to control the variability in land area. The land-use stratification used for the area frame also makes it more efficient for producing crop area and production estimates. The stratification criteria used for the household frame, such as ecological zones, urban/rural and other geographical criteria, are somewhat correlated with land-use. Using data from the agricultural supplement to the 1982 population census, it is also possible to stratify the SE's by predominant crop, which would be ideal for crop area and production estimates.

In the case of household-level characteristics, the area frame is inefficient when the number of households varies considerably by segment. This is especially a problem when housing units are clustered in small villages, separated from the agricultural land; a sample segment may thus have many households or no household depending on where the populated area is located. During a field trip to the mountain areas of Jacmel we noticed extensive areas with agricultural fields but no houses.

2. Nonsampling Error Considerations

Since the area frame is based on segments of known size, it is easier to control the quality of data on land area, while the household approach relies more on the response of farmers. However, the data collection methodology based on the household approach which is described in this report relies on objective area measurement to obtain area in different crops, which also provides more quality control. The traditional area frame approach relies more on information from "informants" who are found inside the segment, which is more subject to response error, as it is difficult to locate the farmers operating each plot of land within segment boundaries. Experience with the area frame in the Dominican Republic has indicated that when the "open" and "closed segment" approaches are carried out at the same time, there can be a serious undercount of households as the enumerators place more emphasis on accounting for land covered by a populated area than in interviewing each household. There are other nonsampling error considerations related to the

implementation of each data collection methodology, described below.

3. Operational Considerations

A major concern in deciding which type of sampling frame to use for the agricultural survey should be the logistical and operational aspects of the data collection, including the time required to obtain the first results from the survey. A major advantage of the household frame is that the SE's have already been defined, so the sample design can be implemented in a timely fashion. In the case of the area frame, it would be necessary to develop the entire frame, so it would take much longer to implement.

In the case of the area frame, the closed segment approach involves obtaining the crop area and production for each plot within the boundaries of a sample segment. It does not appear that the segment size of 1 to 2 km^2 specified for most land-use strata in Bonecker's report (see Project Paper, Attachment G) would be feasible for many areas in Haiti, given the small size of plots and the mixed cropping patterns, so a much smaller area would have to be used. It would be necessary to identify the farmer operating each plot within a sample segment and locate each farmer for the survey interview, since it is essential to obtain information on crop production directly from the farmer. It would be very time-consuming for an interviewer to find the operator of each plot within the segment. Since farmers may

have several plots with the same crop, it may be difficult for them to determine how much production came from a particular plot. For this reason it is proposed that crop production be obtained at the household level instead.

Experience from surveys carried out under the farming systems research component of the project has indicated that although farmers generally know the approximate area of their fields, they do not know the area of specific plots (defined to have distinct crops or crop combinations), so it is necessary to use an objective area measurement procedure to obtain crop area. Since it would be necessary to obtain permission from a farmer to measure his plots, it would be easier to carry out the objective area measurement procedures under the household approach. Based on the farming systems survey data, the average number of fields per farm household in the project areas is about 4.5. Given the dispersion of fields operated by a particular household, the objective area measurement procedures will be time-consuming, limiting the number of sample farm households an interviewer can handle.

Another major constraint is that the farmer is reluctant to provide any information until the community leader has been contacted and has requested the cooperation of the farmers. The plots within a segment may be operated by persons from different "habitations," making it very difficult logistically to contact the various community leaders. On the other hand, the areas defined for the household frame (SE's) were defined to be a

subdivision of an "habitation," an entire "habitation," or an aggregation of "habitations." Given the considerable operational problems of implementing the area frame approach, it appears that the household frame approach is more feasible to implement. The USDA consultant will examine in greater detail the operational aspects of implementing the area frame.

G. Preliminary Guidelines for Sample Design Based on Household Frame

1. Universe and Unit of Analysis Defined for Survey

The unit of analysis defined for the agricultural survey would be the farm household, including all of the agricultural plots and farm animals operated by each member of the household. The last-stage sampling unit would be the housing unit containing one or more farm households. The universe defined for the survey would consist of all farm households in Haiti, excluding the households located in Port-au-Prince and larger industrial cities such as Cap-Haitien and Gonaives. These major urban areas are excluded because the percentage of households operating farms in these areas is expected to be low. The small amount of agricultural production from these areas would not warrant the cost of including them in the survey. An exception is the list frame of large farms, which would be included in the survey regardless of where the operators live (see "Sampling Frame" below).

2. Sampling Frame

Since one of the major objectives of the survey is to estimate the total area and production for different crops and the total number of livestock, it is important to identify all the major producers and include them in the sample with certainty. Therefore, two mutually exclusive frames would be used for the survey: a list frame of large farms and a frame of SE's covering the entire population of interest, from which the large farms in the list would be excluded.

a. List Frame of Large Farms

It is difficult to compile a complete list of all the large farms in the country. However, an effort should be made to develop as complete a list as possible from different sources, and any large farm missing from this list would still have a chance of selection in the frame of SE's. The minimum farm size for the frame of large farms depends on the distribution of farms by size across the country. The number of farms in this frame should not exceed 200, as the data collection would become operationally problematic. Perhaps the list could begin with farms with 30 or more "carreau" (about 96 acres). If the list exceeds 200 farms, a higher cut-off point could be used. Farms with a large number of livestock should also be included in this frame.

The minimum criteria for animals would have to be determined in consultation with staff knowledgeable about the distribution of livestock.

The basic source of data on large farms would be the agricultural supplement to the 1982 census, which includes information on farm size and number of animals. However, given the response and coverage problems normally associated with a census, this list should be supplemented with information from other sources. The survey staff will have to be very resourceful in compiling the list of large farms. The sources of information on large farms will vary according to crop or animal. For example, large sugar cane operations may be identified by the sugar mills which buy the cane production. For other crops or livestock, there may exist associations to which major producers belong. In addition, each extension agent could be requested to compile a list of large farms in his respective area. In some cases a large farm may have an administrator living on the premises in which case he could provide the survey information. However, it is important to obtain the address of the owner/operator wherever possible so that that person could be contacted during the survey.

b. Frame of SE's

The primary sampling units in the household frame would be the "sections d'enumeration" (SE's) defined for the 1982 population census in Haiti. These are areas with well-defined boundaries which contain an average of about 200 households each. There are about 4,730 SE's covering the entire country. Each SE is defined on a sketch map indicating its physical boundaries. A listing would be carried out in each sample SE to identify the farm households within its boundaries. The secondary sampling units would be housing units containing one or more farm households. Each farm household in a sample housing unit would be interviewed for the survey. Any farm household listed in a sample SE which also appears in the list frame of large farms should be purged from the SE listing before the last stage of selection to avoid a multiple chance of selection.

3. Stratification

An efficient sample design requires the universe to be divided into homogeneous areas or strata. The first level of stratification would be by department, corresponding to the domains for which survey estimates will be made. Within a department, the SE's can be stratified by urban, rural and "quartier"

(semi-urban) and by major ecological zones. Depending on whether the "quartiers" are more similar to urban or rural areas, they may be combined with one of the other strata.

If it is found that the proportion of households operating farms is much less in the urban areas or that the average amount of land per urban household is much lower than for rural households, the urban stratum may be sampled at a lower rate. Once the 1982 population census data has been processed it will be possible to obtain the proportion of farm households for each "ville"; also, the number of farm households from the census data can be used as the measure of size for the sample selection.

The ecological zones would be defined within each department based on criteria such as altitude (highlands/lowlands), amount of rainfall, availability of irrigation, etc. These ecological zones should be delineated on the 1:25,000 or 1:50,000 scale maps, based on information from land-use and relief maps and other cartographic references. Perhaps four ecological zones could be defined for each department. In departments with greater variability, it may be necessary to stratify by more ecological zones, but if any stratum thus created is found to contain less then 5 percent of the population of the department, it should be combined with a similar stratum.

With the assistance of the Institut Haitien de Statistique et Informatique, each SE in a department would be assigned to the ecological zone where most of its land fell. Within each of these strata, the SE's could be ordered in a geographic or serpentine manner, resulting in further implicit stratification when systematic sampling is used. Once the agricultural supplement to the 1982 census is processed it will also be possible to stratify (explicitly or implicitly) the SE's by predominant crop or livestock.

A listing of households will be carried out in the sample SE's selected within each stratum. The listing sheet would have a screening question to identify farm households and a question on farm size and number of livestock. The farm households listed in each sample SE could then be post-stratified by farm size for the last stage of selection. Perhaps the farm households could be divided into three farm-size strata, such as 0-1.9 carreau, 2.0-9.9 carreau and 10+ carreau. Since one of the main objectives of the survey is to estimate total area and production,the largest farm size group (10+ carreau or a large number of livestock) should be included in the sample with certainty at the second sampling stage, and the medium size farms (2.0-9.9 carreau) may be sampled at a higher rate than the smallest farms.

4. Sample Size and Allocation

The sample size is determined by the precision required for the survey estimates as well as the resource and operational constraints. It is hoped that the estimates of total area and production for major crops and important livestock estimates would have a relative standard error or coefficient of variation (cv) within 10 percent at the department level. However, there are currently no data available to estimate variances. More important is the accuracy of survey estimates, measured by two components: sampling and nonsampling errors. The sampling errors result from basing estimates on a sample of the population. Other sources of error, such as undercoverage, noninterview, response and measurement errors are referred to as nonsampling errors. Sampling errors can be reduced through a variety of techniques, including stratification, pps sampling and increasing the sample size. On the other hand, nonsampling errors are minimized through quality control procedures; the larger the sample, the more difficult it is for operational and quality control. Given the nature of agricultural data collection in Haiti, controlling nonsampling errors should be a major consideration in determining the sample size. The results of the pilot survey will indicate potential sources of nonsampling errors which need to be better controlled in the national survey. The pilot survey data can also be used to estimate sampling errors. The sample size for the national

survey will be determined taking into consideration both types of error.

Since survey estimates of crop area and production and number of livestock are to be made at the department level, the sample size should be fairly comparable for each department. The data collection methodology requires that one enumerator handle the workload for each sample SE, so there is a limit on the number of SE's which can be sampled in each department. Experience in other countries such as Peru has shown that 30 sample segments per domain with about 12 sample households each provide reasonable estimates at the domain level. Since no data are available for estimating sampling errors, it is recommended that this sample size be used for each department in the pilot survey. The sample size for the national survey can then be adjusted based on the results of the pilot survey taking into account both sampling and nonsampling error considerations. This sampling scheme would result in a sample of 60 SE's and 720 households for the pilot survey in the South and Southeast departments, requiring a total of 60 interviewers and 12 field supervisors. If this sampling scheme is implemented at the national level, it would require about 270 interviewers and 45 supervisors to collect the data for 3,240 sample farm households. If it is found that it is not feasible to manage this level of field staff at the national level given human and financial resource constraints, two alternatives can be examined

based on the results of the pilot survey. One alternative would be to determine whether one interviewer can handle two SE's with a possible modification of the data collection methodology, thus reducing the number of interviewers in half. Another option would be to limit the survey estimates to the planning region level, and have about 40 SE's per planning region, or a total of about 160 sample SE's.

5. Sample Selection

The sample design based on the household frame would be a two-stage stratified design, with SE's selected at the first stage and housing units with farm households selected at the second stage. Surveys carried out under the farming systems research program indicated there is normally one household per housing unit. The sample selection would be carried out in the following steps:

a. First Sampling Stage

i. Within a department, each SE (excluding those in major urban areas) would be assigned to a unique stratum. The following is an example of a simple stratification scheme which could be used:

(1) Urban

(2) "Quartiers" (semi-urban)

(3) Rural
- Ecological zone 1
- Ecological zone 2
- Ecological zone 3
- Ecological zone 4

ii. Within each stratum the SE's should be ordered geographically, in a serpentine manner, to provide implicit stratification. When the data from the agricultural supplement to the 1982 census has been processed, it will also be possible to order the SE's by predominant crop within a stratum; this ordering may be more efficient for crop area and production estimates, although it would probably be highly correlated with geographic criteria. In the case of the urban SE's, it may be desirable to order the SE's by proportion of households with farm operators when this information is available from the 1982 census.

iii. The number of households in each SE from the preliminary census tabulations should be recorded as the measure of size. When the census data has been processed, the number of farm households should be used as the measure of size. Cumulate the measures of size down the ordered list of SE's within each stratum.

iv. The 30 sample SE's for a department should be allocated among the strata proportional to size, with a minimum of 2 SE's per stratum.

v. The sampling interval for each stratum (I_h) would be determined by dividing the total cumulated measure of size by the number of sample SE's allocated to that stratum (m_h).

vi. A random start (R_h) between 0 and I_h would be determined from a random numbers table, and the sample SE's would be selected systematically with pps. The sample "hits" would be identified as follows:

$S_{hi} = R_h + I_h(i-1)$, rounded to the next integer,

$i=1, \ldots, m_h$,

where S_{hi} is the i-th sample SE selected.

b. <u>Second Sampling Stage</u>

i. A listing of all housing units would be carried out in each sample SE to identify those with farm operators.

ii. The housing units listed in each sample SE would be post-stratified by farm size (for example, 0-1.9 carreau, 2.0-9.9 carreau and 10+ carreau). In the case

of housing units with more than one household, they would be stratified according to the size of the largest operation.

iii. Within a sample SE, if there are 6 or less farm households with 10+ carreau, they would be included with certainty in the sample. If there are more than six farm households with 10+ carreau, a sample of six of them would be selected systematically with a random start.

iv. The number of farm households with 10+ carreau (m_L) in the segment would be subtracted from 12 to determine the number of housing units to be selected from the remaining two farm size strata in the segment. The allocation of the remaining ($12-m_L$) sample housing units between the small and medium size strata depends on the distribution of farm households by size. The medium size farms may be sampled at twice the rate of the small farms, with the total number of sample farm households per sample EA fixed at 12. An allocation scheme could be worked out for this purpose.

NOTE: Within each farm size stratum in a sample SE, it may be advisable to select two additional households (if available) to serve as substitutes in case of noninterviews,

in order to control the size of the workload. Substitution should only be allowed by a supervisor after all attempts to gain cooperation from the sample household have failed or if the housing unit has been abandoned.

The sampling scheme described above would result in differential weights by SE and farm size stratum, although the variability of weights within a department should not be large. The data processing system would be designed to have a weight attached to each record and the computer tabulations would automatically weight the data.

6. Role of IHSI in Developing Sampling Frame

Since the household frame requires the use of data from the 1982 population census and the agricultural supplement, it would be necessary to have the involvement of the Institut Haitien de Statistique et Informatique (IHSI) in developing the sampling frame. The ADS-II project statistician should work together with a statistician of IHSI on the stratification of SE's. Since IHSI is planning to conduct a sample agricultural census in 1986 (which has not yet been funded), they are also interested in developing a national frame of farm households based on the census SE's, stratified by information from the census agricultural supplement. Therefore it should not be difficult to work out a cooperative effort with the IHSI for

this purpose. Since USAID/Port-au-Prince has been assisting the IHSI with funding for processing the agricultural supplement data, an arrangement has been made with IHSI to have the supplement forms from the South and Southeast departments keyed first. This should help insure that the data would be available in time to develop the sampling frame for the pilot survey. Certain data processing tasks would be required for developing the agricultural sampling frame, such as tabulating data on predominant crops by SE. Given the interest of IHSI in completing the sampling frame for the proposed 1986 sample agricultural census, they may provide the required data processing staff to carry out this activity and give it the appropriate priority. Other than the funding that IHSI is already receiving from USAID to process the agricultural supplement data, no additional funding may be required for the IHSI input into the development of the agricultural sampling frame.

IV DATA COLLECTION APPROACH

Agricultural surveys always have been very difficult to design and implement given the large number of factors that have to be dealt with and their constant and ever-changing nature. In tropical climates, where agricultural production is continuous for many crops and intercropping the norm, the task of designing a suitable data collection approach is a difficult one. In Haiti, the design is even more difficult to develop because of the very small size of the farmers' fields which generally are under one hectare and the distrust of Haitian farmers toward outsiders who inquire about their livelihood. As a result, any data collection methodology proposed has to be thoroughly tested before it is implemented at the national level.

A. Methodology for Collecting Data

The methodology we are proposing is based on discussions with the ADS-II staff, the results of a survey conducted under the farming system component of the project and our own findings from a field trip to the Jacmel region. We interviewed several farmers to determine whether they could tell us the number of fields they farm, their size, location, distance from their homes, etc. The answers obtained helped us define the methodology described below.

1. Area Measurement

During these visits, we learned that farmers' knowledge of the size of their fields is not consistent with actual field measurements. The experience of the farming systems surveys has also indicated that the farmers usually do not know the area in particular crop or crop combinations. We therefore recommend the use of area measurement instead of relying on farmers' recall. The process involved in measuring fields and plots is a complex one and time consuming, but necessary if reliable information is needed.

The average number of fields each farmer operates, according to results obtained from a survey conducted by ADS-II staff, is 4.5, with some farmers operating as many as 11 fields while others farm just one. Since it is unreasonable to demand that a farmer accompany the interviewer until the measurements from all his fields and plots are completed, only one or two fields with their corresponding plots should be measured per visit. In other words, if a farmer has five fields, it would take an interviewer up to five visits before all the farmer's fields are measured.

An alternative method would be to measure all of the farmer's fields and list the cultivated and uncultivated plots within each. Subsequently, a subsample of plots could be measured to estimate area under different types of crops as well as noncultivated area.

2. Crop Production

From our discussions with ADS-II staff and conversations with farmers in the Jacmel region, we have concluded that crop production data could be obtained at the farm level, but it is very difficult to collect at the plot level. Eliciting information at the farm level would preclude us from obtaining crop yield per hectare in most cases, especially if different crop combinations are present on various plots and fields, but it would help us obtain reliable information on production. In Haiti, where the same crops are planted in various fields and plots in different intercropped groupings on a farm, it would be imposing on farmers to ask them to keep track of the quantity of a crop harvested from a particular plot and field. Generally, at harvest time, farmers pick their crops without regard to the field and plot they come from, which creates a problem in measuring yield. Therefore, the sensible approach to follow for measuring crop production in Haiti is to collect information at the farm level.

One method that could be employed to collect the required information is to ask farmers the quantity of particular crops harvested over the reference period. Another would be to take objective measurements of crop production using a methodology developed and employed successfully in Rwanda. The methodology consists of providing farmers with calibrated buckets of uniform

size. These buckets are used by farmers when harvesting their crops.[1] Each time they fill a bucket with a particular crop, they record the amount by shading in the corresponding number of buckets illustrated in the printed daily production register given to them by the interviewers (see attachment 1). However, if a bucket is only 3/4 full, the farmer shades the bucket accordingly on the daily production register. At the end of a 7-day period, the interviewer returns to the farm to pick up the daily production register for that particular period.

At this time, not enough information is available to choose one method of collecting crop production data over the other. Once the design of the survey gets under way, we could test both methods to determine which of the two gives the best results for individual crops.

3. Livestock Inventory

One of the objectives of the survey is to collect data on livestock. Generally, this type of data is easier to collect than crop data especially in a country like Haiti where the average number of animals per farmer is small.

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[1] A different method is used for measuring production for crops such as bananas, corn and sugar cane.

Livestock data should be collected through interviews once every 6 months to measure the change in inventory. Also, this information should be collected at the household level, so the household frame approach is ideal for livestock estimates.

4. Household Characteristics

A recommended approach for collecting agricultural data is to start the interview by asking basic household characteristics such as number of persons in the household and the sex, age and level of education of the head of the household. Questions dealing with household characteristics are generally not threatening in nature and easy to answer, making the farmer more receptive toward the interviewing process. At the same time, the information collected would complement the crop area and production data, giving analysts a more rounded picture of the agricultural sector.

B. Other Data Collection Considerations

1. Nonhousehold Production Units

Since the principal objective of the survey is to estimate total crop area and production and number of animals, nonhousehold production units will have to be included as part of the universe. A nonhousehold production unit could be defined as an

association of farmers or a business enterprise which manages land for the purpose of agricultural or livestock production. However, the strategy for collecting data from nonhousehold production units is different from that of farm households and requires a special treatment for the former. For example, a list of all nonhousehold production units will have to be made, different forms designed and a distinct set of fieldwork procedures developed.

2. Reference Period

The reference period for the survey should be defined before a calendar of survey activities is developed. If the survey is to measure agricultural production for an entire calendar year, plans have to be made to start the fieldwork at the beginning of the year. By the same token, all survey activities will revolve around the data collection period.

3. Unit of Enumeration

As outlined in the sample design section of this report, the unit of enumeration is the farm household in rural and urban areas outside the major metropolitan areas such as Port-au-Prince, Gonaives and Cap-Haitien. Nonhousehold production units will be also enumerated.

4. Farm Household Definition

What is a farm household? This question should be answered during the early planning stages of the survey. That is, the minimum criteria should be established to screen out nonfarm households from the survey. In the 1984 Peru Rural Household Survey for example, to qualify as a farm household, the members of the household needed to have at least 1,000 sq. meters of land or a minimum number of animals.

5. Public Relations Campaign

There is evidence that farmers are sometimes unwilling to cooperate with data collection agencies. There is also a feeling among some farmers that any information they could provide would be used to their detriment or that no benefit would come out of it. This negative attitude among some farmers could be overcome if a well-organized public relations campaign is mounted.

Since the pilot phase of the survey will be conducted in the two regions where the ADS-II staff have been working over the past year, we do not expect to have too much reluctance on the part of the farm community to cooperate. ADS-II staff have been working closely with the farm community in these two regions and they have been able to gain their trust. At the national level, however, the situation might be different.

The approach that should be taken to gain the farmers' cooperation would be to explain the survey objectives first to community leaders so they, in turn, could inform farmers. Also, interviewers should be well-trained in introducing the survey to farmers and soliciting their support. Finally, the government should guarantee that any data collected would remain confidential and that it would not be used for tax purposes.

V. SURVEY IMPLEMENTATION

There are several steps that must be followed sequentially to successfully implement a survey regardless of the subject under study. Using the proposed agricultural survey called for under the rural economics and agricultural statistics component of the ADS-II project, we will discuss these steps as well as manpower and survey instrument requirements. For an illustration of the survey calendar of activities, see attachment 2.

A. Preliminary Output Tables

The first step for the proposed agricultural survey should be the development of basic output tables. These table outlines serve as the key document for the design of the questionnaire. Without them, it would be inefficient and wasteful to design a questionnaire. Questions included in a questionnaire without the benefit of preliminary output tables might serve no practical purpose if the data collected through them is not going to be utilized at a later stage. On the other hand, tables developed after the questionnaire has been designed might not call for the particular type of information collected. That is, required information might not be obtained. Consequently, valuable resources would be wasted collecting and processing data that would not be analyzed.

The time it takes to develop preliminary tables is directly related to the number of tables needed for the analysis and inversely related to the number of people that have to approve them.

We estimate that it will take two ADS-II survey statisticians approximately 6 to 8 weeks to determine the information needs of the data users (mainly the Ministry of Agriculture) develop the tables and receive the approval of the interested parties to the survey. The sooner this task is undertaken the faster all the other survey activities could get under way, especially the sample and questionnaire design.

B. Questionnaire Design

The most important consideration in form or questionnaire design should be to collect the most accurate data possible. However, the ease with which the form can be processed must also be given adequate consideration. The questionnaire or form should be designed with the collaboration of a data processor. He or she should advise the survey statistician on the feasibility of the design from a data processing perspective. This consultation with the data processor would lead to the simplification of the data processing task without adversely affecting the data collection effort.

To reduce nonsampling errors and improve the quality of the data to be collected, certain techniques could be used during the design of the questionnaire. These are:

- Each questionnaire should be uniquely identified with a numerical code.

- Basic topics should be organized in sections and described in section headings.

- All questions should be stated in complete sentences whenever possible.

- Precoded response items should be used as much as possible.

- All data entered should be numerical.

- Visual aids, such as italics for interviewer's instructions, bold face type for headings, regular type for questions, arrows, shading, etc., should be used.

Since the data collected in the questionnaire should be keyed for computer processing, it is necessary to format the questionnaire based on the data entry technique recommended by the data processors. Although there are several data entry techniques, two commonly employed techniques are fixed-field format and

source-coding. Whichever technique is employed, it should be defined prior to the questionnaire design.

From our meetings with the Minister of Agriculture, AID and ADS-II staff, as well as our visit with farmers in the Jacmel region, we have reached the conclusion that for the pilot phase of the survey, five forms would be needed. One form will be needed to conduct the listing operation. Another form would be used to measure farm size and land utilization. A third form would be used to record agricultural production. A fourth form would be used to collect household characteristics data and the last one to obtain livestock inventory.

To insure the quality of the design, we propose that the Haitian counterparts responsible for the design of the various forms receive support from a Census Bureau survey statistician. The first draft of each form should be thoroughly pretested in the Les Cayes and Jacmel regions, the two sites selected for the pilot survey. During this pretest, the focus should be on question content and wording, ease of data recording, form manageability, and farmers' understanding of and ability to respond to the questions. This pretest should be repeated in other regions of the country when the survey is to be implemented at the national level.

The forms should be developed in Creole since that is the language spoken by farmers throughout the country. If desirable, a French version could be developed for documentation purposes and for distribution to international donor agencies and other interested parties. Also, we recommend that the final design (not to be mistaken with content) for all forms should be carried out at the Census Bureau. This arrangement would not preclude the Ministry of Agriculture from having a final say on the design of each form since the Ministry will have the opportunity to review each form prior to its use. At the same time, by having the forms designed at the Census Bureau, we could guarantee that they will be of the highest quality, thus increasing the accuracy of the data.

We estimate that it will take up to 4 months to design, test, revise, and print all the required forms for the pilot survey.

C. Survey Manuals

A task that should be implemented concurrently with the design of the various forms is the writing of manuals. In the case of the agricultural survey envisioned for Haiti, the following manuals are required:

(1) Listing Manual (used during the listing of each housing unit within a selected census enumeration area).

(2) Interviewer's Manual

(3) Supervisor's Manual

(4) Coding and Editing Manual

(5) Instructors' Training Guide (for the full-scale nationwide survey only, since more than one training site will be required)

The time required to draft each manual varies by the type of manual, but a safe assumption is to allow approximately 4 weeks per manual and an additional 2 weeks for printing.

The order in which they should be developed is listed above. The language for drafting the manuals should be French, since we are assuming the field staff, as well as the office staff, are able to read and speak French. If this is not the case, a decision should be made to develop and print a limited number of the manuals in Creole or to try to recruit staff from other areas where French speakers might be available.

The manuals developed must be comprehensive, that is, they should contain not only instructions on how to fill in forms, but they should also have detailed technical and administrative procedures. For example, the interviewer's manual should include the objectives of the survey, interviewing techniques, instructions on handling refusals, obtaining farmers' cooperation, question-by-question

instructions, editing the questionnaire, submitting completed questionnaires to supervisors and other administrative matters. Although the principal responsibility of drafting the manuals should fall on the Haitian survey statisticians, they should have the technical assistance of Census Bureau staff. Technical assistance consists of helping the Haitian counterparts develop the manual outlines and, if necessary, the main body of the manuals.

D. Field Staff Training

Prior to the fieldwork, interviewers and supervisors must be trained. For the pilot phase of the survey, 68 interviewers and 12 supervisors must be trained on two separate occasions. They should be trained first for the listing operation and then for the area measurement and recording of agricultural production.

During the training for the listing operation, the field staff will be taught how to read enumeration area maps, update sketch maps and list dwelling units. The training should be both theoretical and practical in nature and it should last 1 week. The training for measuring area and production should be 2 weeks long and it should cover every aspect included in the interviewer's manual.

Since it is not advisable to train 80 persons in one room nor perhaps possible to find a room that would accommodate all of them, it is recommended that two training sites be selected, one in Les

Cayes and the other in Jacmel. The training should be the responsibility of the survey director and the survey statisticians to be contracted. The number of trainers required should be three per training site for a total of six. Given that it is possible that at best three survey statisticians would be available at any one time, three additional instructors would be needed to meet staffing requirements during the two training periods (listing operation and area and production measurement). To resolve the training staff shortage, we suggest that the other component of the ADS-II project make available 3 or 4 staff members for the duration of these two periods. We also recommend that two Census Bureau survey staff monitor the training and provide backstopping for the instructors.

E. Fieldwork

The listing of the dwelling units in each of the 60 sampled enumeration areas for the pilot phase should take approximately 10 days, assuming one interviewer per area. There is an average of about 225 dwelling units per enumeration area according to IHSI officials.

If the sample size for the pilot survey is 720, it should take 60 interviewers approximately 5 weeks to complete the measurement of every field and plot a farmer has, assuming a rate of approximately 2 fields with their respective plots per working day. We are also assuming that the average farmer has five fields.

If the sampling scheme proposed for the pilot survey is implemented in each department for the full-scale nationwide survey, the sample size would be approximately 3,240 or the equivalent of 360 observations per department. This would require about 270 interviewers assuming each interviewer could handle one enumeration area. If during the pilot we determine that an interviewer could handle two enumeration areas, then the number of interviewers needed for the survey at the national level would be 140.

We recommend that the interviewers work in teams of five with one supervisor per team. Each supervisor should have a motorcycle to closely monitor the work of his team.

The team members should consist of people having knowledge of the Haitian farming system. An asset would be to employ people who have a minimum of 3 years of secondary level education and know well the area in which they would be assigned to work.

Field supervision and control will require, in addition to team supervisors, regional supervisors to monitor the work of several teams and to assure consistency in the field work. The regional supervisors should include the survey statisticians responsible for designing the questionnaire and survey manuals, since they are the most familiar with the survey methodology. For the survey at the national level, we would need three national supervisors, each monitoring the work in three departments.

The regional offices set up for the farming system component of the ADS-II project could also be used as regional offices during the pilot survey. One person in each office should be in charge of checking in the forms for the region, ordering them by enumeration area and carrying them with their control sheets to Port-au-Prince for processing. The same person should be responsible for monitoring supplies and ordering new shipments whenever they are running low.

F. Data Processing

1. Coding and Editing

Prior to data entry, there should be a coding operation to transform information such as type of crop or livestock into numerical form so that it can be processed. Probably most of the coding operation would entail assigning codes to various crops recorded in the questionnaire. The editing consists of cleaning the data, that is, ensuring that entries are legible, recorded in their proper space, and rounded to whole numbers if necessary.

For the pilot phase of the survey, three coders/editors will be needed for the verification of the area measurement corresponding to the farmers' fields and plots. Although it is difficult to estimate the time it would take for three

coders/editors to check all 720 forms, we presume that it would not be more than 1 month. The same office coders/editors could also code and edit the agricultural production form and the livestock inventory. We recommend that the three office coders/editors participate in the field staff training session. They should also receive a 3-day training session on coding and editing. Their work should be verified 100 percent during the first week following the training and checked on a sample basis thereafter.

2. Data Entry

Data entry is the transfer of data to a computer readable form; that is, from the questionnaire to a diskette. Under topic B, Section V, we briefly discussed two techniques which may be used to format the questionnaire when data are to be keyed from the questionnaire itself: fixed-field format and source-coding.

In fixed-field format, each response data item is assigned a specific set of columns or record positions into which the answer should be keyed. In source-coding, a numeric code uniquely identifies each response item on the questionnaire. At the time of data entry, only non-blank cell entries and their corresponding source codes are keyed. It would be up to the data processors to advise on the appropriate format.

Data entry is often a problem area because the magnitude of the work is sometimes underestimated. Making a realistic estimate requires obtaining at least the following information:

(a) Number of shifts

(b) Number of productive hours on each shift

(c) Number of data entry operators on each shift (which should be equal to the number of data entry stations)

(d) Average number of keystrokes per hour per operator

(e) Number of questionnaires

(f) Average number of strokes per questionnaire

(g) Percentage of verification desired

Explicit instructions must be written for the data entry operators and training provided to ensure that they understand their tasks.

The data entry operation should be under the responsibility of the long-term data processing advisor who could receive backstopping, if necessary, from Census Bureau data processors.

3. Range and Consistency Edit Specifications

Since a computer can perform the valid value (range) and consistency check edits faster and more accurately than a person can, we recommend that computer editing be used for this survey. Detailed computer editing specifications (range and consistency) must be provided to the data processing staff by the survey statisticians. Census Bureau staff could provide guidance to the survey statistician staff preparing the specifications.

Ideally, the specifications should be developed as soon as the questionnaire is finalized. The first draft of the specifications should take a survey statistician 2 weeks. Once the draft is ready, the data processing staff should review the specifications and incorporate their comments, if any, in consultation with the survey statistician. After a consensus has been reached, the specifications would be finalized. The whole process takes approximately 1 month, which does not include the time it would take a data processor to program the specifications.

4. Computer Editing

Errors detected during the computer edits should be corrected by the coding and editing staff before the data is tabulated. The two types of errors detected by the computer during this stage of the processing are invalid values and inconsistencies among two or more responses in the questionnaire.

The coding and editing staff could also be used for resolving the errors detected by the computer. They should be given an intensive 3-day training covering the resolution of each type of error displayed on the printed output. As in the case of manual editing, their work should be checked on a 100 percent basis during the first week and then on a sample basis.

5. Table Specifications

Developing the table specifications is the responsibility of the survey statistician. It is highly recommended that these specifications be developed as soon as the questionnaire has been finalized. The time it takes to write the specifications is directly related to the number of tables defined by the data users. It is also the responsibility of the survey statistician to review the tables once they are printed by the computer; therefore, he/she should work closely with the data processing staff.

We recommend that a Census Bureau survey statistician provide on-the-job training to the Haitian counterparts for the development of the table specifications.

Programming the tables should take approximately 1 day per table if a packaged table-generating software such as CENTS 4 is used and an experienced programmer is on board.

VI PERSONNEL REQUIREMENTS

This section deals with the number of professional, clerical and secretarial staff needed to design, implement and process the pilot phase of the proposed agricultural survey. All references to short-term technical assistance are in terms of person-weeks, except days in-country. Long-term advisor's time is given in person-years. See attachment 3 for a detailed budget of the Census Bureau program for short-term technical assistance.

A. Host Country Personnel

Host country survey staff should become permanent employees of the Ministry of Agriculture, if the goal of the Rural Economics and Agricultural Statistics component of the project is to be accomplished. The goal as outlined in the project paper supplement is the formation of a cadre of technically qualified personnel and the development of procedures for acquiring agricultural information on an on-going manner. Specifically, surveys will be designed and implemented nationwide to obtain specific answers to wide ranging questions. Within this context, we suggest the following staffing requirements for the pilot phase of the survey:

1 Survey Director to oversee all administrative and technical issues related to the survey. This position requires a person with previous experience planning, directing, and coordinating a variety of specialized and complex statistical surveys.

3 Survey Statisticians to develop and implement the methodology. The survey statistician positions require experience in survey work such as manual writing and forms design. Qualifying factors include the ability to plan and carry out work assignments effectively, to write simple technical reports, to plan and prepare graphic and tabular presentations of data, and to present technical documentation in a professional manner.

1 Mathematical Statistician to assist in designing the sample, developing estimation procedures and calculation of variances. This position requires a thorough understanding of survey design and estimation methods and procedures. A university degree in statistics or mathematics is highly desirable.

3 Coders/Editors to code, review, and correct the information collected. The position requires a secondary-level education and thorough knowledge of crops grown in Haiti.

3 Clerks to check in, handle and control completed questionnaires in each of the three survey offices (Jacmel, Les Cayes and Port-au-Prince). The positions call for persons with 3 or more years of secondary-level education.

68 Interviewers to carry out area measurement and collection of agricultural production and livestock data. 60 of these

interviewers should become regular interviewers and 8 should be retained as substitute interviewers. Candidates for the interviewer positions should have a minimum of 3 years of secondary-level education. A thorough knowledge of basic math is highly desirable.

12 Field Supervisors to monitor the work of the interviewers and provide assistance as needed. The candidates should have completed their secondary education. Previous survey or census experience interviewing or supervising fieldwork is a plus.

2 Secretaries to type manuals, questionnaires, memoranda, correspondence, etc.

Data entry and computer programming staffing requirements will be determined at a later date when data processing needs are assessed.

The above survey staff should be employed during the first year of the survey. The field staff will increase substantially for the second and subsequent years. For example, the number of interviewers needed for the nationwide survey is about 270 and the number of field supervisors is 54. In addition, there will be a need for three national supervisors for a total field staff of approximately 327. If it is determined during the pilot that an interviewer could handle two enumeration areas, the number of interviewers and supervisors required would be 165.

B. Short-Term Technical Assistance

Below we present the technical assistance required by survey activity, type of staff and person-weeks, the number of trips involved and their duration in terms of days. The figures below represent the technical assistance to be offered during the pilot phase only. For the nationwide survey, we will reassess the assistance needed based on the results of the pilot survey.

Activity Description	Type of Staff*	No. of Person Weeks	No. of Trips	Trips Duration in Days
1. SAMPLE DESIGN AND SELECTION				
a. Develop sampling frame and methodology	M.S.	6	2	28
i. Familiarization with Haitian agriculture sector and sources of data for developing sampling frame				
ii. Define the objectives, universe and sampling unit for the survey				
iii. Develop procedures to compile list frame of large farms				
iv. Establish stratification criteria and develop specifications for stratification of SE's				
v. Finalize sample design				
b. Review final stratification of SE's and select sample SE's	M.S.	3	1	14

*S.S. = Survey Statistician
M.S. = Mathematical Statistic

Activity Description	Type of Staff*	No. of Person Weeks	No. of Trips	Trips Duration in Days
c. Review results of listing, post-stratify households by farm size and select sample farm households	M.S.	3	1	14
2. QUESTIONNAIRE AND FORMS DESIGN				
a. Develop listing sheet, area measurement form, production record and livestock inventory	S.S. M.S.	4 1	1	14
b. Pretest and revise forms according to pretest results	S.S. M.S.	4 1	1	14
c. Finalize forms for pilot survey	S.S.	2		
3. SUPPORT MANUALS				
a. Assist drafting, reviewing and finalizing listing manual	S.S. M.S.	3 1		
b. Assist drafting, reviewing and finalizing interviewer's and supervisor's manuals	S.S.	6	1	14
c. Assist drafting, reviewing and finalizing coding and editing manual	S.S.	2		
4. FIELD STAFF TRAINING				
a. Assist training field staff for listing operation and observe listing	M.S.	3	1	14
b. Assist training field supervisors and interviewers for pilot survey	S.S.	7	2	28

Activity Description	Type of Staff*	No. of Person Weeks	No. of Trips	Trips Duration in Days
5. FIELDWORK				
a. Observe the fieldwork	S.S. M.S.	2 2	1 1	7 7
6. OFFICE CODING AND EDITING				
a. Assist training office coders/editors and monitor their work during the first week	S.S.	2	1	7
7. COMPUTER SPECIFICATIONS				
a. Write specifications for range and consistency edits	S.S.	5	1	14
b. Write tabulation specifications	S.S.	2	1	7
c. Develop weighting and variance specifications	M.S.	4	1	21
8. DATA PROCESSING				
a. Monitor computer range and consistency edits	S.S.	3	1	14
9. EVALUATION OF PILOT SURVEY				
a. Evaluate data collection methodology and make recommendations for national survey	S.S.	4	1	14
b. Evaluate sampling methodology and finalize sample design for national survey	M.S.	5	1	21

*S.S. = Survey Statistician
M.S. = Mathematical Statistician

In terms of short-term technical assistance by resource category for the pilot phase of the survey, the totals are:

Mathematical Statistician	29 person-weeks
Survey Statistician	46 person-weeks
Data Processor	(not available at this time)

C. Long-Term Technical Assistance

For the pilot phase of the survey, most of the technical assistance recommended is short-term in nature. We see, at this time, no need for a long-term survey statistician resident advisor. However, we strongly recommend a long-term resident advisor in data processing since the lack of one may seriously affect the timeliness of the survey results. Our experience in other developing countries tells us that the biggest bottleneck in survey work is usually data processing.

The data processing advisor should be contracted before the overall planning of the survey begins. He or she should participate in the design of the various survey forms, the development of the computer edit, imputation and tabulation specifications, as well as other survey related activities. We estimate the services of the data processor should be contracted for the first 2-1/2 years of the life of the survey to assure the timely processing and dissemination of the data. Given the heavy workload expected, we recommend that the data processor work exclusively for the agricultural statistics component of the ADS-II project.

VII. TRAINING REQUIREMENTS

To design, implement and process a nationwide agricultural survey, it is necessary to have on board a well-trained professional staff which includes survey statisticians, mathematical statisticians and data processors. At present, the Ministry of Agriculture does not have such staff. It is therefore necessary as a first step to identify Haitian counterparts with educational training and/or experience in survey methodology and data processing.

Below, we will discuss the recommended training by resource category. For a detailed budget of each program, see attachment 4.

A. Training for Survey Statisticians

Based on the needs of the project, we recommend that two of the three Haitian survey statisticians who should be contracted to work full-time in the agricultural statistics component of the project receive training at the International Statistical Programs Center (ISPC) of the U.S. Census Bureau in Washington, D.C. The training we recommend is short-term in nature, lasting no more than 12 weeks at a time, in contrast to our more structured training program which has a duration of 1 year.

The rationale for choosing the short-term training approach is that it cost less and staff are not away from their jobs for long periods

of time. At the same time, we recommend that training should be scheduled in such a way as not to interfere with the survey work. Below is a list of courses we recommend and the dates they are offered.

Course Number	Course Title	Dates
108	Control and Evaluation of Nonsampling Error	Mar. 31-June 13, 1985
109	Quality Control in Censuses and Surveys	Mar. 31-June 13, 1985
206	Objective Measurement of Area and Yield	Mar. 31-June 13, 1985
609	Training for Statistical Activities	Mar. 31-June 13, 1985
601	Introduction to Data Processing for Subject-Matter Specialists	Oct. 21-Dec. 20, 1985
602	Design of Tables and Questionnaires	Oct. 21-Dec. 20, 1985
604	Budgeting, Scheduling and Controlling of Survey-Census Operations	Oct. 21-Dec. 20, 1985

The courses we have outlined are intended for survey statisticians who will have significant responsibility for a recurrent agricultural survey program. They are conducted in English, and, therefore, a minimum English language score of 70/70 (ALIGU) is required.

For the benefit of the project, it is essential that one of the three survey statisticians participate in the first of the two short-term training programs; that is, the one that starts on March 31 and runs through June 13, 1985. Later on, a second survey statistician can attend the program that begins on October 21 and lasts until December 20, 1985.

Costs for the two training periods, including tuition, program fee, living maintenance allowance and, incidental expenses, are as follows:

$6285 for the Mar. 31 - June 13 ,1985 period

$5,670 for the Oct. 21 - Dec. 20, 1985 period

For a detailed budget, see attachment 2

B. Training for Mathematical Statistician

There is on the staff of the ADS-II project a recent graduate of the ISPC training program of the Census Bureau and the George Washington University who could assume the duties of the mathematical statistician. He is Mr. Ernest Dupont who is currently working part-time on the farming systems component of the project and teaching, at the same time, agricultural statistics courses at the Faculte d'Agronomie et de Medicine Veterinaire (FAMV).

The cost for the September 3 - December 20, 1985 training period including tuition, program fee, living maintenance allowance and incidental expenses is $8,855. For detailed budget, see attachment 2.

C. Training for Data Processor

Thus far no data processor has been identified to work on the agricultural statistics component of the project even though there are some prospective candidates in the Faculty (FAMV) and the Ministry of Agriculture.

Since the Census Bureau will possibly be offering a workshop on the use of a tabulation software package known as CENTS 4 at the Institut Haitien de Statistique et d'Informatique (IHSI) in early March, it would be beneficial to the project if prospective candidates for the data processing position could attend this workshop. Additional training for data processors should be in the form of on-the-job training with Census Bureau personnel offering this assistance if no long-term data processing advisor is contracted.

Attachment 1

PRODUCTION AGRICOLE

MOIS ET PERIODE	UBUNYOBWA Arachides	IBISHYIMBO – Haricots		AMASHAZA – Pois		SOYA Soja	INGANO Blé	IBIGOLI – Maïs		AMASAKA Sorgho	IMYUMBATI Manioc	IBIJUMBA Patates douce	IBIRAYI Pommes de terre	IBITOKE Bananes		IKAWA Café Sec
		BYUMYE Sec	BIBISI Vert	YUMYE Sec	MABISI Vert			BYUMYE Sec	BIBISI Vert					INYAM Cuite	AMAKA Bière	
FEVRIER PERIODE 1								(épis)	(épis)					(rég.)	(rég.)	
TOTAL ▶	(gousses)	(grains)	(grains)	(grains)	(grains)	(grains)	(grains)	(épis)	(épis)	(grains)	(tubercules)	(tubercules)	(tubercules)	(rég.)	(rég.)	(grains)

Attachment 2

Calendar of Survey Activities

Since as of this writing we do not know when survey planning will begin, we will present the survey calendar of activities in terms of required effort in months. The survey calendar of activities should be readjusted to accommodate the desired reference period for the nationwide survey but the time required for each activity described would remain constant.

ATTACHMENT NO. 2

CALENDAR OF SURVEY ACTIVITIES*

(IN MONTHS)

DESCRIPTION OF ACTIVITY	SURVEY DESIGN	PILOT SURVEY	FULL SCALE NATIONWIDE SURVEY
	1 2 3 4 5 6 7	8 9 10 11 12 13 14 15 16 17 18 19 20 21	22 23 24 25 26 27 28 29
1. Develop sampling frame and methodology	XXXXXXXXX		
2. Develop list frame of large farms	XXXXXX		
3. Draft preliminary output tables	XXX		
4. Design, pretest, and revise survey forms	XXXXXXXXX		
5. Select sample of SE's for pilot departments	XX		
6. Develop listing operation manual	XX		
7. Produce copies of sketch maps for sample SE's	X		
8. Train field staff for listing operation	X		
9. Conduct listing of housing units in selected SE's	X		
10. Summarize listing data, post-stratify households by farm size and select sample housing units	XX		
11. Develop interviewer's and supevisor's manuals	XXXXXX		
12. Develop weighting and variance specifications	XXXXX		
13. Train field staff for pilot survey	XX		
14. Conduct pilot survey fieldwork		XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	
15. Develop office coding and editing manual		XX	
16. Train coders/editors		X	
17. Code and edit completed forms		XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	XXX
18. Develop range and consistency specifications	XX		
19. Develop table specifications		XXXX	
20. Evaluate data collection methodology		XXXX	
21. Evaluate samling methodology and finalize sample design for national survey		XXXXXXXX	
22. Select sample SE's for national survey		XX	
23. Produce copies of sketch maps for sample SE's		X	
24. Revise survey instruments based on first season data collection results		XXXXXXXXX	
25. Train field staff for listing operation at the national level		X	
26. List dwelling units in selected SE's		X	
27. Summarize listing data, post-stratify households by farm size and select sample housing units		XX	
28. Train field staff for national survey		XX	
29. Conduct fieldwork for the national survey			XXXXXXXXXXXXXXXXXXXXXX

*Does not include computer related activities

BUDGET FOR HAITI ADS-II
COSTS FOR FISCAL YEAR 1985

BUDGET ITEM	COST
1. PERSONNEL COSTS (SHORT-TERM PERSONNEL)	
SUPERVISORY STAFF (GM-14) (1.75 PERSON MONTHS, $4,196 / MONTH)	7343
SURVEY STATISTICIAN (GS-13/4) (14.0 PERSON MONTHS, $3,447 / MONTH)	48258
COMPUTER SYSTEMS ANALYST (GS-13/4) (xx.x PERSON MONTHS, $3,447 / MONTH)	0
MATHEMATICAL STATISTICIAN (GS-13/4) (8.75 PERSON MONTHS, $3,447 / MONTH)	30161
SECRETARY (GS-5/5) (5.00 PERSON MONTHS, $1,359 / MONTH)	6795
SUBTOTAL	92557
BENEFITS (14 PERCENT)	12958
MATERIALS AND SUPPLIES	2314
EMPLOYEE DEVELOPMENT	3185
TOTAL PERSONNEL COSTS.	111014
2. TRAVEL COSTS (SHORT-TERM PERSONNEL)	
AIRFARE (19 TRIPS, $480 EACH)	9120
PERDIEM (252 DAYS, $81 / DAY)	20412
OTHER TRAVEL COSTS (LOCAL TRAVEL, EXCESS BAGGAGE, AND CONTINGENCY)	2953
TOTAL TRAVEL COSTS	32485
3. OTHER COSTS	
FORMS DESIGN COSTS	3700
PARTICIPANT TRAINING (xx PARTICIPANTS FOR xxx PARTICIPANT MONTHS AT $xxxxx PER MONTH)	0
COMMODITIES (SPECIFIED IN ATTACHMENT)	0
TOTAL OTHER COSTS	3700
4. AGENCY OVERHEADS (31.22 PERCENT)	44801
5. CONTINGENCY FOR INFLATION.	5000
6. TOTAL BUDGET	197000

Participating Training Budget[1]

	Training Period 1985		
	Mar. 28 - June 15	Oct. 17 - Dec. 21	Aug. 22 - Dec. 21
Instructional Costs			
1. Tuition and program fee	2,000	1,430	2,860
Living Maintenance Allowance			
1. Monthly rate status	1,488[2]	n.a.	2,550[3]
2. Maintenance advance	1,500[4]	1,500[4]	1,500[4]
3. Daily rate status	n.a.	1,800[5]	n.a.
Miscellaneous Costs			
1. Books	50	50	140
2. Equipment	80	80	80
3. Field Trip	200	n.a.	250
4. Book shipment	60	60	60
5. Professional membership	150	150	150
Non-Transferable Costs			
1. AID/W Administered Services			
a. HAC fees ($25 per month or fraction of month)	75	50	100
b. Orientation materials/WIC	130	130	325
2. RSSA/Contractor charges	525	420	840
TOTAL[6]	6,258	5,670	8,855

[1] As per AID regulations

[2] Monthly rate status: $850/month X 1.75 months

[3] Monthly rate status: $850/month X 3 months

[4] Maintenance advance: $50 per day for first 30 days

[5] Daily rate status: $50 per day for 36 days

[6] Before adding inflation/contingency factor