

METHODS USED IN DESIGNING THE NATIONAL FARM SURVEY

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1. Introduction

The National Farm Survey (NFS) which was conducted for the first time in July, 1983 replaces two annual multi-purpose probability surveys, the Agriculture Enumerative Survey (AES), and the Farm Enumerative Survey (FES). The AES had its beginning as a post-census evaluation survey for the 1971 Census of Agriculture and was conducted nationally until 1977. Its primary objective was to provide reliable annual estimates of level and change at the provincial level for a wide range of crop, livestock, and farm operating expense items. In 1977 the FES was introduced, replacing the AES, in the three Prairie provinces of Manitoba, Saskatchewan, and Alberta as well as the Peace River Block of British Columbia. This was in response to the data requirements of a newly created income stabilization program for Prairie grain farmers introduced in the Western Grain Stabilization Act. In addition to the annual estimates formerly produced by the AES, the FES provided estimates for the many additional operating expense items necessary for the income stabilization program calculations.

2. NFS Objectives

The objectives of the NFS encompass those of the AES and FES. They include providing provincial estimates of level and change for crop, livestock and farm operating expense items which serve as input into the published estimates compiled by subject matter experts. The annual estimates of farm income and expenses are also used in the preparation of the National Accounts.

In addition, the objectives of the NFS have been extended to include: (i) the provision of reliable annual small area estimates for key crop, livestock, and operating expense items; and (ii) to serve as an annual benchmark and sampling frame for integrating other surveys with the NFS such as crop commodity or livestock surveys.

The National Farm Survey was introduced in order to establish a yearly, national multi-purpose survey which would not only meet the objectives of its predecessors with improved efficiency but also satisfy the additional objectives while adhering to the existing time and budget constraints. The redesign exploited the considerable experience gained in the AES and FES as well as the accessibility to the 1981 Census of Agriculture data base for sampling frame and sample design purposes.

3. Major Survey Design Initiatives

In order to satisfy its objectives, the 1983 NFS relied heavily on two essential design elements: a multiple frame sampling technique and an integrated method of data collection.

Multiple frame sampling (in this case, sampling from both an area and a list frame) had been successfully employed in the AES since 1979 in the three Maritime provinces of Prince Edward Island, Nova Scotia, and New Brunswick and since 1980 in British Columbia. This experience has shown that, compared to sampling from an area frame, multiple frame sampling should

significantly improve the efficiency of provincial estimates for most livestock and operating expense items and for some crop items. Based on these findings, the NFS extended multiple frame sampling to the other provinces.

Prior to 1983, data for the AES and FES were collected almost exclusively by costly personal interviews (over 19,000 interviews in 1982). It was necessary to retain this method for the 1983 NFS area frame sample. However, an alternate less costly method of data collection was sought for list frame sample farms. This would permit a substantial increase in the total sample size, necessary for the production of reliable small area¹ estimates, while adhering to a virtually fixed data collection budget. An integrated data collection method involving a mail-out with follow-up by telephone or personal visit emerged as the most viable alternative. However, due to length of interview and questionnaire content constraints associated with telephone interviewing, these list sample farms would be mailed a much shorter version of the survey questionnaire. In order to determine the feasibility of collecting NFS data using this method, two pretests employing a mail-out/telephone follow-up collection methodology were conducted in 1982 in the Maritime provinces. The results of these two tests were very encouraging in terms of cost savings, response rates and data quality.

The introduction of this integrated data collection method for list sample farms resulted in the division of the NFS into two components. The first component, known as the core survey, employed an area frame sample as well as a sample of farms selected from a list of large operations. The primary objective of the core survey was to provide reliable multiple frame estimates at the provincial level for all survey items. As a result, the entire core survey sample of about 15,300 farms would complete the full survey questionnaire. Thus, the use of telephone follow-up was precluded for the core survey and, consequently, a mail-out/pick up method was adopted for the core list sample. The area sample data continued to be collected by personal interview only.

The second component, called the Mail Telephone Follow-up (MTF) survey, was made possible by the reduction of about 4,000 personal interviews in the core survey as compared to the two 1982 surveys. The savings realized were translated into an additional 14,200 list farms for the MTF survey, thus bringing the total 1983 NFS sample size to approximately 29,500 farms. These MTF list farms were selected from an extended version of the core list frame and were mailed the shorter version of the survey questionnaire containing almost all of the crop and livestock items but only about a dozen key financial items. Follow-up was carried out by telephone and then by personal visit, if required. The MTF list sample, in conjunction with common portions of both the core survey area

and list samples, was used to produce multiple frame estimates for the 54 sub-provincial areas (SPA's) as well as at the provincial level for those items on the shorter questionnaire.

4. Target Population and Sampling Frames

The target population was defined, based on 1981 Census of Agriculture data, as those agricultural holdings which received \$1,000 or more in the Maritime provinces, Quebec and Ontario and \$2,000 or more in the Prairie provinces and British Columbia from the sale of agricultural products during the previous 12 months. Excluded, however, were all farms located on Indian Reserves, institutional farms, community pastures in the Maritime provinces, Quebec and Ontario, and farms in marginal areas with little or no agricultural activity.

The multiple frame sampling approach adopted for the NFS led to the creation of three sampling frames: one area frame and two list frames--a core survey list frame and an extended version of this list frame from which the additional MTF sample was selected.

4.1 List Frame - Core Survey

The core survey list frame was created by merging the individual provincial list frames, each of which was constructed from the corresponding 1981 Census of Agriculture provincial list of target population farms. With respect to the content of these provincial list frames, two selection criteria were of particular importance: (i) each farm should be a large farm with respect to at least one of the four key items used to create each provincial list frame; and (ii) collectively speaking, the list frame farms should account for at least a certain minimum percentage of the provincial target population total for each key item. These minimum percentages referred to in (ii) were: 75% for total pig numbers, 40% for total cattle numbers, 40% for the gross value of total sales and 30% for cropland² area. It should be noted that these percentages were set higher for the livestock items and the total sales value which exhibit the greatest gains in efficiency with the introduction of multiple frame sampling. Also, these percentages were minimum values; the actual percentages for most items in each province greatly exceeded these values. In terms of size, each provincial list frame should not exceed roughly 20% of the farms in the provincial target population. Following these guidelines relating to content and size, and aided by two cumulative frequency distributions for each of the four key items (i.e. farm numbers by size of key item and commodity total by size of key item), an iterative procedure was established which determined the composition of each provincial list frame.

4.2 Extended List Frame - MTF Survey

A separate SPA list frame was constructed for each of the 54 sub-provincial areas from the 1981 Census of Agriculture list of target population farms. The MTF survey list frame was then compiled by merging these 54 distinct SPA list frames. The first step in the construction of these SPA list frames was the partitioning of each provincial core list frame into its SPA components. It was necessary to extend the size of these SPA listings in order to accommodate the selection of the MTF list sample, as well as to

ensure the inclusion of large farms in the SPA's which had not necessarily been included on the provincial list frames.

A goal of the MTF list frame design was to account for approximately the same minimum percentage of the target population total at the SPA level as had been accounted for at the provincial level by the core list frame. Additional items (i.e. one or two of total poultry, total sheep and total fruit area) were also used to extend certain SPA list frames. In these SPA's the minimum percentage which should be accounted for by list frame farms was 80% for total poultry, 70% for total sheep and 25% for total fruit area.

Another consideration in the construction of the MTF list frame was its stability. As with any list frame, a concern was the speed with which this frame would become out-of-date. This was particularly felt to be a problem with the smaller sized farms since they are the ones more likely to "jump" strata or go out-of-business. Thus, it was decided that the MTF list frame should include only medium and large farms. This concern also resulted in the limiting of the size of each SPA list frame to approximately 30% of the farms in the SPA target population. The same iterative procedure used to construct the provincial core list frames was then employed to finalize the SPA list frames.

4.3 Area Frame

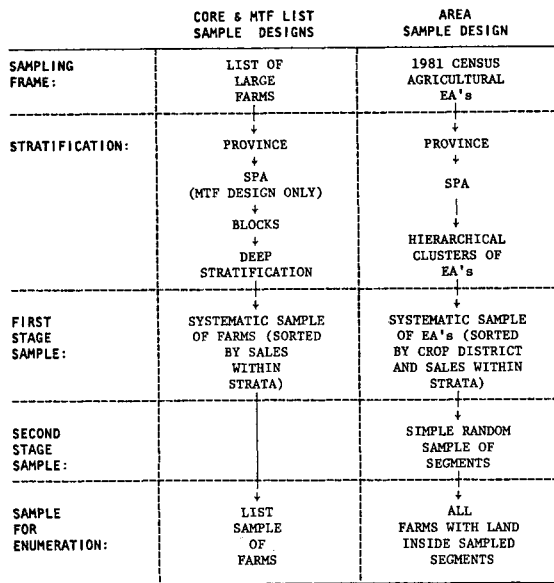
The area frame was constructed to meet the sampling requirements of both the core and MTF components of the NFS and ensured complete coverage of the target population. It consisted of all 1981 Census Enumeration Areas (an EA being the geographical area canvassed by an enumerator during the Census) in each province excluding those EA's located in Indian Reserves and in marginal areas with little or no agricultural activity as determined by the 1981 Census of Agriculture.

5. Overview of the NFS Sample Design

The overall sample design developed for the 1983 NFS was composed of three elements: the core and MTF list sample designs and the area sample design. The core list sample design consisted of a stratified, replicated, single stage systematic sample of farms in each province. The MTF list sample design adopted an almost identical approach which was implemented independently in each of the 54 SPA's across Canada. The area sample design, also implemented independently in each SPA, involved the selection of a stratified, replicated, two stage sample of parcels of land (called segments) with 1981 Census EA's as first stage sampling units and segments within EA's as second stage sampling units. The sample of EA's was selected employing systematic sampling while segments were chosen using simple random sampling without replacement. The NFS sample design is outlined in Figure 1.

An annual sample rotation scheme involving roughly 25% of the core and MTF list samples, as well as of sampled EA's, is planned starting in 1984. This rotation scheme will attempt to strike a balance between the need to provide reliable estimates of change between years and the desire to reduce the response burden on the farmer.

FIGURE 1: 1983 NFS SAMPLE DESIGN



6. Sample Size Determination

Before work could proceed on developing the separate sample design strategies, it was necessary to determine the core survey total provincial sample sizes, the area and core list sample sizes by province and the MTF survey list sample size for each SPA.

6.1 Core Survey

Provincial estimates for most financial items could only be provided by the core survey. Consequently, the core survey sample size of about 15,300 farms was allocated to provinces with the goal of achieving acceptable provincial coefficients of variation (cv's) for the more important operating expense items. The allocation method adopted took into account past experience with multiple frame sampling in the AES and employed the rule of thumb stating that the cv for an item is inversely proportional to the square root of the sample size.

After establishing total provincial sample sizes, the provincial area and core list sample sizes were determined. The method utilized involved calculating the optimum allocation of the provincial sample size to the core list and area frame samples separately for each of four variables (i.e. total pigs, total cattle, gross value of total sales and total cropland area for harvest). Then, a final allocation was determined which was a compromise of these four optimum allocations. The calculation of the optimum allocation involved estimating the design effect for the non-overlap area sample component (i.e. that portion of the area sample which does not overlap with the core list frame) of the core multiple frame sample. This design effect was estimated using either 1981 AES or FES area sample data depending upon the province. The need to estimate a design effect for the core list sample was circumvented by applying a simple stratification scheme to the core list frame created and utilizing 1981 Census of Agriculture data to estimate directly the variance of the list sample component.

6.2 MTF Survey

Rather than allocating only the additional MTF sample of 14,200 list farms to SPA's, an estimate of the total sample size which would be used in producing estimates at the SPA level was allocated among the SPA's. This total sample size consisted of the core list sample farms, the MTF additions and the estimated number of area sample farms which did not overlap with the extended list frame. The allocation of this total sample size to SPA's was a compromise between that required for an allocation proportional to the square root of the SPA target population size and that necessary for an allocation proportional to the square root of the total value of sales for the target population in the SPA. This compromise allocation resulted in a larger sample size to those smaller SPA's (in terms of the number of farms or sales) than would have been attained with proportional allocation. It was felt that this compromise allocation was preferable since SPA estimates of roughly equivalent quality were desired.

Once this total sample size allocation to SPA's was determined, the estimated non-overlap area sample size was subtracted from the total SPA sample size yielding the combined list sample size (i.e. core list plus MTF additions) which was selected from the SPA list frame. Across Canada, approximately 16,200 list farms were selected from the extended MTF list frame.

7. Core List Sample Design

The core list sample design for each province employed a stratified, replicated, single stage systematic sample of farms selected from the provincial list frame.

7.1 Stratification

The initial step taken in stratifying each of the provincial list frames was to identify those very large farms (i.e. large with respect to one or more key items) which collectively formed a separate complete enumeration stratum. These very large farms, referred to as core specified farms, were not only included in the 1983 sample with certainty, but will also be exempt from the 25% annual rotation to be initiated in 1984. Specified farms will be included in the sample with certainty each year because of their significant contribution to provincial estimates for key items. Consequently, possible fluctuations in the provincial estimates caused by their chance inclusion or exclusion from the sample will be avoided.

An objective method of identifying such very large farms for the core survey was sought which would considerably reduce the number of specified farms identified as compared to previous years. Such a cutback would result in a reduction of the response burden among the operators of large farms. After testing a number of methods, a rather simple procedure was developed which met these requirements. This procedure, which was named the "σ-gap" rule, involved the examination of the frequency distribution produced using 1981 Census of Agriculture data for each of the key items used to identify specified farms. For each frequency distribution a cut off limit was established for the identification of specified farms. This limit was defined to be the first point, in ascending order of size, at which the distance between it and the preceding value

exceeded the standard deviation (i.e. the interval exceeded the σ -gap). The standard deviation used was calculated using only those farms which had reported that key item. All farms which met or exceeded at least one of the cut off limits became specified farms. This procedure identified 501 specified farms in all provinces using the following nine key items: cropland area as previously defined, total cattle, dairy cows, beef cows, total pigs, sows, total sales, feed expenses and cash wages (with a tenth item, total fruit area, added in British Columbia only).

Three other groups of specified farms were identified not using the σ -gap rule. These groups were corporate farms and greenhouses and nurseries in all provinces, and community pastures in the Prairie provinces and British Columbia. Although usually very large in size, these farms were included in the specified farm stratum primarily because of the special data collection methods employed to handle them.

After identifying the specified farms the remainder of the provincial core list frame was stratified. An initial stratification into 8 primary strata, or blocks, was performed utilizing the cut off points determined for the four key items during the creation of the provincial list frame. Seven of these eight blocks contained those list farms which met or exceeded any one, any two or all three of the cut off points for the three key items: total pigs, total cattle and cropland area. The eighth block contained those farms which met or exceeded the cut off point for total sales only.

Following this initial stratification into 8 blocks, a further stratification was carried out within each block where the number of farms would permit it. This within block stratification was performed employing the deep stratification method. This method consisted of first choosing a primary stratification variable and forming a number of optimum strata according to this variable, employing a method developed by Sethi[5]. Then, a secondary stratification variable was chosen, if feasible, and a further optimum stratification was performed according to this variable within some or all of the initial set of optimum strata created. It would be possible to repeat this same procedure with a third stratification variable and so on. The important point to note is that each subsequent stage of stratification was performed within the strata created during the preceding stage. The stratification variables chosen to stratify a block were, almost without exception, either identical to or a subset of the items which had been employed in its creation.

The deep stratification method was chosen based on its performance (particularly for total cattle and total pigs) following a comparison with three other stratification methods: the hierarchical cluster analysis performed by the CLUSTER procedure of SAS, the disjoint cluster analysis of the FASTCLUS procedure of SAS and the method of multiple stratification. This latter method consisted of determining a number of optimum strata separately for each stratification variable and then forming a final set of "multiple" strata by taking the intersection of these optimum strata.

7.2 Sample Allocation

The goal in allocating the provincial core list sample size (less the number of specified farms identified) to strata was to obtain acceptable cv levels for the key items involved in the creation of the provincial list frame. As is usual in sample allocation situations involving multiple key items of varying degrees of importance, the allocation chosen should represent a suitable compromise to the optimum allocations determined separately for each key item. An initial compromise allocation was obtained employing a method developed by Chatterjee[2]. However, this method assumed that all key items were of equal importance and, consequently, the Chatterjee allocation was modified to take into account these differences in importance. This resulting allocation was then adjusted so that the final stratum sample sizes were multiples of 8. This adjustment was made in order to accommodate the selection of two replicates of farms per stratum coupled with the planned 25% annual rotation of sampled farms in future years.

7.3 Sample Selection

Prior to the selection of the sample of core list farms, the provincial core list frame (excluding specified farms) was sorted by stratum and then by total sales. Then, within each stratum two non-overlapping systematic samples of farms were selected. This use of systematic sampling and the sorting of farms prior to selection ensured better representation of total sales classes in the sample selected for the province.

8. MTF List Sample Design

The MTF list sample design for each SPA employed a stratified, replicated, single stage systematic sample of farms selected from the SPA list frame.

8.1 Stratification

As in the core list sample design, the initial step in the stratification of each SPA list frame involved the identification of a separate complete enumeration stratum. This group of farms, known as MTF specified farms, consisted of large farms at the SPA level with respect to the key items chosen for each SPA. For the MTF design, specified farms were identified employing the σ -gap rule for the four key items (i.e. pigs, cattle, cropland, sales) used in all SPA's as well as for poultry, sheep and fruit, where applicable. This resulted in the identification of 381 MTF specified farms.

Once the MTF specified farms were identified, the remainder of the MTF frame was re-stratified, that is, in stratifying the MTF list frame the previous core survey stratification of the core list frame farms was ignored. Also, as in the core design, the frame was first divided into eight blocks. However, additional blocks were added for poultry, sheep and fruit, where appropriate. The blocks were then stratified using the deep stratification technique employed in the core design. The block stratification variables were not always identical to those items which had been used in the creation of the block.

8.2 Sample Allocation

Each SPA sample size was first reduced by the number of MTF specified farms identified. The

allocation of this resulting sample size to strata was carried out exactly as in the core design, with the final stratum samples being multiples of 8.

8.3 Sample Selection

Prior to sample selection, the MTF list frame was first sorted within each MTF stratum by core stratum. Within each of these cells, or intersections of core and MTF strata, the frame was then sorted in increasing order of sales. Two non-overlapping systematic samples were selected within each MTF stratum from this sorted frame.

At this point, a technique proposed by Kish and Scott [4] for retaining the maximum number of initial selections (for the core sample) in the MTF sample was employed. Using this method ensured the inclusion of core list sampled farms in the MTF sample unless the core list sample size for a cell was greater than the number of farms selected in that cell. At the Canada level, this resulted in the inclusion of 94% of the core list sample in the MTF sample. Those MTF farms selected which were not also sampled core list farms represented the MTF additional sample, of which there were approximately 14,200 across Canada.

9. Area Sample Design

The area sample design for each SPA employed a stratified, replicated, two stage sample of land segments with EA's as the first stage sampling units and segments within EA's as the second stage sampling units.

9.1 First Stage Design

In each province farm level data from the 1981 Census of Agriculture was summarized to the EA level and was used in stratifying the EA's as well as in allocating the area sample size to strata. As only non-overlap area sample farms could be used in the production of core survey multiple frame estimates, all farms appearing on the core survey list frame were excluded from these EA summaries.

9.1.1 Stratification of EA's

Since farms selected from the sample of EA's in each province would be involved in the production of both provincial and SPA estimates, it was decided to initially stratify the area frame EA's in each province according to SPA. Within each of the SPA's in a province the EA's were further stratified using the hierarchical cluster analysis performed by the CLUSTER procedure of SAS. The stratification (or clustering) variables employed varied from province to province and often from one SPA to another within a province. Total cattle was used as a stratification variable in all 54 SPA's. The other variables utilized consisted of a single crop (i.e. potatoes) or specific groups of crops.

The hierarchical cluster analysis method was adopted after analyzing the results of an area frame stratification study carried out in two SPA's in Saskatchewan and Quebec. In this study it was compared with the disjoint cluster analysis method, performed by the FASTCLUS procedure of SAS, and the method of multiple stratification. The hierarchical clustering method was chosen based primarily upon its ease of implementation and its performance in situations where stratification is desired

employing several variables with only a few strata possible due to the small sample size.

9.1.2 Sample Allocation

Two sample allocation steps were necessary: first, the allocation of the provincial area sample size to the SPA's, and then the allocation of the SPA sample size to strata. Both sample allocation steps were carried out, as in the core and MTF list sample designs, by first determining the Chatterjee allocation and then modifying it to take into account the relative importance of the key items involved. The final SPA sample sizes were adjusted to be multiples of 8. However, due to the small sample size allocated to some of the SPA's, the stratum sample sizes were only adjusted to be multiples of 2, permitting the selection of two independent replicates of EA's per stratum.

9.1.3 Sample Selection

Prior to selection of the sample of EA'S for a SPA, the EA's comprising the area frame for the SPA were sorted according to stratum, then by crop district and finally by the EA total sales figure. Then, within each stratum in the SPA, two independent systematic samples of EA's were selected.

9.2 Second Stage Design

Each selected EA was first divided up into a number of segments. Wherever possible these segments were formed by following natural or man-made boundaries, thus facilitating their identification on the ground by the interviewers. In addition, an attempt was made to form segments within an EA which contained similar amounts of agricultural land as determined from topographical maps. The average segment size in most provinces was about 3 square miles. Then, within each EA, a simple random sample of one or more segments was selected based on the total number of segments formed in the EA. All farms with some land located inside at least one sampled segment were enumerated.

10. Overlap Determination

As only area sample farms which are not on the list frame contributed to the area frame portion of the multiple frame estimates, overlap determination was crucial to the success of the NFS. Based on experience with the AES, the NFS interviewers determined overlap between the area sample and the core list frame. They carried with them copies of the core list farms in their area not selected in the core list sample. At each interview involving a segment farm, they determined whether or not the farm was on the list frame by matching the farm operator name (rather than pieces of land or farms). If the operator was on the core list frame, only a small amount of information was required. If not, a full NFS area questionnaire was completed.

This overlap determination was verified as part of the Head Office check-in procedures. This year, at the same time, Head Office staff determined whether there was any overlap between the area sample and the extended portion of the MTF list frame. This approach was taken since, in these cases, the full area questionnaire was still required for the core survey.

A computer verification of the overlap was also done as a by-product of the ongoing name and address update process to the Central Farm Register. This process showed that field overlap

determination had been successful. As well, it indicated a few areas where clearer interviewer instructions would be beneficial.

11. Estimation

The 1983 NFS provided estimates of population totals, means and proportions as well as measures of their precision. The principal estimator employed to produce these estimates was the multiple frame screening estimator, which is the sum of the list frame and non-overlap area frame estimates. The Hartley multiple frame estimator [3], which includes an area frame estimate for the overlap portion, was not considered for the NFS. This decision was based on a 1978 AES test [1] which showed that it provided little gain in efficiency for most items. As well, it would have been more expensive to implement due to the necessity of completing a full questionnaire for all overlap area sample farms.

Two other estimators were used to produce estimates for a subset of the survey items. One was a multiple frame Census ratio estimator, which involved the pairing of 1983 NFS sample data with 1981 Census of Agriculture data at the farm level in order to calculate an estimate of change, and then used this change ratio to adjust the corresponding 1981 Census total. These estimates were produced for about 60 items common to both the NFS and the 1981 Census. The other was an area sample estimator calculated for a few key crop items using the entire area sample (not just the non-overlap portion) supplemented by the core specified farms.

All three estimators employed in the 1983 NFS provided estimates relating to the target population defined in section 4. However, this target population excluded certain types of agricultural holdings so as to make more efficient use of the limited data collection resources available. In order to provide estimates for users which would conform to the 1981 Census target population definition, adjustment factors were calculated for all survey items (based on 1981 Census data for the same or closely related items) and then applied to the initial NFS estimates produced.

12. Results and Future Plans

The processing of the survey data is currently nearing completion. Hence, it is too early to be able to assess the success of the 1983 NFS with respect to meeting its cost and data quality objectives. It is possible, however, to present the very encouraging sample response rates. A total of 29,492 farms were sampled for the 1983 NFS, of which 4.6%, or 1366 farms, were not enumerated. Not being able to contact the farm operator accounted for 465 of these farms. The other 901 farms were either core or MTF list sample farms for which the farm operator, obtained from the 1981 Census of Agriculture name and address list, was no longer farming. This latter group of farms provides an indication of the deterioration that can be expected in the core and MTF list frames in the next two years. The response rate percentages by type of sample and questionnaire completion status are shown in Table 1 for the 28,126 remaining NFS sample farms. Also of interest are the MTF list sample response rates by data collection method. A total of 12,644 MTF questionnaires were either

TABLE 1: RESPONSE RATE PERCENTAGES BY TYPE OF SAMPLE AND QUESTIONNAIRE COMPLETION STATUS

COMPLETION STATUS	TYPE OF SAMPLE			TOTAL SAMPLE
	CORE LIST	MTF LIST	AREA	
Fully Completed ...	84.7	90.3	93.0	90.6
Partially Completed	12.1	5.3	5.4	6.3
Total Refusal	3.2	4.4	1.6	3.1
Total	100.0	100.0	100.0	100.0

fully or partially completed, of which 36% were received by mail (although almost 47% of these questionnaires required telephone follow-up primarily to correct edit failures), 60% were completed by telephone interview and the remaining 4% required a personal interview.

During the coming year the NFS list frames will be employed to select samples for two livestock surveys and a crop yield survey. Integration of the survey and NFS estimates will also be examined for these surveys. In addition to a detailed evaluation of the 1983 NFS, a number of research projects are planned including: (i) an investigation of Computer Assisted Telephone Interviewing (CATI) Techniques; (ii) a study of various synthetic estimating methods for small area estimation; (iii) the development of a common sample change ratio estimator and a composite estimator to be implemented in the 1984 survey; and (iv) the extension of an existing project to determine the feasibility of using income tax data instead of NFS data for the production of expense estimates in certain provinces.

Footnotes

¹A total of 54 small areas (termed sub-provincial areas, or SPA's) each comprising one or more crop districts were identified across Canada.

²Cropland area was defined to be the sum of the areas devoted to all major grains and oilseeds, three other field crops of particular importance in certain provinces and summerfallow.

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