TECHNICAL REPORT OF CENSUS BUREAU ADVISORY TEAM

1986 EGYPTIAN CENSUS OF POPULATION,

HOUSING, AND ESTABLISHMENTS

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by

Marie G. Argana
Robert R. Bair
David V. Bateman
Leo Dougherty
International Statistical Programs Center
U.S. Bureau of the Census

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INTRODUCTION

In February 1983, a three person team from the U.S. Bureau of the Census spent two weeks in Cairo working with USAID/Cairo and the Egyptian Central Agency for Public Mobilization and Statistics (CAPMAS). The purpose of the team's trip was to develop a detailed plan for AID-funded technical cooperation between CAPMAS and the U.S. Bureau of the Census, focusing primarily on the 1986 Egyptian Census of Population, Housing and Establishments.

The report begins with a description of the organization and functions of CAPMAS followed by an overview of the statistical accomplishments of CAPMAS over the last 40 years. The current status of planning for the 1986 Census is described with a summary of the Egyptian's evaluation of their requirements for the Census. The final sections provide the team's detailed recommendations for a program of technical cooperation.

The major sections of the proposed program are:

1. Long-term technical cooperation

   A 24 month tour for a resident advisor in cartography and census mapping and a 30 month tour for a resident data processing advisor are proposed during 1984-1986.

2. Short-term technical cooperation

   A total of 142 person-months of short-term cooperation (about 2-4 weeks per trip to Cairo) is proposed during FY83-FY-88 in a broad variety of technical areas, including questionnaire design, operations planning, evaluation, and sampling.

3. Workshops, Training and Workstudy Programs

   A comprehensive program of mid- and upper-level training is proposed that includes long-term (11 month) participant training, in-country workshops, an innovative joint training program to develop CAPMAS training capabilities and a joint computer software development program to enable CAPMAS to develop, enhance and maintain their own generalized computer software.

4. Commodities

   The equipment and related needs for the 1986 Census are enumerated in this section.

The visit of the Census team was, in part, a continuation of discussions begun in Washigton in April 1982, when Dr. Hallouda, President of CAPMAS and key CAPMAS staff visited Washington for 4 weeks to study the U.S. statistical system. At that time, an extensive program of meetings was arranged with Census and other U.S. Government and private agencies. Several of the discussions focused on the forthcoming Egyptian Census. During the February visit of the Census team to Egypt, the team continued these discussions at a more technical level, meeting with virtually all CAPMAS officials concerned with the census. These discussions provided the technical basis for this report.

I. ORGANIZATION AND FUNCTIONS OF CAPMAS

The Central Agency for Public Mobilization and Statistics (CAPMAS) is an independent agency of the Government of the Arab Republic of Egypt. Three First Under-secretaries and eleven Under-secretaries are responsible to the President of CAPMAS for the organization's work. CAPMAS is divided into four sections covering public mobilization, statistics, electronic data processing, and administration and consists of the following departments:

1. Central Administration for Public Mobilization, which is responsible for evaluation and mobilization of human, productive and service resources to secure necessary data and studies for different sectors under different circumstances.

2. Central Administration for Statistics, which is responsible for all statistical operations, according to a set five-year program.

3. Central Administration for Electronic Data Processing, which is responsible for EDP operations of the Agency and various Administrations of the Republic.

4. Central Administration of the Follow-up of Statistics and Inspection, which is responsible for setting statistical programs with the different ministries and for the inspection of statistical training.

5. Central Administration for Censuses, which is responsible for all censuses, such as the population and housing census, establishments, employment, wages and hours of work.

6. Population Studies and Research Centre, which is concerned with analyzing the results of population statistics, conducting specialized field surveys in connection with population as well as issuing the relevant studies and recommendations in this respect. It will also be holding training sessions for the personnel of the Agency as well as personnel from the various sectors of the State, in the field of demography.

7. National Statistical Training Centre, which is concerned with the training of those employed in all fields of statistics in the agency and in the State at large on all levels. Students from the various countries of the region are admitted to this Centre. The Centre publishes an annual detailed program concerning the sessions which are held.

8. National Computing Centre, which is concerned with providing computer services to other government agencies as well as CAPMAS. The information bank at the Centre makes statistical, economic, and informative data available by using a microwave system for data transmission to outside users.

9. Software Centre, which is concerned with all software activities for the Agency and EDP users in the country.

10. Public Mobilization Studies and Research Centre, which is concerned with conducting studies and research relating, inter alia, to planning for public mobilization in the Republic at large, especially those closely related to the strategic aspects such as strategic stockpiling, qualified manpower, the integration of the means of transport and the conversion of production so as to be subservient to war potentialities. It is also entrusted with conducting training programs for responsible staff in ministries and branches thereof and for those personnel engaged in public mobilization with a view to helping these personnel carry on the duties entrusted to them.

11. Consultative Committee for Statistical Planning and Coordination. All administrations of the Republic which are involved in statistical operations are represented therein. This committee plays an important role in planning and setting statistical programs and in preventing the duplicity of work.

These descriptions of the CAPMAS departments were taken from the Statistical Yearbook for the Arab Republic of Egypt published in July 1980.

Appendix A shows the CAPMAS organization chart. Appendix B shows the NCC/EDP organization, functions, and staffing.

II. HISTORY OF STATISTICAL ACCOMPLISHMENTS

A. Censuses of Population and Housing

1. General Background

The first modern population census of Egypt was conducted in 1882, with the second one taken in 1897. Thereafter, a population census was conducted at 10 year intervals until 1947. The next census after that was taken in 1960, with an experimental sample census conducted in 1966. Following a decennial schedule, the next complete census should have been taken in 1970; however, there was none because of the disruption following the 1967 war. In 1976, a complete population and housing census was conducted, following the United Nations recommendations for such censuses. In addition, since 1976 special population and housing censuses have been conducted in Port Said, Suez, and Sinai.

2. 1966 Census

In 1966, an experimental census, using sampling techniques for the collection of specified characteristics was undertaken. A five-percent systematic sample of households and villages was taken in urban and rural areas respectively. In general, it was considered a failure due to problems of implementation in the field and weighting problems resulting from sample design.

3. 1976 Census

The 1976 Census of Population and Housing was conducted in November 1976. A detailed discussion of the content and procedures is given in Appendix C. All data were collected on a 100-percent basis; no sampling was employed in the field enumeration. About 60,000 workers were used to collect and process the census data. The census collected data on social and economic characteristics of individuals, housing conditions and public utilities. In addition, a census of buildings was taken to determine number and type (flats, hotels, etc.) and their present usage (dwelling, work or both purposes). Preliminary results, based on hand tallies, were issued in March 1977.

B. Censuses of Establishments

1. General Background

The first full establishment census was conducted in 1942, although no data were published. The first census for which data were published was taken in 1960. Thereafter, establishment censuses were taken in 1964, 1967, and 1976. The establishment census is used as a sampling frame for surveys which are taken following the census. These generally include establishments with 10 or more employees and collect data on industrial production, employment and wages. In 1962, a census of employment and wages was undertaken and in 1967, a complete industrial census was taken.

2. 1976 Census

The 1976 Establishment Census was taken in conjunction with the population and housing census. The content and procedures are detailed in Appendix C. The 1976 Establishment Census utilized the same collection and processing staff as the population and housing census. The data processing system used for the 1972 census was modified for use in 1976. According to National Computer Center (NCC) staff, establishment data were coded and keyed prior to the population data. Publications are issued showing estabishment data for each Governorate; the first Governorate volume was issued in 1979.

C. Survey Activities

There are three major current sample surveys:

1. Labour Force Surveys

Since 1957, labour force surveys have been conducted regularly. They first were conducted on a quarterly basis (1957-1965); since 1967, the surveys have been done on an annual basis. The major purpose of these surveys is to measure unemployment rates and to provide information on the characteristics of the labour force. The current sample design for urban areas consists of a systematic sample of segments and a systematic selection of dwelling units within the selected segments. For rural areas, the current sample design consists of a sample of villages, and a systematic sample of dwelling units within selected villages. The sample size currently is about 30,000 households and produces estimates at the governorate level (there are 26 governorates). Since the 1976 census, the sample has not been updated to include dwelling units constructed since 1976. Research has shown that the use of permits as a sampling frame for enumerating new construction is not feasible.

2. Budget Surveys

A survey is conducted every five years to measure family consumption and expenditures; income data have been added to the last survey. The current sample consists of segments that adjoin those segments selected for the annual Labour Force Survey. The most recent survey included 10,000 urban and 10,000 rural families. Again, no updating of the survey is made for new construction.

3. Economic Surveys

A survey of economic establishments is conducted every three years. The most recent survey included all urban establishments with five or more employees with certainly and sampled the remaining urban establishments from the establishment census frame. For rural areas, all establishments from a sample of villages are enumerated. No updating of the sample is done.

III. 1986 CENSUS PLANNING DEVELOPED BY CAPMAS STAFF

This chapter summarizes the plans that are being developed by CAPMAS and the status of these plans at the time of the team's visit.

A. Census Planning Committee

CAPMAS has established a committee for the preparation of the 1986 Population and Housing Census. This committee began its work in August 1982 and meets twice a month. By July 1984, all decisions are anticipated to be made regarding questionnaire content, methodology, budgets, etc. As of February 1983, four subcommittees had been established: (1) Sampling; (2) Data of Census; (3) Census method (de facto/de jure); and (4) Mapping (new vs old method). Additional administrative and technical work is being carried out by other individuals.

The census planning committee consists of the following members:

Ismael Raafait, First Under-secretary, Statistical Sector (Chairman of Committee)

Mohamed Saad El Shaikh, Under-secretary for Central Administration of Census

Abd El Salam Sultan, Under-secretary for Central Administration for Statistics

Mohamed Abd El Rahman, Under-secretary for Financial Affairs

Gihad El Mikaaty, Under-secretary for Data Processing

Saad El Amin, Under-secretary for Research Centre

Saad El Zomar, Under-secretary for National Centre for Training

Farag Sedky, Under-secretary for National Computer Center

Abdelhamid Shallaby, Director-General for Technical Affairs

Mohamed Amin Maheeb, Director, Administrative Affairs

Kamal Ali Farag, Director-General for Population and Labour Administration

Refaat El Denonshury, Director, Population and Housing Census

B. Methodology

No final decisions have been made regarding methodology related to the 1986 census. CAPMAS is obtaining comments from other government agencies; letters have been sent to all administrative units in the public sector and about 120 government agencies asking for their data requirements. Responses are expected by the end of February 1983. These will be evaluated and the final decision on 1986 Census content should be made by June 1983. CAPMAS has the final decision-making authority on the content of the census questionnaire.

C. Mapping

In census mapping, several experiments are underway to determine if block maps, rather than the sketch maps used in 1976, can be used to map shiakahs (shiakahs are small geographic areas). Currently, the maps (block maps) are being drawn by office staff with little or no mapping skills. It is proposed that several people who attended the January 1983 mapping workshop train office staff in mapping while the experimentation is underway.

D. Evaluation

An independent evaluation unit for the 1986 census currently is envisaged as part of the Population Studies and Research Centre. This would include evaluation of all phases of the census process and procedures. A post-enumeration survey is being considered as part of the evaluation program, but the money available for the census may not be sufficient to carry out such a survey.

E. Staffing

Personnel estimates (excluding the EDP area) given by CAPMAS are as follows:

Enumerators	70,000
Crew leaders (3-5 enumerators per crew leader)	20,000
Assistant inspectors	6,000
Inspectors	700
Supervisors	80
General supervisors	19
Capmas technical staff	175

In addition to CAPMAS technical staff, the general supervisors, supervisors, and inspectors will be CAPMAS permanent staff.

F. Data Processing Requirements

Dr. Farag Sedky stated that he will be personally responsible for the design and implementation of the clerical and computer systems used for processing the 1986 census. This means that the National Computer Centre (NCC) will have responsibility for execution of the system and that Dr. Sedky will hand-pick the technical personnel from within the NCC and the Central Administration for EDP to be directly responsible for design and implementation of specific processing steps.

All of Dr. Sedky's 1986 estimated requirements are based on 1976 Census resources utilized and projected upwards for the expected 1986 population count of about 52 million. In addition, for estimation purposes, it is assumed that in 1986 the same number of data items will be collected as in 1976. Dr. Sedky estimates, therefore, that he will need 50 percent more resources in all areas in order to complete the data processing with the schedule that he has set forth. Current plans call for all data check-in, coding and keying to be done 16 months after the first enumerator area booklets arrive in CAPMAS and to have all processing and tables produced for the Republic 18 months after receipt of data from the field. If the census date is November 1986, and returns come back to CAPMAS by February 1987, then, based on this schedule, final census tabulations would be available in August 1988. In addition, if computer software is utilized that can produce publication quality reports in Arabic and English, published results could be available shortly thereafter by photographing the computer generated tables directly. This would represent a tremendous savings in clerical costs and accelerate release of census results.

The NCC has delineated the following requirements:

1. Check-in and Pre-coding Stage

   Staff requirements: 150 clerks (60 per shift for 2 shifts plus 30 reserves)

2. Coding Stage

   Staff requirements: 2250 clerks (750 per shift for 2 shifts plus 750 reserves)

3. Data Entry Stage

   Staff requirements: 750 operators (300 per shift for 2 shifts plus 150 reserves)

   Equiment requirements: 300 keying stations (assumes key to disk or diskette)

   15 spooling disk drives, or thousands of floppy disks.

CAPMAS currently has only 108 data entry stations of incompatible varieties.

In 1976, the census questionnaire was so long that the data entry operators had to key information for each person in the household on two different record types. On this basis, Dr. Sedky estimates that there will be 144 million records to key. This is based on 52 million population and 8 million establishments, multiplied by 2 record types plus 20 percent to account for estimation error and keying verification. Dr. Sedky assumes an operator can key 800 card equivalents (records) per shift. Using 280-300 key stations per shift, 450,000 records per day can be entered. The rate will achieve 144 million records entered in 16 calendar months.

4. Computer Check-in, Editing and Tabulation Stage

a. Software development

Staff requirements have not been estimated. In 1976, Dr. Sedky designed the system and wrote most of the check-in, editing and tabulation programs himself in ICL machine language (PLAN). He had four assistant programmers helping him, two of whom he assumes will be the chief systems analysts in 1986. Additional programming staff will be required as the new system should be completely rewritten in structured COBOL. At least 4 CRT terminals are needed for access to the mainframe computer for this project.

b. Operations:

Staff Requirements: 3 systems programmers
6 senior operators
18 assistant operators

These requirements assume three 6-hour shifts per day.

Estimated Equipment Requirements:

Assuming the existing ICL 2966 computer at NCC will continue to be used to support non-CAPMAS users and the ME29 computer at the Central Administration for EDP will be used to support current statistics processing and processing of the 1983 Agriculture Census, new dedicated mainframe capacity will be required to process the 1986 Census.

To produce the 13,000 hours of computer time required to process 144 million records, Dr. Sedky estimates that 2 compatible mainframe computers are necessary, each with a minimum of 4 megabytes storage and a processing speed of at least 2 million computer instructions per second. Although this processing requirement can be met by single larger mainframe computer, Dr. Sedky feels that having two machines running in parallel is preferable so if one is inoperative, the other can still process data. It would not be absolutely necessary to have this new equipment compatible to the existing ICL system. Approximately 1500-2000 9-track 1600 bpi magnetic tapes will be needed for processing the census data.

CAPMAS is completing a needs assessment of total EDP system requirements, which will be refined into one proposal for vendor comments later in 1983. It is hoped that all data entry and computer equipment can be in place no later than September 1984 so that systems staff can have several months training before beginning the actual design of the processing system in January 1985. If this schedule holds, then CAPMAS will have two full years to design, develop, implement, test, and refine the processing system before census data are available for processing.

G. Other Requirements Developed by the CAPMAS Planning Committee

Discussions with CAPMAS staff indicated that the census planning committee perceives the following requirements to complete the 1986 Census:

1. Training

   a. 3 fellowships (6 months) to participate in preparatory census work, including mapping (7/83 - 12/83);

   b. 2 CAPMAS staff members to visit similarly developed countries to observe general census operations (1 month, 7/83 - 12/83);

   c. 3 fellowships for training in fieldwork, 6 months each (7/83 - 12/83);

   d. 2 missions to similarly developed countries to observe fieldwork (1 month, 7/83 - 12/83);

   e. 3 fellowships in quality control operations (3 months, 7/83 - 9/83);

   f. 3 fellowships for tabulation and publication training (6 months, 1/84 - 6/84);

   g. 2 missions to similarly developed countries to observe tabulation and publication activities (2 months, 10/86 - 12/86);

   h. 3 fellowships to train data processors in systems analysis (6 months, 7/83 - 12/84);

   i. 6 fellowships for programming (9 months, 7/83 - 12/84);

   j. 3 fellowships for specialized programmers to establish data base and information systems (6 months, 7/84 - 12/85);

   k. 2 missions, director of data processing, for software management and administration (6 months, 7/84 - 12/84);

l. 3 fellowships in evalution of data (6 months, 7/84 - 7/85);

m. 1 visiting expert in census evaluation (3 months, 1/84 -12/84);

n. 1 visiting expert in data analysis (3 months, 7/85 - 12/85);

2. Seminars

CAPMAS proposes five seminars be given in Cairo on all phases of census operations. These seminars would last 3-4 weeks with CAPMAS attendees numbering 15-30. One seminar would be given each year for five years from 1983-1987.

3. Printing

a. 2 visiting experts to study existing equipment and make proposals to modify that equipment (2 weeks, 10/83 - 12/83);

b. 4 missions to visit companies to see different types of equipment (4-6 weeks, 7/83 - 9/83);

c. 4 fellowships to train on new equipment (4-6 weeks, 4/85 - 6/85);

d. 2 visiting experts to followup on training (2 weeks, 4/85 - 6/85).

4. Other Equipment

a. Vehicles

28 cars
55 microbuses
14 vans
40 jeeps
8 trucks (4-6 toms)
10 buses
300 motorcycles with sidecars
28 motorcycles with no sidecars

b. Video/sound/communications

30 video sets
30 TV sets
300 tape recorders
300 wireless machines (telex)
500 video tapes
2000 cassettes
3 overhead projectors

c. Printing (in addition to that provided under UN project)

Photocomposition equipment with Arabic and Latin fonts
3 color offset printers, 71x102
1 color offset printer, 52x72
Printer for plate making
Binding, folding and stitching equipment

d. Other Office Equipment

1 Xerox 7000
1 Xerox 3107
1 Xerox 2600
1 Xerox 2300
300 calculators
25 word processors

IV. RECOMMENDATIONS

This chapter contains the recommendations developed by the team. These recommendations deal with specific areas of the census process and procedures that the team members believe must be considered for implementation to ensure that the 1986 censuses achieve their goals.

A. Planning and Field Work

1. Mapping

Immediately prior to the team's visit, a mapping workshop was held at CAPMAS. The recommendations for the 1986 mapping program are based on follow-on work to that workshop. Appendix D provides a detailed report of the 1986 Egyptian Census mapping program. This chapter provides a summary only.

CAPMAS should assign a staff person immediately to begin canvassing other government agencies and private organizations for copies of maps and airphotos. This project will lead to the development of a source material library, which is essential for census map production.

A report produced for USAID/Cairo by the U.S. Geological Survey entitled "A Review of Topographic Mapping in Egypt," would be a useful reference. Two important map series cited in this report should be acquired by CAPMAS: (1) 1:10,000 scale maps of the Nile Valley compiled under contract by Kenting Earth Sciences LTD of Canada in 1979 (400 maps) for the Ministry of Irrigation; and (2) 1:5,000 scale maps of Cairo completed under contract by the Institut Geographique National of France in 1979 (347 maps) for the Ministry of Development and New Communities.

The CAPMAS Geographic Unit staff should be upgraded to an organizational framework similar to the Mapping Manual/POPSTAN model. This expanded organization should be headed by a trained cartographer.

Priorities must be established for the order of preparation of block maps for the 1986 census. The recommended priority order is: pretest areas; the Cairo/Giza metropolitan area; remaining high population density areas; and the desert areas. If enumeration maps for all areas cannot be prepared prior to the census, the mapping program must continue beyond the census date until it is completed.

During the intercensal period (1986-1996), a steady pace of census map updating should be undertaken. This avoids the excessive amount of work to be done immediately prior to a census. In addition during this period, maps will be provided for the sample survey program.

2. Questionnaire

The content of the 1986 census has not been determined. This should be done as soon as possible (not later than September 1983) so that materials for the pretest, to be taken in September 1984, can be prepared.

Substantial savings of processing expense and time could be achieved by the use of sampling. Items to be included on the 100-percent questionnaire could be sex, relationship to head, religion, nationality, birth date and age, marital status, and education. All other items could be collected on a sample basis. Use of sampling would also eliminate some of the multiple keying requirements and certainly reduce keying workload, which is a major processing bottleneck.

In 1976, CAPMAS census procedures required enumerators to use several separate forms for housing, population, special institution, and establishment data. Compounding the enormity of control procedures was the design and length of the forms themselves. In particular, enumerators were required to write each individual response in longhand, instead of using forms with precoded response "boxes." In fact, of the 10 housing characteristic items and 36 population characteristic items asked of a respondent, only 10 items were numerical responses that could be directly keyed. Therefore, 80 percent of the items had to be coded later by hand to numerical entries, tremendously increasing clerical staff requirements and the potential for errors. The 1986 Census form should maximize the use of precoded responses to ease enumerator and office coding burden.

3. Quality Control

In 1976, 15 percent of the enumerator's workload was checked by the crew leader, assistant inspector and supervisor. This operation must be systematized and records of errors maintained so the quality of the field work can be measured.

4. Preliminary Counts

It is recommended that sampling be employed for purposes of tabulating preliminary counts. Sampling is feasible for estimates at the governorate, urban/rural area level for a few characteristics. Based on 1976 experience, data that are transcribed and summarized by field staff should be extensively checked in a systematic manner in those enumerator areas that are selected to produce preliminary counts. It is conceivable that the reduction in transcription errors from the quality control checking procedure could balance off a substantial portion of the sampling error. Also, the time and the costs involved in producing preliminary counts could be greatly reduced.

Normally, an optimum point exists at which nonsampling error reduction balances sampling error, and the overall costs would be substantially reduced. Several alternative sampling fractions for the quality control operation, as well as the selection of enumerator areas, should be examined. Staff also should consider the possibility of "ratio adjusting" the sample preliminary estimates to a 100-percent hand-tabulated head count. This procedure could appreciably reduce the sampling error in the estimates.

5. Census Sample

It is recommended that the CAPMAS staff use sampling for collecting the data on certain characteristics, especially those characteristics that require a great deal of processing (editing and coding). Because of the level of detail that is needed, a highly clustered sample design probably is not feasible. Thus, it is recommended that the staff consider the use of a systematic random sample, especially in urban areas. This procedure should be tested as part of the 1986 Census Pretest to be conducted in 1984. Because of the 1966 census sampling experience, emphasis in the pretest should be placed on determining if a sample enumeration can be properly controlled in the field.

If it is determined that a sample enumeration for certain characteristics is not feasible, the following option should be considered: all data would be collected on a 100 percent basis, but only a sample of questionnaires would be processed for certain specified characteristics. This procedure would require data preparation prior to the sample processing stage so that a proper sample could be drawn.

Sampling staff should begin immediately to consider alternative census sampling fractions and their resulting standard errors for various characteristics. Estimates from the 1976 census for various geographical areas could be used for this analysis.

6. Table Design

In 1976, table requirements were very complex requiring the computer processing software to produce matrices of tallied data in parts of tables. These parts had to be consolidated manually and table descriptions applied manually before they could be sent for printing. The design problem was that the tables had a total number of rows and columns that could not be produced on a single page of computer paper.

Consideration should be given to designing tables in conjunction with CAPMAS computer systems analysts so that individual table size and complexity do not exceed the capacity of generalized software packages. Table simplicity and adequate spacing of data columns on the printed page also should be considered to increase understanding and to ensure that published data can be readily used by planners and policy makers.

7. Training Field Staff

It was impossible to judge the quality of the training materials, since there were no English translations available. Therefore, no specific recommendations can be made at this time. However, new training techniques should be researched to determine if these techniques can be utilized for the 1986 census. In addition, the highly controlled system of training at all levels should be continued.

8. Staffing

Key staff should be named as far in advance as possible so that any necessary training can be identified and obtained.

The sampling staff needs to be increased to handle the sampling applications of the 1986 census and the current survey redesign efforts required following the census.

The Geographic Unit staff must be increased to meet the demands necessary to produce enumerator maps for the census - (see 1, above).

B. Processing

Dr. Sedky was responsible for the entire design of the manual and computer processing operations used on the 1976 census data and he documented these operations in detail in a volume on processing methodologies. However, this volume was not translated into English and, therefore, accounts of the actual procedures used for 1976 were related to the census team verbally.

In 1976 an enormous clerical effort was required to prepare the 7 million household questionnaires for data entry and computer processing. The fact that the design of the questionnaires did not incorporate precoded responses was a major impediment to the manual coding operation. In addition, the fact that all 46 housing and population items were enumerated on a 100 percent coverage basis made the questionnaire a two page form. This required the keying operators to enter individual person data in two passes. This fragmentation of the person records required major matching operations be performed on the computer which were extremely time consuming and added to the potential for data omissions during data keying.

1. Manual Procedures

In general, great efforts were made to control effectively the flow of questionnaire processing at each stage of the operation. However, in order to realize greater efficiencies for 1986 in the manual stages of the operation, it is recommended that the following alternative procedures be used.

-- During manual check-in of Enumeration Area booklets in the Receiving and Control Department, time and and clerical resources required can be reduced by generating computer labels with geographic codes at the EA level which can be affixed to the cover of the

booklets. This would eliminate the need for manual coding of the booklet covers and also would provide for a labeling system that would enable the computer to track the flow of questionnaire processing from department to department.

Software packages exist that facilitate the establishment of a national geographic code base on the computer derived from maps, which then can be used to monitor the flow of forms out to the field and back to the office through all the processing stages. (CONTROL, a generalized package developed by an AID contractor, is an example of such a software system).

-- In addition to reducing the amount of manual coding required through the use of precoded item responses on the questionnaire, the coding process should be streamlined by relaxing the verificati procedure. A systematic sampling of the coders' work would be adequate followed by procedural adjustments or personnel changes when indicated. Adequate records should be kept by supervisors and shift managers to identify sources and frequencies of coding errors to enable adjustments to be made to procedures and to administer retraining, when required.

-- The data keying operation used in 1976 was complex because of the need for two-pass entry of person item records. We recommend that this be relieved significantly through improved questionnaire design and use of sample coverage on population items. Additional complexity was introduced in 1976 by the necessity of using three different types of data entry hardware, each with different editing and control capabilities, and two of which created ouput tapes incompatible with the mainframe computer. Sufficient data entry stations of the same type and features should be made available to allow one set of standard procedures to be implemented for all operators. Editing and control features of this equipment should be used to assure that extra keystrokes (extraneous digits) are not incorrectly entered into specific fields of the record. As already indicated for the coding stage, systematic sampling should be used in the keying verification process.

2. Computerized Procedures

The software system used for computerized processing was designed and implemented by Dr. Sedky with the help of four assistant programmers. The entire system was written in PLAN, the assembler language for ICL computers. Although the software processing system was adequate in its accuracy, the lack of timeliness of programs for production processing and the need for four major revisions of the system reduced the overall effectiveness of the operation. Several recommendations are appropriate here to improve the quality, timeliness and effectiveness of the 1986 software system.

a. Intra-organizational Communications and Procedures

Better lines of communications must be estabished between the subject matter specialists in charge of data manipulation procedures and the systems team responsible for developing the software. It is imperative that the Census staff develop comprehensive structured forms for specifying computer edits to be performed, actions to take to correct missing, invalid or inconsistent data. Definitions of variables, recodes, computations and formats for cross-tabulations should be documented in detail prior to the software development process.

This should improve the acceptability of the data results produced by computer without numerous software revisions. Several training exercises recommended in another section of the report will help CAPMAS staff learn these specification writing and interface communication skills.

b. Software System Development

It is recommended that a new software system be developed to process the 1986 census using a high-level, structured, and portable programming language like COBOL. Emphasis should be placed on techniques of structured systems design, structured programming, full documentation of all program modules and procedures, team programming concepts, and the use of statistical software packages such as CONTROL, CONCOR, and CENTS 4.

Compensating for the loss of processing efficiency experienced when using a high level language like COBOL are the advantages of COBOL's structured code. By using structured COBOL, which is much more intelligable than assembly language, programs can be maintained, documentation can be more comprehendable and programs may be used on a broader variety of equipment.

Packages such as CONTROL (management of questionnaire flow), CONCOR (edit and imputation system), and CENTS 4 (crosstabulation and report generation) should be evaluated, modified if necessary, and used by CAPMAS for 1986 census processing. Additional software packages should be evaluated or designed for demographic analysis, graphical representation of data (including color graphics), data base construction and management, and user extraction and manipulation of data from census summary files. (CENSPAC is an example of such a system).

It is recommended that a joint CAPMAS-ISPC software enhancement on-the-job training effort be established. This would insure the establishment of a staff within CAPMAS, presumably in the Software Centre currently headed by Dr. Sedky, that is fully trained and expert in the science of software package design, implementation and user support, and to insure that the most appropriate use is made of packaged statistical software at CAPMAS for processing the 1986 census. Through this program, major statistical packages such as those mentioned above would be installed at the National Computer Centre. Workshops would be taught to the CAPMAS staff on the present capabilities and applications of the packages. Then, through hands-on evaluation of the software systems, CAPMAS, in concert with Dr. Sedky and a resident EDP advisor,

could identify those areas of each package which could be modified or enhanced to better meet the requirements of the 1986 census processing system.

As specific features are identified for inclusion as upgrades to the existing software packages, a systems analyst from CAPMAS could travel to Washington to study the proper approach to designing user interface language components for new features, systems design for internal implementation of modifications and proper testing and documentation techniques. Specific considerations of modularity and machine and operating system independent of the code (portability) will be stressed. ISPC staff would be made available subsequent to the study trip to implement the new software jointly with CAPMAS, and assist with installation and training at CAPMAS. This joint exercise, over the next few years, would not only provide CAPMAS with packages that will be customized for optimal use on the 1986 census data but will also provide CAPMAS with an ability to continue to support the use of such packages and upgrade these types of systems in the future. This should protect CAPMAS from facing major software conversion or rewrite efforts in the future if machine changes are required. This effort should revitalize the function of the Software Centre at CAPMAS and make it a prominent unit which could be the central focus of support for users of these statistical packages in other agencies of the Republic as well as other statistical offices of developing countries in the region.

c. Upgrade of Computer Equipment

Use of such software concepts mentioned above, coupled with the introduction of a fourth generation mainframe computer, will relieve the restrictions that were placed on the editing and tabulation system used in the 1976 census. Larger memory availability will allow the use of more sophisticated editing techniques, such as hot deck imputation, which requires storing large data matrices in memory for production processing. Also, tabulation programs could be designed and written to generate many table reports simultaneously in one pass of the data, reducing considerably the number of data passes necessary to complete the tabulation phase of processing. All tally matrix outputs could be retained indefinitely on disk or tape so that as special requests for revised tables or reports at unique administration levels are required, they can be met without repassing the entire detailed data file.

When CAPMAS upgrades its present computer system, it should be designed to provide sufficient primary storage and processing speed to make feasible the implementation of more complex routines for examining data, performing imputations based on "live" observations, rigorous statistical computations, and multiple cross-tabulations in a single pass of the data. Mainframe computers are available that have more than five times the processing power of the machines currently installed at CAPMAS.

Microcomputers also should be acquired by CAPMAS to be integrated as an extension of the mainframe environment. This will allow analysts (subject matter specialists) to perform analysis on summarized census data using software products available on these smaller machines. This will not only stimulate CAPMAS analysts to take a more active role in census data analysis, but it will also free scarce programmer resources from having to perform time consuming data anlaysis processing on the mainframe computer.

Microcomputers also can serve to enhance the training offered in the National Statistical Training Centre and the EDP Training Centre through computer-assisted training modules and computer familiarization courses. Management information and financial analysis software available for microcomputers would greatly assist CAPMAS managers in controlling budgets, tracking projects and human resource management.

d. Staff Training and Utilization

Although the NCC trains large numbers of students each year in computer programming fundamentals, the continued large turnover of experienced staff to private agencies leaves the CAPMAS organization very thin at higher levels of experience, particularly in the systems analysts positions.

This high turnover rate of trained EDP staff to the private sector is a common phenomenon in developing countries. To a certain extent, it is not controllable, but certain actions can be taken to slow the rate of staff loss. CAPMAS can work with government officials to institute salary reforms for technical positions such as programmers to upgrade compensation and narrow the pay gap between the public and private sectors. Also, special training programs can be created and offered to promising EDP students to give them incentive to obligate themselves for several years of service to the government. Such a special EDP training program was established jointly between the National Computer Center in Riyadh, Saudi Arabia and ISPC of the Census Bureau in Washington. This program has been quite successful in Saudi Arabia and it is recommended that CAPMAS initiate a similar joint training program with ISPC over the life of the census project.

Through such a joint program, participants would receive computer training through the National Computer Centre in Cairo and the Bureau of the Census, ISPC, in Washington, D.C. The period of training, in addition to providing the basic tools needed for programming as systems analysts, permits exposure to the latest in computer technology. In addition, program-related trips are taken to various cities throughout the United States to take part in conferences, expositions, and special programs of educational benefit and interest to the participants. These trips, and the overall atmosphere of the training program, permit and actually emphasize the opportunities for meetings and discussions with leading computer professionals (this requires adequate English language skills which is an integral part of this specialized training program).

This period of training, both in Egypt and the United Staes, is complemented by timely application of the information learned on the job at the NCC in Cairo. This provides for an accelerated program to train highly skilled applications computer programmers and systems analysts within a abbreviated time schedule. The training would be given in four phases as follows:

Phase 1 (Egypt) - Introductory Topics in EDP and Programming Fundamentals

Phase 2 (U.S.) - Communications Skills (English training)
Applied programming skills for survey and census processing

Phase 3 (Egypt) - Specific Systems Training for Computer Configuration at CAPMAS/NCC

Phase 4 (U.S.) - Specialized advanced studies in a particular area of expertise

-- data base systems
-- interactive, time-sharing systems
-- systems analysis
-- advanced applications programming
-- systems programming
-- operations management
-- data processing management

Graduation --

To avoid jeopardizing the timely implementation of the census processing system, team programming, where pairs of programmers are given a single assignment, or a series of program modules to complete, should be used. In this way, there are always at least two technicians fully conversant with any one specific module of the system.

The same principle would apply to assigning major subsystems to the system analysts to design and supervise their implementation. Systems analysts should overlap in their assignments so that each has primary responsibility for one subsystem, as well as secondary or back-up responsibility for another subsystem. Subsystems can be viewed as major processing stages like check-in (coverage), response validation, consistency inspection, imputational procedures, tabulation, etc.

e. Schedule of Staff Assignments for 1986 Census

Plans should be made by January 1984 to identify key systems analysts for these responsibilities so that they can be trained in time to begin to participate in the design of census tables and the questionnaire instruments to insure ease of processability. If a census pretest is undertaken and evaluated in 1984, then the final questionnaire content and format should be finalized by January 1985, so that the census systems team has a full 24 months to design, code, test, and refine the software system before census data returns from the field. This should provide adequate time for a comprehensive, well-documented system to be produced and to insure that the census results are available in a timely manner.

C. Evaluation

Although demographic analysis is useful for determining if a potential problem exists in the census, it does not provide detailed information about the source of error. It is recommended that CAPMAS staff establish an evaluation unit that would develop studies to provide specific measures of error in the census data. This information would be useful internally for planning future censuses and surveys, and would have significant side benefits for data users who need to have some measures of the limitations of the data.

Two types of error traditionally have been measured in evaluation programs: coverage and content errors. The methodology (other than demographic analysis) usually consists of taking a specially designed survey shortly after the census enumeration and matching the survey results with the census. These surveys are called post enumeration surveys (PES's). Whereas the methodology used to measure content error is usually straightforward, this is not the case for coverage error. The methodology for measuring coverage error is unusually complex and the procedure is relatively costly. Therefore, it is recommended that CAPMAS staff proceed cautiously in developing this capability.

Whereas PES successes have occurred in certain countries, others have had unpleasant experiences. We recommend that the 1984 census pretest also be used to test the PES procedures, e.g. the questionnaire design and the matching operation. Under any circumstances, it would not be wise to engage in a census PES without a pretest. This test would be of immense help in implementing a PES as part of the 1986 Census program. It is also recommended that CAPMAS staff utilize the extensive experience that the U.S. Bureau of the Census has accumulated in this area. A workshop on evaluation recently has been developed by the U.S. Census Bureau; this could be of considerable help in developing a census evaluation capability at CAPMAS. Short-term technical assistance also could be provided.

D. Redesign of Current Surveys

1. Census Methodology

Since the current sample surveys use the census as a sampling frame, it is very important to plan the census such that it facilitates the redesign of current surveys. The current surveys sample selection includes the selection of shiakahs and villages at the first stage of selection, a segmenting of "blocks" and groups of "blocks" within the selected shiakahs and villages, and a sample of dwelling units within selected segments. Segmenting requires that good maps be available and that one has an idea of how households are distributed throughout the "blocks." Since an attempt is made to make the segments equal in size, it is recommended that the census enumerators indicate on their maps where the housing units are located. Usually a number is inserted on the map that indicates the number of households residing in that location. It is recommended that this "map spotting" be tested as part of the 1984 pretest.

2. Survey Design

It is recommended that survey designs be implemented with the following considerations:

-- Master Sampling Frame:

CAPMAS staff are considering the use of sample design that would select one set of shiakahs and villages for all surveys. Within the sampled shiakahs and villages, segments would be allocated to the various demographic surveys as well as the economic surveys. The effect of this plan would be to concentrate the enumerator's work in certain areas and thus reduce field costs. This plan also would provide a ready-made sample for any new surveys in the future.

-- Updating:

Because of the rapid growth and internal migration of Egypt, it is recommended that periodic updating of selected segments be made to incorporate new construction in the survey. As one gets further from the census in the intercensal period, the variation in segment sizes is likely to introduce more variability in the survey estimates. However, this is usually not as serious a problem as the possibility that persons who reside in new construction units are very much different than those enumerated in the census in that segment.

-- Sample Design:

Research will probably indicate that above some cutoff point large shiakahs and villages should come into the sample with certainty. The smaller shiakahs and villages will then be sampled. It is recommended that this sampling be done in such a way that the calculation of standard errors is enhanced. A two primary unit per stratum design (or a one primary sampling unit design with strata collapsed for variance computations) should be considered. The type of design will facilitate the estimation of standard errors. CAPMAS staff may want to consider a Durbin method of selection which has been used successfully on an international basis. It is recommended that a half sample replication scheme be used for standard error estimation. This variance estimation should provide estimates with reasonable accuracy and most importantly, this type of estimation is relatively easy to program in a computer.

-- Household and Person Nonresponse Adjustment:

The current sample surveys use a field substitution scheme to account for nonresponse. This procedure not only can produce results of dubious quality, but is is also very difficult to implement in the field. It is recommended that CAPMAS staff consider a procedure that would adjust for household and person nonresponse by means of a special weighting procedure. This type of procedure replaces nonresponse with averages of characteristics from "similar" household and person respondents.

-- Item Nonresponse Adjustment:

CAPMAS staff also should consider an imputation scheme for item nonresponse that is handled by either a weighting process or a substitution procedure. Simulation studies that have been conducted by the U.S. Census Bureau may be useful for designing a research program to determine optimum procedures.

-- Rotation of the Sample:

Concern has been expressed by CAPMAS staff that nonresponse would constitute a major problem if households were not eventually rotated out of the sample. Currently a new sample is enumerated every year for the Annual Labour Force Survey. This procedure does keep nonresponse bias at a small level, but it also sacrifices the ability to obtain good estimates of yearly change. Research should be conducted to determine the optimum number of times a respondent should be included in the sample in order to develop a rotation scheme. Another consideration in rotating the sample is the impact that such a scheme will have on the estimator.

V. PROPOSED TECHNICAL ASSISTANCE AND TRAINING PROGRAM

The proposed technical assistance and training plan proposed by the Census team is presented in this chapter. The assistance and training outlined is designed to implement the recommendations discussed in the previous chapter and to assist CAPMAS in carrying out an accurate and timely census.

The proposed program is based on the following assumptions regarding the 1986 Census:

... The pretest will be conducted in September 1984.
... The census will be conducted in November 1986.

A. Long-term Technical Assistance

1. Advisor in Cartography and Census Mapping

Duration: January 1984 - January 1986 (24 months)

The cartographic/mapping area of CAPMAS must be significantly expanded and upgraded if census maps are to be produced in a timely fashion. In order to assist with this, it is proposed that a resident advisor in the cartographic field be assigned to CAPMAS for a two-year period. It is desirable that the advisor have a working knowledge of Arabic.

The primary responsibility of the cartographic advisor would be to expand and and upgrade the present CAPMAS Geographic Unit into an organization that will be capable of meeting the objectives of the census mapping program which are:

(1) to produce maps for the census field work to be used in making enumerator assignments and used by enumerators to assure complete coverage of assigned areas;

(2) to establish a map base for sample surveys;

(3) to provide additional maps to accompany published census and sample survey reports.

The advisor's major area of concentration would be in achieving the first objective. Experience in census mapping is the major qualification for this advisor.

The cartographic advisor will provide additional training for CAPMAS staff when the expanded unit has been organized. In addition, he/she will assess the need for additional equipment (recommended preliminary equipment is included in this proposal) and will train CAPMAS staff on the use of such equipment. Other training will be arranged as necessary. In addition, the cartographic advisor will assist CAPMAS to develop a plan for achieving the other objectives of census mapping program.

If we are unable to locate a cartographic advisor with the requisite skills as soon as is needed, a series of short-term technical assistance visits can be made in the interim.

2. Advisor for EDP Management and Systems Design for Censuses and Surveys

Duration: January 1985 - July 1987 (30 months)

Although the Central Administration for EDP and the National Computer Centre of CAPMAS have significant numbers of trained programmers graduating from their elementary introduction to EDP, COBOL programming, and systems analysis curriculum, the numbers of highly experienced programmers and, especially, systems analysts are not sufficient to meet the current or future needs of the agency. High turnover rates to private agencies is a major factor. Certainly few, if any, analysts currently at CAPMAS have the technical background, experience, and management skills to lead a systems team responsible for the design of the processing system for the 1986 census.

Dr. Farag Sedky, Under Secretary of State for the National Computer Centre, is a well-qualified statistician and computer system analyst with over 20 years experience in processing census and survey data. He was solely responsible for the design and implementation of the manual and computerized processing systems for the 1976 census. Dr. Sedky would certainly be qualified to direct the design of the 1986 census system, but as director of the NCC and the Software Center, his day to day responsibilities are so extensive that it would be impossible for him to assume responsibility for the census system as well.

The NCC has several systems analysts with some experience in designing and implementing computer processing systems for surveys, but none have the combination of management and technical experience required to lead a systems team in processing a national census covering over 50 million people. It is therefore highly advisable that an expert systems analyst be identified to report to CAPMAS and work as a counterpart to Dr. Sedky, working with technical staff that Dr. Sedky assigns to the census project. This advisor would be on board early enough to help review the results of a census pretest operation planned for late in 1984 to assure that the questionnaire design is optimal for processing, and to analzye the manual processing procedures used in the pretest.

The advisor would be available to assist in the design of the software system for processing the census; assist in the identification and evaluation of statistical software packages that might be used in census processing; monitor the day to day progress of system implementation; help to establish documentation standards and programming standards for the project; and serve as technical backstop through the first 4 to 6 months of actual census data production processing. At the end of the advisor's tour of duty, CAPMAS should have successfully completed the final tabulations for some of the governorates of the Republic. From that point on, the technical staff of CAPMAS should have gained sufficient experience to see the production processing through to completion without day to day assistance from an advisor. If problems arise after the departure of the advisor, additional assistance can be provided on a short-term, periodic basis to assure that the processing is completed in an accurate and timely fashion.

Additional duties of the advisor would include:

- identification of special area needs, such as software packages, procurement, data base management systems, networking, etc., and coordinating short-term technical assistance missions to cover these areas.

- working with user departments of CAPMAS to identify future statistical processing needs, and to assist in defining and designing the objectives of a CAPMAS statistical data base that would be available to outside users.

- assist NCC with the establishment of a professional reference library of up-to-date EDP textbooks, scientific journals, and periodicals.

In order to carry out these tasks, the advisor should have at least 10 years experience with the design and implementation of large, complex statistical processing systems as well as a working knowledge of the Arabic language. This person should be expert in structured system design and program implementation techniques in COBOL as well as have a working knowledge of FORTRAN or other scientific programming languages. Understanding of some machine language coding would also be advisable. The advisor should possess skills in technical writing and systems documentation as well as general familiarity with statistical packages for processing and data analysis. Demonstrated management skills in an EDP organization and the ability to communicate clearly and openly with counterparts in the data processing departments and with the subject matter departments of CAPMAS are essential.

B. Short-term Technical Assistance

The objective of the short-term technical assistance program is to provide CAPMAS staff with appropriate assistance in key technical areas and critical phases of census planning and implementation. This assistance is of a specialized technical nature and does not require a full-time advisor. The short-term assistance will complement the skills of the two proposed full-time advisors. In the short-term assistance program, advisors will work closely with CAPMAS counterparts to transfer our skills to CAPMAS staff.

In this section:

"SS" means Survey Statistician
"MS" means Mathematical Statistician
"DP" means Data Processor

The timing of activities is tentative and as the detailed plans are made and work progresses, the schedule may have to be modified.

Date	Activity	Assistance by Type in Weeks			Number of Weeks in Egypt		
		SS	MS	DP	SS	MS	DP
FY 1983							
May-June 1983	SS, MS and DP develop detailed scope of work for technical assistance	8	4	4	3	2	2
May-June 1983	DP expert in procurement of hardware and telecommunications equipment and services to assist CAPMAS in preparing a Request for Proposal (RFP) to solicit vendor offerings to upgrade CAPMAS' entire EDP facilities to meet the agency's needs for remainder of decade.	-	-	5	-	-	4
July 1983	MS to provide assistance in developing anticipated standard errors for various sampling fractions, characteristics and geographic areas; also to provide assistance in developing a field procedure for enumerating a sample in the 1984 census pretest.	-	6	-	-	3	-

Date	Activity	Assistance by Type in Weeks			Number of Weeks in Egypt		
		SS	MS	DP	SS	MS	DP
Sept. 1983	SS to review preliminary plans for timing, and scope of work of 1984, pre-test and 1986 census.	4	-	-	2	-	-
May-Sept 1983	Contingency and other activities not identified above	2	2	1	-	-	-
TOTAL FY 83		14	12	10	5	5	6
FY 84 Oct-Dec 1983	DP (in Washington) to convert CENTS 4 tabulation software package for use on CAPMAS computer.	-	-	8	-	-	-
Nov. 1983	MS to develop scope of 1986 census evaluation program; includes methodological procedure recommendations, timetables, assessment of staffing needs, questionnaire design alternatives.	-	6	-	-	3	-
Jan. 1984	MS to design and plan quality control system for pretest fieldwork and to review sampling procedures for pretest.	-	8	-	-	4	-
Jan. 1984	SS to assist in developing pretest materials.	5	-	-	3	-	-
Jan-Feb 1984	DP procurement expert to assist CAPMAS in reviewing vendor proposals, soliciting vendor bids and preparing terms of contract to make procurement award.	-	-	6	-	-	4

Date	Activity	Assistance by Type in Weeks			Number of Weeks in Egypt		
		SS	MS	DP	SS	MS	DP
FY 1984 (cont)							
March 1984	SS expert in data user activities to assess CAPMAS program and make recommendations for improvements.	5	-	-	3	-	-
April 1984	DP & MS to review pretest questionnaire and manual operation procedures that will be tested during pretest.	-	4	4	-	2	2
June 1984	SS to review pretest materials.	6	-	-	3	-	-
June 1984	MS to review evaluation plans and procedures for 1984 pretest; review progress made on developing the 1986 evaluation plan and to assist in developing a plan for the 1986 matching studies.	-	8	-	-	3	-
August 1984	DP training advisor to work with NCC training advisor in setting up a joint NCC-ISPC EDP training program and identifying students to participate.	-	-	5	-	-	3
September 1984	DP expert in computer hardware and telecommunications to assist CAPMAS with requirements for expansion of computing capability to regional and local offices of CAPMAS.	-	-	6	-	-	4

Date	Activity	Assistance by Type in Weeks			Number of Weeks in Egypt		
		SS	MS	DP	SS	MS	DP
FY 1984 (cont)							
September-October 1984	SS to observe pretest procedures. MS to to assess pretest operations, matching feasibility.	4	4	-	2	2	-
Sept-Dec 1984	DP (in Washington) to convert CONTROL Census management system package and conversion of the CONCOR edit and imputation package for use on CAPMAS computer.	-	-	16	-	-	-
Oct 1983-Sept 1984	Coordination and management of PASA.	8	-	-	-	-	-
Oct 1983-Sep 1984	Possible assistance to be requested by cartographic advisor.	10	-	-	6	-	-
Oct 1983-Sept 1984	Contingency and other activities not identified above.	6	5	7	-	-	-
TOTAL FY 1984		44	35	52	17	14	13
FY 1985							
January 1985	MS to analyze results of the sampling used on the pretest and to provide recommendations on use of sampling for 1986.	-	6	-	-	2	-
January 1985	SS to review pretest results and provide recommendations on 1986 procedures.	6	-	-	2	-	-

Date	Activity	Assistance by Type in Weeks			Number of Weeks in Egypt		
		SS	MS	DP	SS	MS	DP
FY 1985 (cont)							
March - Dec. 1985	ISPC software staff, as a result of feedback from CAPMAS evaluation, will assist in the implementation of enhanced program modules for the CONTROL package for managing the flow of paper during the census field procedures. Such modifications will focus on geographical reporting requirements for Egypt and office structure and functions in the field offices of CAPMAS.	-	-	28	-	-	-
June 1985	MS sampling expert to review CAPMAS plans for current survey redesign; also reviw sample design for post enumeration evaluation surveys.	-	10	-	-	6	-
June - Sept. 1985	ISPC software staff, as a result of feedback from CAPMAS evaluation, will assist in the implementation of enhanced program modules for the CONCOR edit and imputation package. Such modifications as: creation of a sub-system to provide an interface for users to make manual corrections and updates to a data file based on edit reports produced by CONCOR (at present only automatic correction can be applied to the data file at time of edit run); implementng a CREATE command in user language to automatically produce a record for one that is missing in an interview; and allow	-	-	16	-	-	-

Date	Activity	Assistance by Type in Weeks			Number of Weeks in Egypt		
		SS	MS	DP	SS	MS	DP
FY 1985 (cont)	missing in an interview; and allow the user to to edit and process an entire interview or questionnaire as one logical record rather than a series of individual smaller records will be considered. (This activity will be continued through May 1986).						
July 1985	SS to finalize operational control procedures for the census.	4	-	-	2	-	-
August 1985	DP training advisor to work with NCC training advisor to set up curriculum for up-coming training year in joint NCC-ISPC EDP training program and to identify students to participate.	-	-	4	-	-	2
Oct 1984-Sept-1985	Coordination and management of PASA.	12	-	-	-	-	-
Oct 1984-Sept 1985	Possible assistance to be requested by cartographic advisor.	10	-	-	6	-	-
Oct 1984-Sept 1985	Contingency and other activities not identified above.	5	2	7	-	-	-
FY 1985 TOTAL		37	18	55	10	8	2

Date	Activity	Assistance by Type in Weeks			Number of Weeks in Egypt		
		SS	MS	DP	SS	MS	DP
FY 1986							
October 1985- May 1986	Continuation of CONCOR enhancement (see June-Sept 1985 DP activity.	-	-	32	-	-	-
October 1985	MS to review final plans and procedures for the census evaluation program	-	5	-	-	2	-
January 1986	MS to review sampling procedures, proposed estimation techniques, presentation of estimates, and format of estimates and standard errors.	-	6	-	-	3	-
January 1986	SS to review questionnaires, manuals, training materials for 1986 census.	6	-	-	3	-	-
April 1986	SS to review procedures for manual processing	5	-	-	2	-	-

Date	Activity	Assistance by Type in Weeks			Number of Weeks in Egypt		
		SS	MS	DP	SS	MS	DP
FY 1986 (cont)							
May-Sept. 1986	ISPC software staff, as a result of feedback from CAPMAS evaluation, will assist in the implementation of enhanced program modules for the CENTS 4 tabulation and report generation package. Such modifications are: providing a dictionary for data item definitions in the format of a data base that can be used by other packages; allowing the performance of tallying and statistical computations to be done in double precision; providing interface between tally matrix outputs and other statistical analysis packages; providing a front-end interactive language to allow a statistician to compose tables without knowledge of programming, will be considered. (Activity will be continued through May 1987).	-	-	12	-	-	-
June 1986	MS to review evaluation processing plans and procedures.	-	4	-	-	2	-

Date	Activity	Assistance by Type in Weeks SS	MS	DP	Number of Weeks in Egypt SS	MS	DP
FY 1986 (cont)							
August 1986	DP training advisor to work with NCC training advisor to set up curriculum for upcoming training year in joint NCC-ISPC training program and to identify students to participate.	-	-	4	-	-	2
Oct 1985-Sept 1986	Coordination and management of PASA.	12	-	-	-	-	-
Oct 1985-Sept 1986	Contingency and other activities not identified above.	4	2	7	-	-	-
FY 1986 TOTAL		27	17	55	5	7	2
FY 1987							
October 1986 - May 1987	Continuation of enhancement of CENTS 4 (see DP activity, May-Sept. 1986)	-	-	36	-	-	-
November 1986	SS to observe census	4	-	-	2	-	-
January 1987	SS to review and observe manual processing	4	-	-	2	-	-

Date	Activity	Assistance by Type in Weeks			Number of Weeks in Egypt		
		SS	MS	DP	SS	MS	DP
FY 1987 (cont)							
January-February 1987	DP in Washington convert FORTRAN routines for demographic analysis (developed by Census Bureau's International Demographic Data Center) for use on CAPMAS computers.	-	-	8	-	-	-
February 1987	MS to observe PES matching operation and review tabulation plans.	-	4	-	-	2	-
March-April 1987	SS to consult with CAPMAS staff on publication of preliminary results of 1986 census.	4	-	-	2	-	-
June 1987	SS to review publication plans for census results.	6	-	-	3	-	-
August 1987	DP training advisor to work with NCC training advisor to set up curriculum for upcoming training year in joint NCC-ISPC EDP training program and to identify students to participate.	-	-	4	-	-	2
September 1987	DP to consult with CAPMAS EDP staff on any outstanding problems with remaining production processing of 1986 census data.	-	-	3	-	-	2

Date	Activity	Assistance by Type in Weeks			Number of Weeks in Egypt		
		SS	MS	DP	SS	MS	DP
FY 1987 (cont)							
Oct 1986-Sept 1987	Coordination and management of PASA.	8	-	-	-	-	-
Oct 1986-Sept 1987	Contingency and other costs not identified above.	4	1	8	-	-	-
TOTAL FY 1987		30	5	59	9	2	4
FY 1988							
October 1987	DP and SS expert in census summary computerized data products and services to advise NCC and CAPMAS on objectives and implementation approaches for generating public use data files, and producing support services to outside users.	5	-	5	3	-	3
October-December 1987	DP (in Washington) software staff to convert CENSPAC for use on CAPMAS computer.	-	-	9	-	-	-
November 1987	MS to review PES tabulations.	-	6	-	-	2	-

Date	Activity	Assistance by Type in Weeks			Number of Weeks in Egypt		
		SS	MS	DP	SS	MS	DP
FY 1988 (cont)							
January-February 1988	DP to consult with CAPMAS EDP staff on any outstanding problems with remaining production processing of the 1986 census data, and to discuss plans for archiving of final data products from the census and production of user summary files.	-	-	5	-	-	3
March-September 1988	ISPC software staff as a result of feedback from CAPMAS evaluation will assist in the implementation of enhanced program modules for the CENSPAC utility package for extraction and manipulation of data from census summary files. Modifications will focus on the regional file structures and levels of data reporting upon which the outside users of census data frequently request special census reports.	-	-	52	-	-	-
Oct 1987-Sept 1988	Coordination and management of PASA.	8	-	-	-	-	-
Oct 1987-Sept 1988	Contingency and other activities not identified above.	2	1	11	-	-	-
TOTAL FY 1988		15	7	82	3	2	3
TOTAL FY83-FY88		166	93	310	49	38	30

C. Training

The purpose of the training program is to provide structured training in specific technical areas to CAPMAS staff. This training provides the basis for many of the areas in which short-term technical assistance is given. Training will be either workshops conducted in Egypt with materials specifically designed for CAPMAS or CAPMAS staff will travel to other countries for their training.

1. In-country Workshops

Date	Activity	Assistance by Type in Weeks			Number of Weeks in Egypt		
		SS	MS	DP	SS	MS	DP
FY 1983							
August-September 1983	3-week seminar on census evaluation techniques. This would cover such topics as questionnaire design, estimation and other areas related to evaluation. A rough draft of a PES questionnaire (to be tested in 1984) should come out of this seminar.	5	10	-	3	6	-
August-September 1983	Contingency and other activities not identified above.	1	2	2	-	-	-
TOTAL FY 1983		6	12	18	3	6	8
FY 1984							
October-November 1983	Workshop on the introduction to microcomputer technology and its application to statistical data processing. This will introduce CAPMAS and NCC staff to the alternatives for putting low-cost computers on the statistician's and programmer's desk and being able to communicate with a mainframe computer when necessary.	-	-	16	-	-	8

Date	Activity	Assistance by Type in Weeks			Number of Weeks in Egypt		
		SS	MS	DP	SS	MS	DP
FY 1984 (cont)							
January-February 1984	Workshop on the definition of census objectives, table design and table specification writing. The course would bring statisticians and data processors together to jointly discuss outputs of the census, reports to be produced, and to learn to communicate through formal specification writing which will provide the necessary instructions for the programmer have a clear understanding of the definition of variables to be tabulated, formulae for statistical calculations to be made, and formats of final table layouts. This experience would be in preparation for the design used in the census pretest planned for the fall of 1984.	8	-	8	4	-	4

Date	Activity	Assistance by Type in Weeks			Number of Weeks in Egypt		
		SS	MS	DP	SS	MS	DP
FY 1984 (cont)							
February-March 1984	Installation and workshop on the CENTS 4 tabulation system at CAPMAS. This will provide programmers with first-hand knowledge of a package that can produce complex camera-ready tables. CAPMAS can then evaluate the utility of this package for use on the 1983 Agriculture Census, and on other current demographic survey programs. Evaluation on how this package could be integrated as part of the 1986 census processing system will be carried out after the long-term advisor is on board in January 1985.	-	-	8	-	-	4
April 1984	Workshop for policy planners and other data users on use of census data. This would provide input for the 1984 pretest as well as the census itself.	6	-	-	2	-	-
July 1984	Workshop on designing a training course. This would be targeted to trainers, subject matter specialists and others who will be preparing and presenting training to census staff.	14	-	-	8	-	-
Oct 1983-Sept 1984	Contingency and other activities not identified above.	4	-	2	-	-	-
TOTAL FY 1984		32	-	18	14	-	8

Date	Activity	Assistance by Type in Weeks			Number of Weeks in Egypt		
		SS	MS	DP	SS	MS	DP
FY 1985							
January-February 1985	Installation and workshop on the use of CONTROL census management system package. This will provide CAPMAS staff and the long-term advisor the opportunity to evaluate how this software may be used to control the flow of questionnaires to the field and back to the office through all processing stages. Evaluation then can be made as to applicability of this software for 1986 census processing or other current survey processing.	-	-	12	-	-	4
March 1985	Workshop for survey statisticians and subject-matter specialists on "Preparing Computer Edit Specifications" using the pre-test questionnaire as the training vehicle	6	-	-	2	-	-

Date	Activity	Assistance by Type in Weeks			Number of Weeks in Egypt		
		SS	MS	DP	SS	MS	DP
FY 1985 (cont)							
April-May 1985	Installation and workshop on the use of the CONCOR edit and impuation system package. This will provide CAPMAS staff and the long-term advisor the opportunity to evaluate how this software may be used to write editing and imputation rules in a language that statisticians can understand and to produce comprehensive reports about the numbers and types of data errors found and the corrections made. Evaluation then can be made as to the applicability of this software for use in editing the 1986 census data as well as other current survey data. This training should be attended by statisticians and data processors.	-	-	8	-	-	4
Oct 1984-Sept 1985	Contingency and other activities not identified above.	1	-	3	-	-	-
TOTAL FY 1985		7	-	23	2	-	8

Date	Activity	Assistance by Type in Weeks SS	MS	DP	Number of Weeks in Egypt SS	MS	DP
FY 1986							
January 1986	Reinstallation of the modified CONTROL package on the CAPMAS computer and a 1-week refresher course on new features for 1986 census processing.	-	-	6	-	-	2
May 1986	Reinstallation of the modified CONCOR package on the CAPMAS computer and a 1-week refresher course on new features for 1986 census processing.	-	-	6	-	-	2
Oct 1985-Sept 1986	Contingency and other activities not identified above.	-	-	2	-	-	-
TOTAL FY 1986		-	-	14	-	-	4
January 1987	Reinstallation of modified CENTS 4 package on the CAPMAS computer and a 1-week refresher course on new features for 1986 census.	-	-	6	-	-	2
January 1987	Designing and preparing publications and reports.	14	-	-	6	-	-

Date	Activity	Assistance by Type in Weeks			Number of Weeks in Egypt		
		SS	MS	DP	SS	MS	DP
FY 1987 (cont)							
March-April 1987	Installation and workshop on the use of FORTRAN routines for demographic analysis. This could be attended by statisticians, demographers, and data processors. CAPMAS staff will then be able to evaluate how these routines can be used for further analysis of the 1986 census data and any other current demographic survey data.	8	-	8	4	-	4
July-August 1987	Installation and workshop by use of SAS (Statistical Analysis System) and SAS graphics software package. This would depend on the availability of this software for use on the ICL machines or other machines available at CAPMAS, and would also require a license fee to be paid to the software developer (SAS Institute Inc. in North Carolina) for the use of the software.	10	-	10	4	-	4

Date	Activity	Assistance by Type in Weeks SS	MS	DP	Number of Weeks in Egypt SS	MS	DP
FY 1987 (cont)							
Oct 1986-Sept 1987	Contingency and other activities not identified above.	5	-	4	-	-	-
TOTAL FY 1987		37	-	28	14	-	8
FY 1988							
October 1987	Installation and workshops for programmers and demographers on statistical packages (e.g. tabluation generation, data base management and graphical analysis) for use on microcomputers within CAPMAS.	-	-	10	-	-	4
January 1988	Installation and workshop on CENSPAC software - to be attended by statisticians, programmers and outside users to learn how to use this package to extract and manipulate data from 1986 census summary file.	-	-	10	-	-	4
September 1988	Reinstallation of modified CENSPAC on CAPMAS computer and 1-week refresher course on new features.	-	-	6	-	-	2
Oct 1987-Sept 1988	Contingency and other activities not identified above.	-	-	4	-	-	-
TOTAL FY 1988		-	-	30	-	-	10

2. Overseas Training and Study

In addition to providing in-country workshops for CAPMAS staff, a program of training and study tours for CAPMAS staff to be given in the United States and other countries is proposed.

Time Period	Activity	No. of CAPMAS staff	Length of study	Census staff time
FY 1983				
July-December 1983	Discussions of cartographic issues and census mapping with U.S. Census Bureau. This also includes actual work experience in the Census Bureau mapping operation in Jeffersonville, Indiana and Washington.	2	4 wks each	6 wks
July-December 1983	Review and discussion of general census planning and operational issues and activities (Scheduling, promotion, staffing, budgeting, etc.).	1	2 wks	3 wks
July-December 1983	Discussions and exchange of ideas/problems with two similarly developed countries in the African region that have recently conducted censuses (Morocco and Zimbabwe are possibilities).	2	2 wks each country	6 wks
September 1983-August 1984	Survey statisticians from CAPMAS who will be working on the 1986 census attend Census Bureau's ISPC participant training program in Survey Methods. The objective of the Survey Methods curriculum is to equip statisticians with the wide range of skills required to design and implement surveys and censuses.	2	11 mos	none

Time Period	Activity	No. of CAPMAS staff	Length of study	Census staff time
FY 1983 (cont)				
September 1983-August 1984	Graduates of the NCC's EDP training program enroll in the Computer Data Systems curriculum at the Census Bureau's ISPC participant training program. During this training, the students will sharpen their skills as programmers, learn the latest techniques for program documentation and design, be exposed to a variety of hardware and software products in the U.S., and participate in the design and implementation of a processing system to edit and tabulate a live household and agriculture survey that the student administer as part of their graduate work. Nominees for this training should be CAPMAS staff who will be assigned as part of the programming team to implement the 1986 census processing system.	4	11 mos	none
September 1983-December 1983	Draftsmen from map production area of CAPMAS to attend special four-month program on Census and Survey Geography at Census Bureau.	4	4 mos	none

Time Period	Activity	No. of CAPMAS staff	Length of study	Census staff time
FY 1984				
January 1984	CAPMAS staff person responsible for EDP curriculum development at the National Training Center visit the National Computer Center (NCC) in Riyadh, Saudi Arabia to observe how the NCC successfully developed an ongoing EDP training program for both Central Department of Statistics programmers and outside users of the NCC centralized service bureau. Also CAPMAS staff person should review with the NCC training advisor the ISPC-NCC joint training program which trains data processing personnel over a two-year program in four phases - two phases in the U.S. and two phases at the NCC in Riyadh.	1	2 wks	none
January-April 1984	Senior staff from the NCC should be identified from the Network and Data Base Division to take formal training courses in comparative analysis of data base management systems, data base management administration, and the design and maintenance of applications on data base management systems. The training can be a mixture of university courses and commercially available courses. After completing the formal courses in data base systems (3 months), the same two technicians should visit several large computer centers that support the use of data base management systems for outside users. Visits should be arranged with government as well as commercial computer service bureaus and exposure should be to both centralized and decentralized (distributed) networks of data base operations.	2	4 mos	6 wks

Time Period	Activity	No. of CAPMAS staff	Length of study	Census staff time
FY 1984 (cont)				
March 1984	CAPMAS staff person who is responsible for sampling activities visit the Census Bureau to talk with persons who have recently gone through the redesign process and to collect documents on the same subject. Discussions also will take place with technicians who are familiar with relatively new sample design and estimation techniques.	1	2 wks	2 wks
May-July 1984	CAPMAS staff person responsible for EDP curriculum development to visit ISPC participant training program in Washington during the 4th and 5th academic sessions to observe how EDP students are being taught advanced topics in the EDP field and how they actually get hands-on experience in designing and implementing a processing system for the school's field survey exercise.	1	3 mos	6 wks
June-July 1984	The Director of the NCC and one senior manager in the Software Centre of the NCC should attend formal training courses in administration and management of EDP resources for large software development projects. After one month of formal training, the two staff should visit several software oriented data processing organizations to review firsthand, the techniques adopted in those organizations for efficiently managing large, multi-year software projects.	2	2 mos	1 wks

Time Period	Activity	No. of CAPMAS staff	Length of study	Census staff time
FY 1984 (cont)				
August 1984-July 1985	Member of CAPMAS Geographic Unit attend university to obtain degree in cartography. We suggest either University of Glasgow in Scotland or the Institute for Aerial Survey and Earth Sciences (IAC) in Enschele, Netherlands. After such training, this person could head the CAPMAS cartography unit.	1	11 mos	none
July-December 1984	CAPMAS staff involved in evaluation activities visit the Census Bureau for 2 weeks to discuss evaluation procedures.	2	2 wks	3 wks
September 1984-August 1985	4 more graduates of the NCC's EDP training program should attend ISPC's Computer Data Systems curriculum. This will produce a base of 8 fully trained programmers with practical experience to be used as a technical base for implementing the programs for the 1986 census processing system.	4	11 mos	none
September 1984-August 1985	2 more survey statisticians should be enrolled in ISPC's training program in Survey Methods.	2	11 mos	none

Time Period	Activity	No. of CAPMAS staff	Length of study	Census staff time
FY 1984 (cont)				
September 1984-August 1985	2 statisticians who are involved in the sampling area of CAPMAS attend the ISPC training program in Sampling and Statistical Methods. This curriculum provides both theoretical instructions and practical experience in sample design and methodology.	2	11 mos	none
FY 1985				
October-December 1984	Two senior systems analysts from the Software Centre of NCC who are identified as the team leaders for designing the 1986 census processing system should attend formal training courses on structured systems design, structured programming concepts, and structured documentation techniques. These courses are available commercially (like Yourden in New York) and will provide a sound base for those team leaders to estabish good standards and programming practices for the rest of the census programming team.	2	3 mos	3 wks
January 1985	The Director of NCC and a lead systems analyst, as well as the long-term EDP advisor would travel to the developing countries in the region (perhaps Morocco or Zimbabwe) to review the design and implementation of the processing system used to process their national population censuses. Two weeks would be spent in each country.	3	1 mos	6 wks

Time Period	Activity	No. of CAPMAS staff	Length of study	Census staff time
FY 1985 (cont)				
January 1985-March 1986	Identify a first cohort of 4-6 CAPMAS EDP students in the NCC training program that have some English language capability and that have mastered elementary EDP courses to enter the NCC-ISPC joint training program. First phase training in the U.S. would be 8 months of English language training arranged through the American Language Institute at Georgetown University (ALIGU). The second phase of training would be at ISPC taking coursework in structured COBOL computer programming and systems concepts of 4th generation computer systems. Elective coursework (based on student acomplishment) would include design of statistical tables and questionnaires as well as procedures for editing, coding and imputation. Students would return to NCC for third phase of training for continued specialized work in systems courses for CAPMAS' specific computer configuration.	4-6	15 mos	8 wks
March 1985	Senior systems analyst from the Software Centre of CAPMAS would travel to Washington for 1 month to work with ISPC software staff in developing systems design for modifications to be made to the CONTROL package for use on the 1986 Census. Work assignments for implementing changes to the package will be defined for programmers both at the Software Centre and at ISPC.	1	1 mos	none

Time Period	Activity	No. of CAPMAS staff	Length of study	Census staff time
FY 1985 (cont)				
July-August 1985	Senior systems analyst from the Software Centre of CAPMAS would travel to Washington for 2 months to integrate completed software modules into the enhanced CONTROL package and to work with ISPC software staff in developing systems design for modifications to be made to the CONCOR package for use on the 1986 Census. Work assignments for implementing changes to the CONCOR package will be defined for programming both at the Software Centre and at ISPC.	1	2 mos	none
FY 1986				
September-August 1986	2 more statisticians should be enrolled in the ISPC's training program in Sampling and Statistical Methods.	2	11 mos	none
March-April 1986	1 senior systems analyst from the Software Centre of CAPMAS would travel to Washington for 2 months to integrate completed software modules into the enhanced CONCOR package and to work with ISPC software staff in developing systems design for modifications to be made to the CENTS 4 package for use on the 1986 Census. Work assignment for implementing changes to CONCOR package will be defined for programmers both at the Software Centre and at ISPC.	1	2 mos	none

Time Period	Activity	No. of CAPMAS staff	Length of study	Census staff time
FY 1986 (cont)				
September 1986-January 1987	First cohort of 4-6 CAPMAS EDP students in the joint NCC-ISPC training program return to U.S. for final phase training in one of 7 particular areas of EDP expertise. Graduation from the program would take place at the successful conclusion of this phase.	4-6	5 mos	none
FY 1987				
November 1986	Senior systems analyst from the Software Centre of CAPMAS would travel to Washington for 1 month to integrate completed software modules into the enhanced CENTS 4 package.	1	1 mos	none
January 1987-March 1988	Identify a second cohort of 4-6 CAPMAS EDP students of the NCC for 1st and 2nd phase training in Washington in the NCC-ISPC training program	4-6	15 mos	none
FY 1988				
March 1988	Senior systems analyst from the Software Centre of CAPMAS would travel to Washington for 1 month to work with ISPC software staff in developing systems design for modifications to be made to the CENSPAC package for use on 1986 Census summary files. Work assignments for implementing changes to the package will be defined for programmers both at the Software Centre and at ISPC.	1	1 mos	none

Time Period	Activity	No. of CAPMAS staff	Length of study	Census staff time
FY 1988 (cont)				
August 1988	1 senior systems analyst from the Software Centre of CAPMAS would travel to Washington for 1 month to work with ISPC software staff to integrate completed software modules into the enhanced CENSPAC package.	1	1 mos	none
Sept. 1988-January 1989	Second cohort of 4-6 CAPMAS EDP students in the joint NCC-ISPC training program return to U.S. for final phase training in one of 7 particular areas of EDP expertise. Graduation from the program would take place in the successful conclusion of this phase.	4-6	5 mos	none

Other training or study tours may be arranged for specific topics as the detailed plans for the project are developed.

D. Commodities and Other Assistance

1. Cartographic Equipment

In order to upgrade the Cartographic capability of CAPMAS, it will be necessary to purchase equipment. We have identified the major equipment that will be required as well as estimated the approximate cost.

Light tables* (wooden frame with 24" x 36" frosted glass or translucent plastic with clear glass cover). One will be needed for each drafter with an extra one for layout work. We suggest purchasing ten initially. These tables probably can be made locally.

Approximate cost - $400 per unit if purchased in the U.S.

Map files* (steel 5-drawer stackable units with 43" x 32" x 2" approximate drawer size). We suggest initially purchasing 12 units with 4 bases and 4 tops.

Approximate cost - $400 per unit
- $80 per base
- $80 per top

Phototypesetting machine with English and Arabic fonts.

Approximate cost - $4,000

Reflecting projectors (one similar to Goodkin Swivel Top Projector and one similar to 17" Opaque Projecting Sketchmaster).

Approximate cost - $1,000 each

Vacuum Frame Contact Printer with light source (similar to Douthitt Heavy Duty model).

Approximate cost - $8,000

Photographic Processing trays and other equipment for photo lab.

Approximate cost - $4,000

Diazo Reproduction Machine (similar to Bruning 8700).

Approximate cost - $12,000

Polyester drafting film* .005 matt one side (similar to K & E Strabline) Roll 42" x 20 yards. We suggest 100 rolls be purchased initially.

Approximate cost - $100 per roll

Air conditioning units for photo lab and drafting area.
Approximate cost - not available (depends on size of area, etc.)

Miscellaneous drafting equipment to be determined by Cartographic Advisor. This probably can be purchased in Cairo at reasonable prices.
Approximate cost - $5,000

* Additional units of these items probably will be needed. The Cartographic Advisor will make that determination as to the project progresses.

2. Resource Materials for Analysis

CAPMAS wants to increase its capability to undertake demographic analysis. Resource materials and publications on demographic analysis to expand the CAPMAS library on this subject would be helpful.

3. Resource Materials for Evaluation

CAPMAS is planning to establish an evaluation unit to evaluate the 1986 census. Resource materials on this topic are necessary to provide adequate background information to staff members.

4. Computer Equipment and Supplies

Earlier in this report, it was stated that CAPMAS had a current operating budget for data entry equipment and computer hardware and software of approximately 750,000 L.E. It was also stated that the processing of the 1986 census will require additional data entry equipment as well as additional dedicated mainframe computer capability, and that the EDP Under-secretariat of CAPMAS was going to prepare an RFP for this new equipment. Information is not available from CAPMAS at this time to make a determination if CAPMAS needs assistance in obtaining the necessary equipment. This will be discussed between AID and CAPMAS at a later time. It is evident that CAPMAS will also need a substantial inventory of computer paper, ribbons, tapes, disks and diskettes, and program coding paper to process the census.

To specifically extend the EDP capability of CAPMAS beyond the traditional limits of the data processing areas (subject matter areas of CAPMAS feel that there are bottlenecks in getting requests for processing through the EDP shops), microcomputers should be procured to be inserted in both the EDP areas and the subject matter areas (especially in the demographic analysis unit) within CAPMAS. In view of the large number of statistical operations that are constantly ongoing, coupled with the enormity of the upcoming census operation, it can be assumed that CAPMAS could readily use 4-6 microcomputer units initially. Each unit with sufficient hardware peripherals and software language processors would cost approximately $5,000 - $7,500. This new capability could greatly enhance CAPMAS' ability to do significant analyses of its data products and also permit managers to plan effectively for new projects, control fiscal matters and manage existing resources.

5. Computer Software Products

For increasing the data analysis capability of CAPMAS, special purpose software packages like SAS and SPSGRAPHICS should be obtained. These are proprietory software products and carry a licensing fee for subscribers. Fees can run as high as $10,000 initially with annual renewal rates at a fraction of that cost.

Although the NCC already has IDMS, an ICL-produced data base management system, as part of its existing contract with ICL, it may be determined, after NCC staff receive formal training on other DBMS packages, that another system is more suitable to the statistical data base needs of CAPMAS and its users. If this is the case, the fees for obtaining these systems can range from $50,000 to $300,000.

Additional special purpose software packages should be requested for use on the microcomputer units. These packages would include such specialized needs as financial planning and management, resource tracking and utilization, cross-tabulation and report generation, data base management, statistical and demographic analyses, and graphical representation of data. A comprehensive set of packages would cost approximately $20,000.

6. Technical Documents

CAPMAS is in short supply of technical reference manuals and guides for use by the data processing staff. Commonly used references such as programming language reference manuals should be readily available to all programming staff. Under the current contract with ICL, only a minimum number of sets of reference documents are provided. There should be at least one set of complete programming reference manuals available for every 2 to 3 programmers. The NCC's Training Center is in need of a technical reference library from which EDP students as well as CAPMAS technical staff can draw contemporary texts, scientific journals, and weekly and monthly periodicals in the EDP field. ISPC at the Census Bureau has developed a suggested list of such materials that would be a beginning base for a technical reference library. This list containing titles, authors, publishers and prices will be made available to CAPMAS and AID.

7. National Accounts

The National Accounts program is of importance to CAPMAS. We recommend a 2-3 week visit by a National Accounts expert to assess the need for technical assistance in this area.

VI. USAID-CENSUS ADMINISTRATIVE RELATIONS

This report has been prepared under a USAID/Cairo PASA with the Bureau of the Census. The proposed program of technical cooperation would similarly be carried out under a PASA. The purpose of this section is to describe the proposed administrative arrangements among USAID/Cairo, CAPMAS and the U.S. Bureau of the Census.

A. Reports

At the end of each calendar quarter, a report will be prepared for USAID/Cairo and will include (1) a summary of activities during the preceding quarter; (2) a summary of anticipated activities during the forthcoming quarter, as well as a discussion of contingencies or uncertainties relating to the forthcoming quarter's work that need to be resolved; (3) a summary of any other issues or administrative concerns; and (4) a summary of expenditures during the preceding quarter. Actual financial billings will take place separately following standard PASA guidelines.

At the conclusion of each assistance visit or workshop, a trip report will be prepared in Washington and sent, via pouch, to USAID/Cairo. The trip report will summarize the purpose and accomplishments of the visit and list substantive contacts made during the stay in Cairo.

At several points during the project, technical reports on a variety of topics will be prepared for use by CAPMAS. These will generally be prepared in final form and reproduced in Washington, although draft reports will usually be completed in Cairo with copies to appropriate USAID and CAPMAS offices.

Resident advisors will prepare monthly activity reports and distribute copies to appropriate USAID/Cairo and CAPMAS offices. End-of-tour reports also will be prepared.

B. Evaluation

Due to the size and duration of the technical program, a mid-term evaluation is proposed in late 1985. At this point, all census preparations should be substantially underway for the 1986 census and the effectiveness of the technical cooperation, in support of planning and technical training should be reviewed, prior to the actual census implementation. The mid-term evaluation should be conducted by an independent organization.

Appendices

A. List of CAPMAS Officials Consulted and CAPMAS Organization Chart

B. NCC/EDP Organization, Function and Staffing

C. 1976 Census Content and Procedures

D. Egyptian Census Mapping Program

D-1 Some Considerations in Setting Up a Census Cartographic Office

CAPMAS OFFICIALS CONSULTED

Dr. Awad Mokhtar Hallouda

Ismail Raafait

Gilhad El Mikaaty

Dr. Farag Sedky

Saad Zaghloul El Zomar

Saad Zaghloul Amin

Saad El Shaikh

Abd El Salam Sultan

Rafaat El Denoushury

Kamal Ali Farag

Mrs. Nabila Ahmed Zaki

El Said Hafez

Mohamed Gad El Maurila Said

Shawky Fareed Mind

Mrs. Nagla Adly Salem

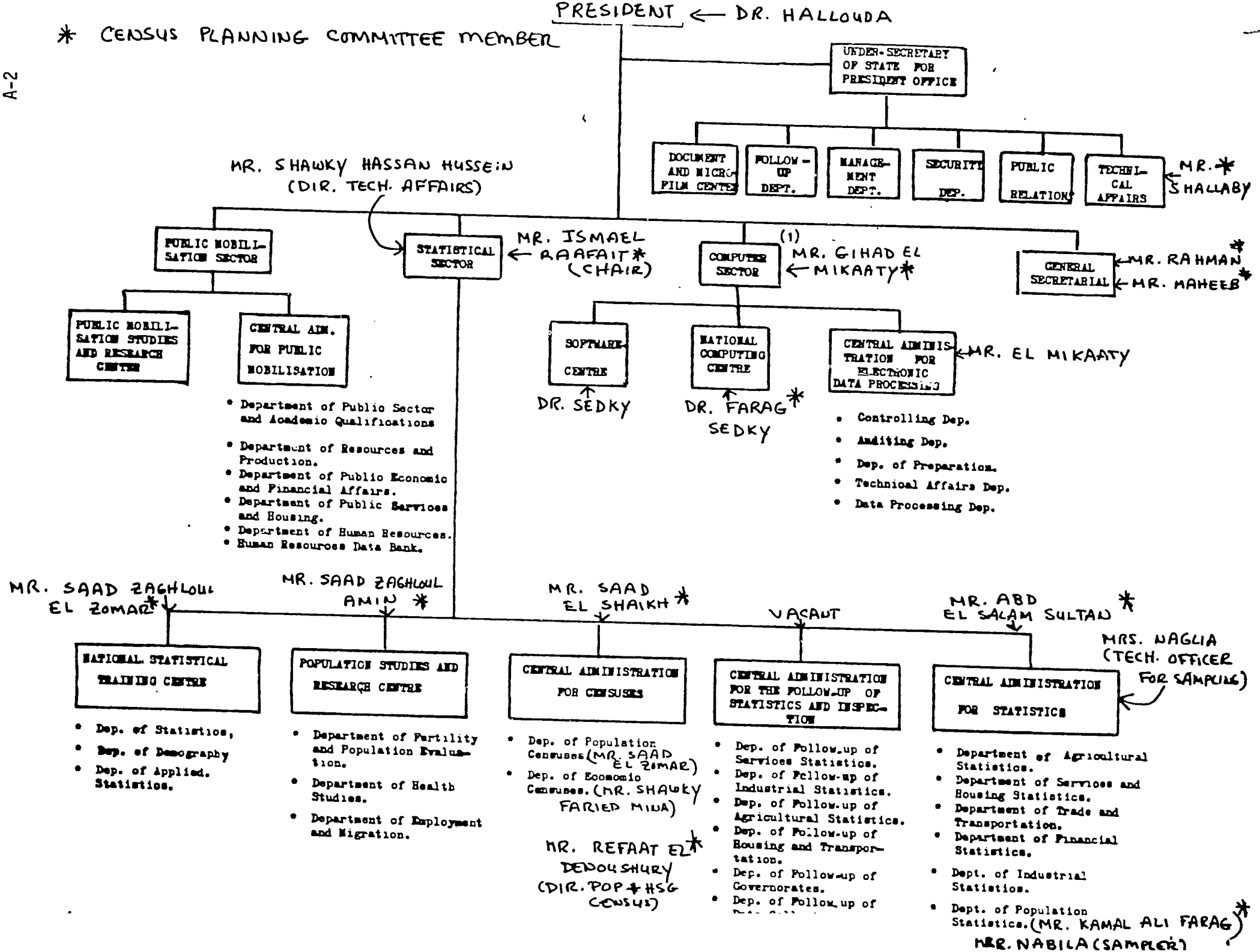
Shawky Hassan Hussein

Bahgat Awad El-Morsy

Mohamed Abd-El-Fattah-Foda

Abdelhamid Shallaby

* CENSUS PLANNING COMMITTEE MEMBER



NCC/EDP ORGANIZATION, FUNCTION, AND STAFFING

History

1966 - First computer installed -- an ICL 1904 with 16K words of memory -- updated to 32 K in 1968.

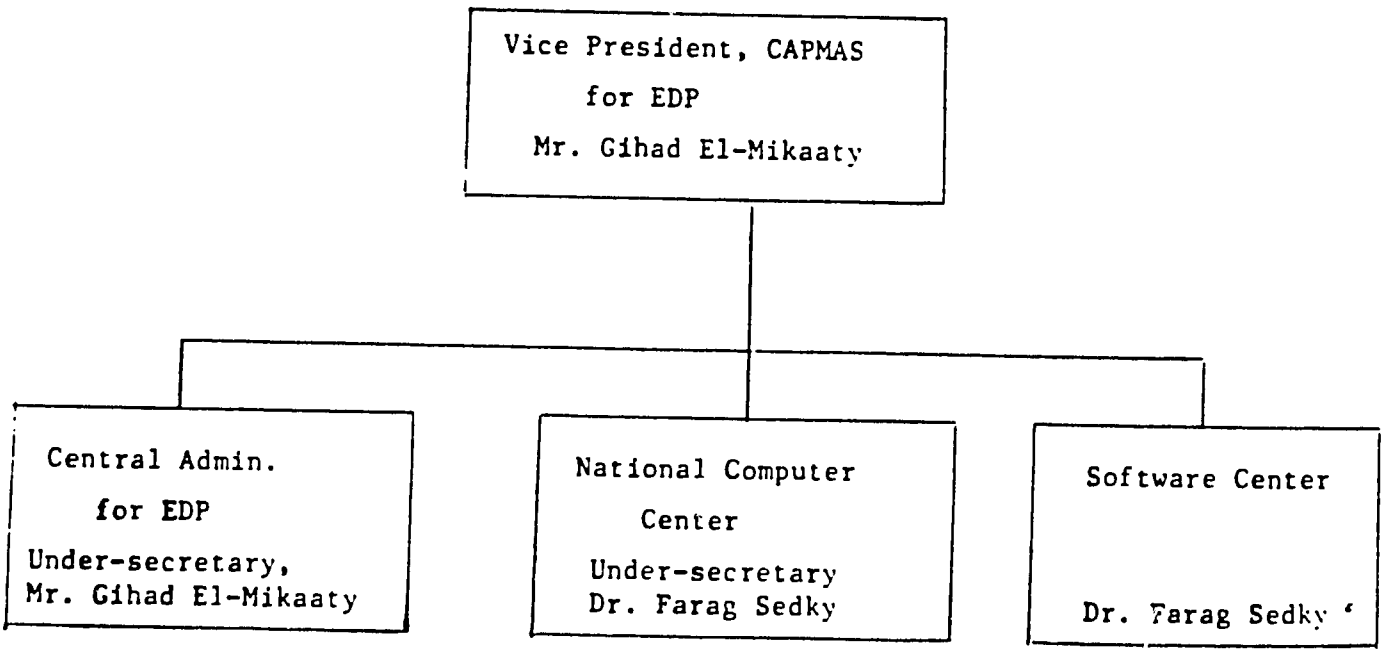
This was the first 3rd generation computer in the Republic of Egypt.

The EDP area of CAPMAS was started with 24 staff members, none of which are still at CAPMAS.

Present technical staff is about 70, 20 having experience and 50 newly trained. There are only about 2-3 very experienced staff in each department.

The major problem with staffing is the continual large turnover: the private sector salaries in computing are established by law. Every effort should be made to change government regulations to substantially increase the personal compensation of government employees in technical positions such as EDP.

EDP ORGANIZATION



CENTRAL ADMINISTRATION FOR EDP

Under-secretary of state, Mr. Gihad El-Mikaaty

Equipment

Computers

1. ICL 2904 (leased since 1977) with 48K words memory; processing speed 0.2 MIPS

   - o 7-track 556 bpi tape drives
   - o 9-track 800/1600 bpi tape drives
   - o 2 1500 lpm line printers

   This machine will be removed soon (it was partially used to process the 1976 population census).

2. ICL ME29 0.75 megabyte memory (leased); processing speed 0.7 MIPS

   - o 3 30megabyte disk drives
   - o 3 60megabyte disk drives
     (portable disk packs are used to move between both types of drives)

   Current estimates are that the machine is 80 percent utilized.

   Plans are to connect this machine with the ICL 2966 at the National Computer Center to share peak loads. Also it is planned to have 4 CRT terminals hard cabled to this machine for CAPMAS users.

Data Entry

1. ICL key-edit programmable system (donated by the U.N. in 1975)

   - o 6 disk controller systems each managing 12 key stations; a total of 72 stations

2. Mohawk Data System (MDS) key-to-tape (leased)

   - o 12 key stations; tapes incompatable with ICL

3. NCR key-to-disk (leased)

   - o 2 MDS disk controllers with 12 key stations each total 24 stations; 2 tape units for merging

   Total 108 key stations with 150 staff as operators and verifiers.

Functions of the Central Administration for EDP

1. All current survey statistical processing for CAPMAS

   - o all data entry for CAPMAS and NCC
   - o 5-6 million data records processed annually

     - o vital statistics
       - births 1.6 million records
       - deaths .45 million records
       - marriages .4 million records
       - divorces .1 million records
     - o trade statistics 1.2 million records
     - o industrial statistics .76 million records
     - o annual labor force .25 million records

2. Payroll record processing for CAPMAS

   - o 500 record updates for monthly reports to Min. of Treasury (due the 18th of each month)
   - o 4000 employee record revisions at end of fiscal year for upgrades to salary and position information

3. Consultation to government, public, and private agencies

   - o computer needs
   - o procurement
   - o EDP organization
   - o systems design
   - o evaluation and feasibility studies

4. Inspection of other agency computer sites

   - o reports on status
   - o recommendations for improvement

5. Set EDP standards for other agencies

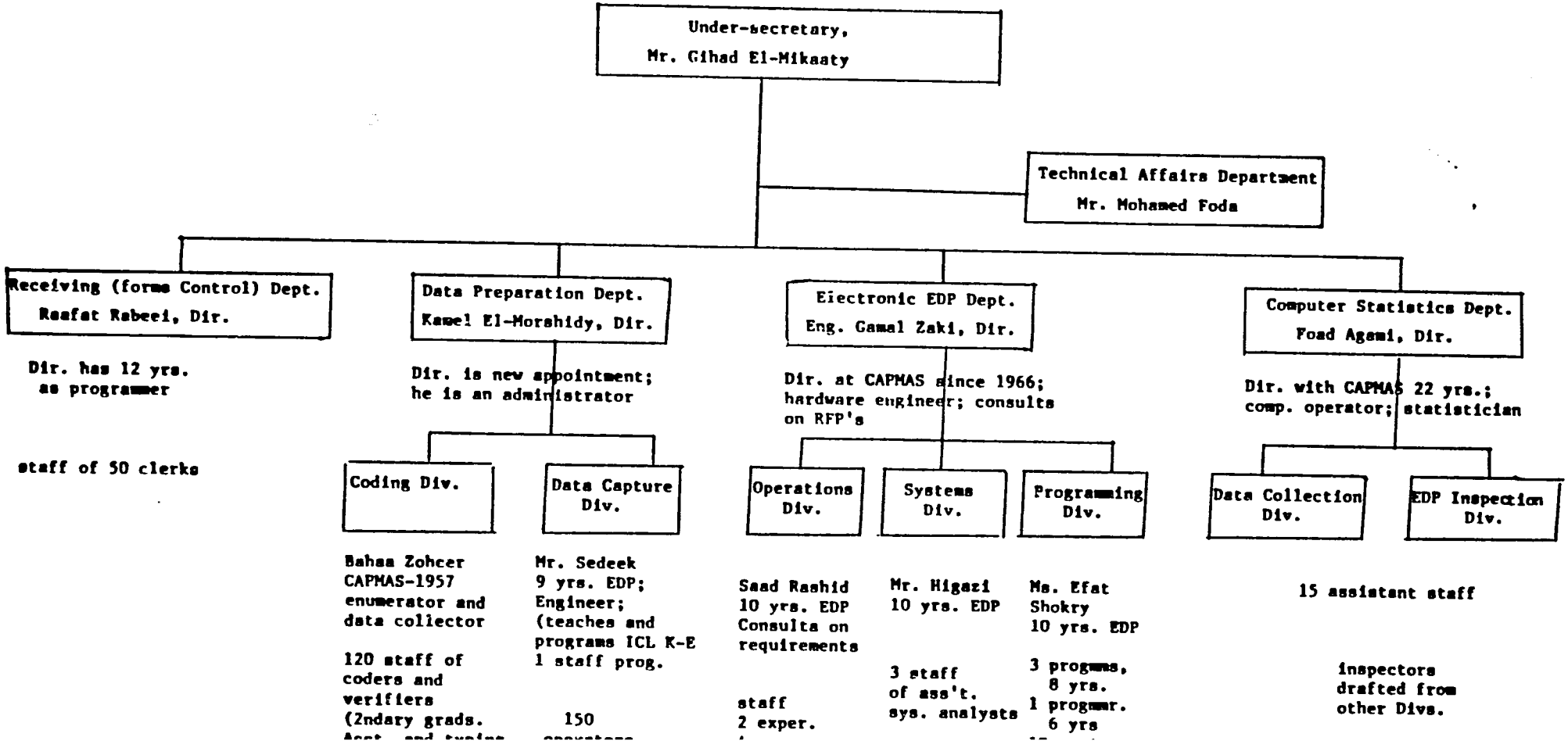
   - o July 1983 will publish manuals for managers and technicians

6. Evaluate and identify CAPMAS future EDP needs

   - o July 1983 a needs statement on EDP through 1990 will be prepared
   - o an RFP will be released later in 1983 to reconfigure entire computer facility of CAPMAS
   - o vendor responses to RFP expected by early 1984

ORGANIZATION

Central Administration for EDP



Function of Technical Affairs Department

- o Manage and coordinate overall activities of Central Admin. for EDP
- o Overall scheduling and coordination of 1986 Census processing

Function of Receiving Department

- o Check-in of census returns
- o Check-in of current statistics returns
- o Control of flow of returns processing
- o Review outputs (diaries) of validation and correction runs on the computer

Function of Data Preparation Department

- o Code and verify all census and current statistics returns
- o Key all census and current statistics forms onto disk or tape, and verify

Function of Electronic EDP Department

- o Operate the ICL 2904 and ICL ME29 computers and process all current statistics and administrative data for CAPMAS
- o Design of systems to process current surveys such as vital statistics (being redesigned in COBOL); trade statistics (designed in PLAN in 1974); industrial statistics (designed in PLAN in 1972); labor force survey (redesigned each year in PLAN and COBOL); consumer expenditure survey (being redesigned in COBOL)
- o Design system to process agriculture census in 1983
- o Implement programming systems for all above including CAPMAS payroll of 4,000 employees

Function of Computer Statistics Department

- o Conduct annual survey (30 page questionnaire) of 300 data processing centers in all agencies in Egypt; required reporting that is collected in April and tabulated by July; results are kept confidential in Under-secretary's office.
- o Perform on-site inspections of EDP operations at other agencies measuring utility of equipment, work load, and identifying problems. CAPMAS issues a report making recommendations for improvement of operations.

NATIONAL COMPUTER CENTER

Under-secretary Dr. Farag Sedky

Equipment

Computers

1. ICL 2966 (leased) with 4 megabytes memory; processing speed 2 MIPS (air cooled system) Installed in June 1982

   - o operating under DME operating system currently able to handle up to 64 jobs concurrently. Will be upgrading to VME and CME soon
   - o 3 60 megabyte disks - used as system packs
   - o 1 60 megabyte disk - for backup to system
   - o 5 200 megabyte disks - for public use
   - o 1 200 megabyte disk - for backup
   - o 8 9-track 800/1600 bpi tape drives
   - o 3 1500 lpm line printers

2. ICL 2960 (leased) with 1 megabyte memory; used only as a backup system; will be used to test new VME operating system before it is installed on the 2966 machine.

At peak loads the ICL 2966 cpu is 50 percent utilized averaging 300 jobs per day from an average of 90 users.

All the machines are leased under a contract with ICL that terminates in June 1984. After that it will be a year to year agreement.

The computer center operates on two shifts from 8am - 8pm six days per week. Each Monday preventive maintenance is performed on the machine by ICL engineers.

Terminals

12 CRT terminals are in the NCC building
10 of these are hard cabled to the CPU
2 are connected through a telecommunications port
9 other telecommunications ports to the CPU are at remote user sites in other agencies; at each remote site a microprocessor with 28k memory controls the local terminals and transmits data through a MODEM to the NCC mainframe computer. Each microprocessor currently supports 2 terminals.

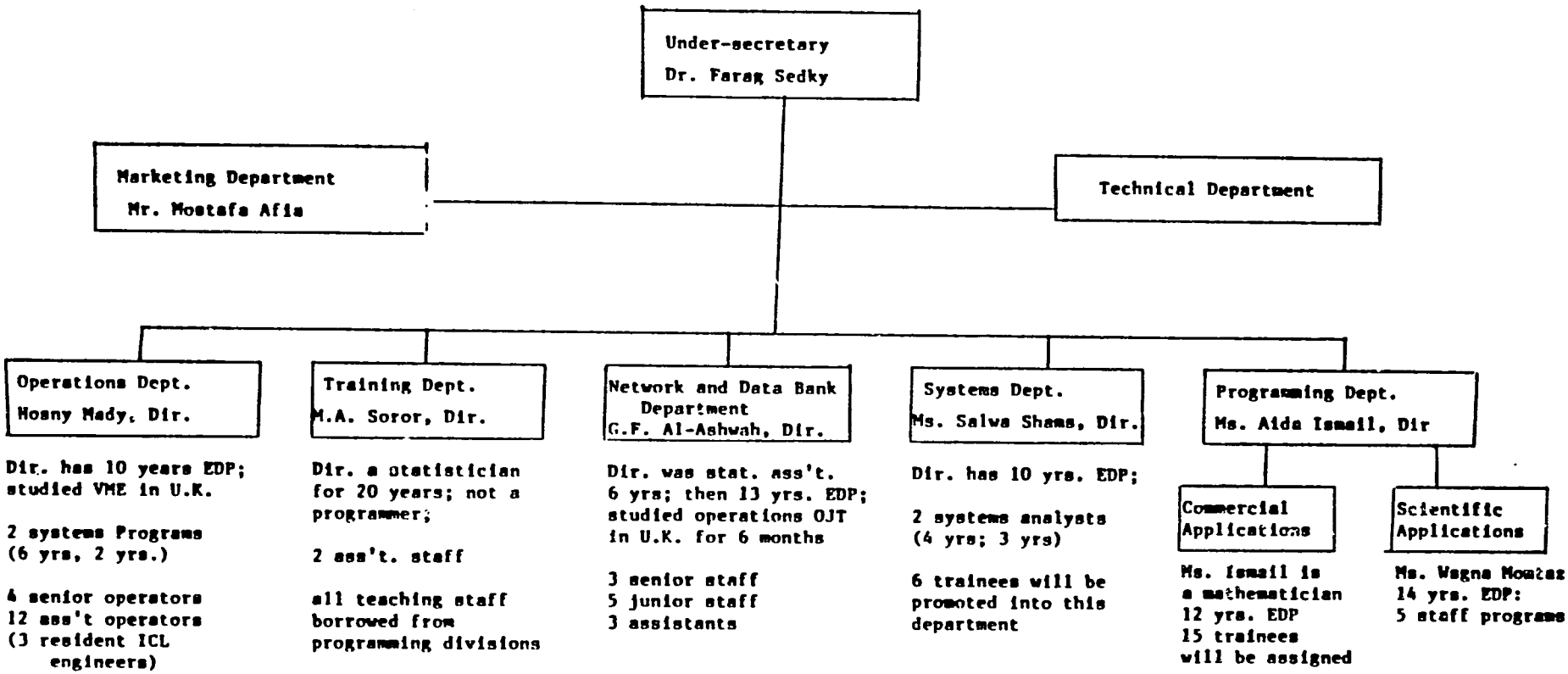
Function of the National Computer Center

1. A non-profit computer service bureau for all government, public, and private agencies

2. A full backup for overflow work from the CAPMAS EDP Department (large jobs such as the 1986 Census, the World Fertility Survey and the Health Map projects are run on this computer)

ORGANIZATION

National Computer Center



Function of Operations Department

- Operate and maintain ICL 2966 and ICL 2960 computers running about 300 jobs per day.
- Maintain tape library of 6,000 reels
- Operate and maintain systems software including DME operating system, utilities, processors, and the IDMS data base.
- Operate and maintain 10 remote user sites through microwave telecommunications to the ICL 2966.

Function of Training Department (National Training Center for Informatics)

- Support local CAPMAS EDP training need
  once each year about 120 CAPMAS employees apply for EDP training
  These applicants are tested for
  1. EDP aptitude
  2. English proficiency review

  About 75 applicants are accepted for training (all usually have University degrees)

Elementary Training

Introduction to computer technology
24 hrs. lecture

PLAN (assembler) programming
80 hrs. lecture 60 hrs. lab

COBOL programming
80 hrs. lecture 60 hrs. lab

FORTRAN programming
80 hrs. lecture 60 hrs. lab

ON-THE-JOB-TRAINING
6 months

Systems analysis
80 hrs. lecture 60 hrs. lab

Workshop assignments in programming languages are sample validation, update, and tabulation programs

Workshop assignments in the systems analysis course are commercial applications designing inventory or production control systems.

Each student must finish training -- achievers are given permanent programming positions; others are given quasi-clerical jobs (coders or become technical assistants)

Advanced Training

Achievers out of the elementary training program that have done well with a few years experience in a permanent programming position are nominated to attend the 1 year ISPC program in Computer Data Systems, or be trained in specialized software packages.

- Support of Outside Users' training needs
  Evening Courses (5-8pm) 4 days per week
  - Introduction to computer technology
    60 hrs. lecture 48 hrs. lab
  - COBOL programming
    60 hrs. lecture 48 hrs. lab
  - FORTRAN programming
    60 hrs. lecture 48 hrs. lab
  - Systems analysis
    60 hrs. lecture 48 hrs. lab
  - COBOL (disk access methods)
    3 weeks
  - Systems Design using Disk
    3 weeks

  Special courses - taught by guest lecturers from University
  - Management Information Systems
  - Data Structures
  - Structured COBOL programming techniques
  - Structured Systems Design

- Training Department needs
  - 2 permanent staff (currently a budget problem)
  - training aids
    microcomputers; computer assisted instruction; full reference library; manuals; text books

Function of Network and Data Bank Department

- To provide on-line access to CAPMAS statistical information to outside users
- To provide information system network services

IDMS data base system (CODASYL version adapted for ICL) is on the ICL 2966 but will have to be upgraded from the 1900 version to the 2900 version when the VME operating system is installed on the ICL 2966.

Current applications of IDMS - to be implemented in 1983
- detailed annual summaries of industrial statistics
- monthly and annual summaries of trade data (users want time series which is currently a storage problem with present equipment)
- Egyptian commodity indices
- an outside user is implementing a personnel system

Future applications of IDMS
- It is Dr. Holluda's goal to put all CAPMAS data products on-line under IDMS.

Problems
- Only 1 NCC staff member is experienced under IDMS: he had 3 weeks basic training, 2 weeks advanced, and 6 weeks OJT in Liverpool)
- Outside users have no experienced staff
- Support software for networking data access from the data base is not sufficient
- Noise in the communications lines drops connections for outside users.

Needs

- o Training for staff in comparative analysis of DBMS' for statistical applications as well as on-site inspection of other service bureaus that provide data base user support service.

Planned networking

- o CAPMAS wants to start with 3 or 4 computer sites at local governorate CAPMAS offices with possible communications to the CAPMAS mainframe computer in Cairo
  purpose
  1. to process local area data
  2. for local user data support services

Functions of Systems Department

- o Systems analysts design software systems for outside agencies;
  Health Map
  a joint Ministry of Health and U.S. NCHS project

  to collect survey data in 5 phases of 20,000 households per phase per year. Doctors, nurses and social workers screen respondents asking 11 personal characteristics, household characteristics, diet, fertility, infectious diseases, hospital visits, etc.

  5 million records per phase are produced and 150 tables are produced. They are not yet weighted for phase 1.

  Its an all COBOL system with 7 validation modules, and 14 tabulation modules. Ms. Aza Taher is responsible for the design of the system with 10 assistants helping her.

- o Feasability study and cost/benefit analysis of redesigning CAPMAS COBOL payroll system to generalize it to be used as a standard system for for all government agencies. Ms. Salwa Shams has responsibility for this project.

- o Consulting with government sector on inventory control system
  Mr. Rizk Ahafzz has this responsibility

Function of Programming Department

- o Commercial programming (COBOL) for outside users (Health Map)
- o Scientific programming (FORTRAN) support services for outside users

SOFTWARE CENTER

Director, Dr. Farag Sedky

History

Established in 1974 to develop an assembly language (PLAN) tabulation system for the 1976 population census. Since that time this system has now been generalized for use on the other surveys of CAPMAS. Also, developed the system to process the Egyptian World Fertility Survey between 1979-1982.

Function

- o To design processing systems for major censuses, in particular the 1986 population census. Ms. Abla Afifi and Ms. Zenab Gwareeb will share responsibilities for this design.
- o To evaluate other generalized software systems for use at CAPMAS and provide for training in their use
  - . SPSS workshop - accomplished
  - . CENTS 4 workshop - planned
  - . CONCOR workshop - planned
  - . PERT/CPM - installed, no users yet
  - . PROSPER (financial analysis) - for future Evaluation
- o Design other generalized systems as required

CAPMAS EDP STAFFING SITUATION

Training

The last training cycle started 55 students and graduated 40 students in December 1982. They are now in on-the-job training throughout CAPMAS departments.

The current training cycle will finish 30 more graduates in summer of 1983, but it is estimated that only 15 of them will stay in EDP at CAPMAS, the others will be put in other jobs.

Staff capabilities

Dr. Sedky ranks systems analysis capabilities in staff in the following order:

- o Mr. Abo El-Fadi Hammad, 45 yrs. old, has 23 years with CAPMAS. He now is head of the HP-3000 computer site at the Population Resources Center of CAPMAS (Public Mobilization). He is now designing two data base applications in IMAGE, the HP DBMS package. Mr. Hammad started at CAPMAS with Mr. Foda and Mr. El-Denonshurg. He has technical capability to design 1986 census processing system. He is a good teacher and a COCENTS expert. Mr. Foda will be relied on heavily for census system management.
- o Mr. Hosny Mady (Dir. NCC Operations Department)

- Ms. Abla Afifi (Software Center)
- Ms. Zenab Gwareeb (Software Center)
- Mr. Higazi (Dirl, Systems Div. of Central Admin. for EDP)
- Ms. Aido A. Rahman NCC Programmer
- Ms. Effat Shokry EPP Programmer

CAPMAS EDP SYSTEMS EXPENDITURES

There is an existing unified contract with ICL which is due to be re-negotiated in June 1984. This contract covers the leasing of all four ICL computers plus software and maintenance. The contract price is 58,000 L.E. per month.

Including the rent on other data entry equipment, the total hardware and software expenditures per year is estimated to be 750,000 L.E.

There are many concessions in the contract with ICL because CAPMAS is a long time client and one of the largest ICL sites outside of the United Kingdom.

ICL provides only a limited number of manuals and reference materials under the present contract. CAPMAS has to XEROX other copies. There are still not enough for the present technical staff.

Future EDP Plans of CAPMAS

CAPMAS has a five-year plan to begin to expand its EDP capability to regional and local governorate CAPMAS offices.

CAPMAS would like to see regional and local offices develop capability to collect, compile, and analyze data not only for national statistical needs, but also for local statistical needs. This eventually would include putting computing equipment in these offices and having them transmit data back to Cairo. It would be necessary to develop local staff to operate computers and write software systems to process data. For national statistical applications CAPMAS would centrally develop the software needed and install it at the local level.

CAPMAS would start the computerization process with a few regional centers like Alexandria, the major seaport of Egypt where most trade statistics are generated.

CAPMAS submitted a request to the former AID/Cairo Mission Director, Brown in 1981 requesting $600,000 for a 1-year feasability study to look at a regional processing center at Alexandria -- the request was focused towards economic trade statistics.

AID has no recollection of such a formal request from CAPMAS.

CAPMAS coordinates all requests to AID through Mr. Foad Iskander, Under-secretary of State for the Treasury.

CAPMAS ESTIMATE OF COMPUTER NEEDS FOR 1986 CENSUS

Dr. Sedky estimated that 8,500 hours (wall clock hours) of computer time (on an ICL 1906S and an ICL 2966 operating at 2 MIPS (million instructions per second))was used to process 36 million population and 8 million establishments in 1976.

Because of the size of the questionnaires in 1976, two records had to be created for each person interviewed, making 72 million population records and 16 million establishment records; this equals 88 million records; adding data entry verification makes a total of 93 million records.

In 1986 it is estimated that the population will be 50 million, and with 8 million establishments the total number of records to be entered and processed will be 120 million (assuming the same type questionnaires are used as 1976 requiring 2 records per person). Adding 20 percent for a sample verification at data entry time and for margin of error in the population estimate, there will be 144 million records to process in 1986.

CAPMAS is setting a target schedule within which the data entry is to be completed within 16 months and final tabulations for the entire Republic completed within 18 months of the returns coming into CAPMAS from the field. This is an extremely ambitious schedule!

To meet this schedule the following capability is required:

Data Entry

9 million records per month must be keyed making the required output per day at 450,000 records. With two shifts per day producing 225,000 records per shift (figured at 800 records per operator per shift), then 280 operator stations at a minimum are required to be operational 12 hours per day. It is, therefore, estimated that 300 key stations of the same type and capability be acquired to handle the data entry load.

Computer Processing

As 8,500 hours were used in 1976 on a 2 MIPS processor, then with 50 percent more records expected in 1986 approximately 13,000 hours of computer time will be needed at 2 MIPS of processing power.

If computer operations are extended at NCC from the present two 6-hour shifts per day to three 6-hour shifts per day, six days per week, then 722 processing days would be necessary equalling nearly 3 processing years (assuming 240 work days per year). If 2 computers each having 2 MIPS processing power are available and totally dedicated to the population and establishment census processing, then the work could conceivably be accomplished in 18 calendar months.

Dr. Sedky feels that if 2 machines are available inparallel, each with a minimum of 4 megabytes of storage and processing at a minimum of 2 MIPS, then the census work will be completed in a timely fashion. However, there are machines available on the market today that are processing at rates of 10+ MIPS, and with an increase in operating hours up to 24 hours per day during peak processing periods possibly one mainframe dedicated to the project would be sufficient.

CAPMAS feels that the new system must be identified by June of 1984 so that processing staff will have 4 to 6 months to train on the new equipment before they must begin to design the processing system for the 1986 Population Census. If the population census data is kept around November 1986, then this would provide two years for the systems team to properly design, develop, and test the entire processing system before any data came in from the field.

Depending on data entry and computer equipment selected, a substantial volume of magnetic tapes, hard disks, floppy disks, ribbons, and printer paper will be required for the processing.

1976 CENSUS CONTENT AND PROCEDURES

The 1976 census of population and housing was conducted in November 1976

1. Content

All information was collected on a 100-percent basis. The population census items included:

- Name
- Sex
- Relationship to head
- Religion
- Nationality
- Birth
  - Year of birth
  - Age
  - Place of birth
- Residence
  - Length of time, current residence
  - Previous residence
  - Cause of change
  - Residence as of June 5, 1967
- Marriage
  - Marital status
  - Age at first marriage
  - Number of wives
- Fertility
  - Years married
  - Live births
  - Still alive (children)
- Education of husband
- Education level
- School attendance
- Employment status
- Place of work
  - Name of establishment
  - Sector
  - Industry
- Occupation
- Length of time, occupation
- Place of work or study
- Transportation to work/study
- Visible infirmities

The housing census items included:

- Nature of occupancy (owned/rented)
- Number of rooms
- Toilet facilities
- Use of dwelling
- Water supply
- Kitchen facilities
- Type of dwelling
- Amount of rent
- Electricity supply
- Bathroom facilities

The establishment census items included:

- Address of establishment
- Description of establishment
- Commercial name of establishment
- Owner or holder of establishment
- Nationality of owner
- Sector of establishment
- Legal status of establishment
- Head office, branch, or single establishment

Number of branches
Economic activity (industry)
Number of persons engaged in establishment
  Owners
  Employees

2. Census Staff Organization

The "Chain" of the census staff is as follows:

Chief of Project
↓
2 Assistants
↓
Inspector generals
↓
Supervisors
↓
Inspectors
↓
Assistant inspectors
↓
Registrars (crew leaders)
↓
Enumerators

The Chief of Project, his two assistants, the inspector generals, supervisors and inspectors were permanent CAPMAS staff. There were 11 inspector generals in 1976; the number was determined by area and population of the governorates. Each supervisor was responsible for 2-3 kisms (districts) in the urban governorates; in the rural areas there were 2 for each governorate. Each inspector was responsible for one kism or one markaz (part of a kism) or part of a markaz. Size was the determining factor. Assistant inspectors were responsible for 4-5 registrars (crew leaders). Each registrar was responsible for 4-7 enumerators.

3. Schedule of Activities, 1976-1977

3 July	- 5 August	: Central training for inspector generals, supervisors, and inspectors
30 July	- 22 August	: Numbering of streets
28 August	- 2 September	: Assistant inspector training
3 September	- 22 September	: Numbering of buildings
2 October	- 6 October	: Registrars training

7 October	– 30 October	: Registers of households and establishments created
2 November	– 7 November	: Enumerator training
8 November	(Midnight)	: Census Day
23 November	– 26 November	: 2nd enumeration visit (verification of Census Day)
27 November	– 29 November	: Check-in materials
8 December	– 23 December	: Return materials to CAPMAS (for storage)
6 December	– 16 December	: Preliminary data to CAPMAS
25 December	– 23 January	: Inspectors return to CAPMAS
March 1977		: Preliminary counts issued (based on field counts)
May 1977	– December 1978	: Manual coding
?	– March 1979	: Data entry

. Description of Field Activities

(a) 30 July - 22 August - The inspector generals number all streets and roads in their areas.

(b) 3 September - 20 September - The assistant inspectors number all buildings in their areas. This is done by physically painting a number on the outside of the building. Information also is obtained from the person responsible for the building on how many household units are in the building, kind of building, ownership, use, number of floors, utilities, etc.

(c) 7 October - 30 October - Registrars (crew leaders) visit every building and every unit in the building to obtain information about the unit and to identify each unit. Number of units in building is written on outside of the building. At this time any establishments also are identified and listed.

(d) 8 November - 22 November - Household questionnaires are completed by enumerators. Average workload is 200 - 250 households per enumerator. Individual questionnaires are completed for persons not in households (hospitals, prisons, etc.).

(e) 23 November - 26 November - All households are visited again to verify members and all characteristics as of Census Day. Questionnaires are corrected as appropriate.

5. Quality Control of Data Collection

Registrars reviewed 5 percent of the enumerator's work. In turn, the assistant inspectors reviewed 5 percent of the questionnaires; then the inspectors reviewed 5 percent of the questionnaires. (Presumably this was not the same 5 percent.) Errors were corrected when found. Essentially this seemed to amount to a spot-checking of the enumerator's work.

6. Preparation of Preliminary Data

Preliminary data were obtained by summarizing data from the Household Questionnaire. This was done by transcribing the appropriate information to the bottom of the questionnaire and then transferring this data into a separate book, one line for each household. As far as we could ascertain, all calculations were done using mental arithmetic; few if any calculators were available. These results were summarized successively by the assistant inspectors, inspectors and supervisors.

Preliminary data are published at the governorate level only, showing total population, urban and rural, male and female.

These data are field counts that were done manually. The tallies were checked on a 5 percent basis throughout. It should be noted that the final counts eventually showed discrepancies with the preliminary counts. This was probably due to the more accurate counts produced by computer processing of the final results.

7. Maps

Sketch maps showing boundaries of the shiakahs (small geographic areas), with the major streets within the shiakah, were used by the Inspector Generals as they numbered the streets. The maps were used only as a guide to the field work. Field workers, other than the Inspector Generals, did not have maps for their use.

8. Manual Processing

There was no manual editing done on the census questionnaires once they were returned from the field.

(a) Receipt and Distribution

This unit controlled the flow of work through the manual processing system. There were 40 persons per shift, two shifts a day, 6 days a week. Basically this unit had three functions:

(1) Receipt from storage;
(2) Geographic coding of booklet (EA) covers;
(3) Check serial numbers in household; enter number of males/females on questionnaire.

The productivity of this unit was 1 enumerator area (EA) per shift per worker (an enumerator area = 200 - 250 households). As to verification, there was one supervisor for each 4 workers; the supervisor checked 20 - 30 percent of the group's work.

(b) Coding

The manual coding operation began in May 1977 and was completed in December 1978. Coding was done by 1500 university graduates, women who were fulfilling their public service obligation. There

was an average of 500 coders per shift; absenteeism was high, about 20 percent average. Verification of coding was done on a 100 percent basis throughout, with 100 percent rechecking done on verifier's work during the first month; then gradually reduced to 10 - 20 percent. Coders wrote in red pencil across enumerators' written entries, verifiers wrote in blue pencil over that, and recheckers wrote in green pencil over that.

9. Data Entry

Data entry (keying) was done using 3 types of equipment; (1) ICL key-edit (key-to-tape); (2) Mohawk MDS (key-to-tape) and (3) NCR KDS (key-to-disk). No editing capabilities were utilized to correct fields. There were 120 data entry stations per shift, with 2 shifts per day with 500 person-records entered per person per shift for a total of 120,000 person-records per day entered. Verification was done on a 100 percent basis at the beginning, but this was later relaxed to 10 percent. Data entry was completed in March 1979, 3 months after the coding stage was done.

10. Data Editing

All editing of data was carried out in the computer; however, only intra-record checking for consistency was done; consistencies were not checked within households. There were no cold deck or hot deck imputations done. This decision was taken primarily because of the computer used in 1976 did not have enough memory to retain large imputation matrices.

Several demographers, including some staff from the Cairo Demographic Center, worked with CAPMAS staff to determine edit and imputation rules applicable to the Egyptian population.

Editing (and tabulations) went through 4 major revisions after CAPMAS staff reviewed preliminary results.

11. Tabulations

To produce the 1976 census tabulations, a custom table system was written in assembler language that was driven by parameters similar to CENTS I. The final tables, with descriptions for publication, were all hand-posted and typed prior to being published.

A total of 83 tables were produced by the computer, with 53 tables published. The English language publication of these tables now is being printed. Of the published tables, eight contained village level data, twenty contained shiakah level data, and thirty-three contained data at the governorate level. There are two publications for each governorate and a total volume for the Republic.

A. Objectives of a Mapping Program

There are three principal areas where maps can be very useful in a statistical data-gathering operation: census field enumeration, survey sample selection, and in the publication of statistical results.

In census field enumeration, maps can be used to make enumerator assignments. Each enumerator is assigned a specific area and given a map of that area. This is more efficient and results in much better coverage than other methods (prelisting, etc.). In Egypt, for example, it would reduce the workload by eliminating the need for several field visits to each area to compile the prelists (as was done in the last census).

In most sample survey work maps are indispensable in the sample selection and maintenance process. Area samples using maps can be kept up-to-date much easier than a sample based on a list. CAPMAS is presently experiencing problems with its sample survey program because it is based on a list sample. Maps are also useful to aid the interviewer in locating the sample units (and/or segments), particularly in areas with poor address systems.

Maps accompanying the published data can serve several important functions. They show the location and boundaries of the administrative and statistical areas referenced in the tabulations. Presenting the data on maps can identify geographic relationships not readily apparent in the tabulations

B. Present Capabilities

The Geography Unit at CAPMAS consists of the head of the unit and four drafters. None of the staff has formal university training in cartography. They have minimal equipment (drafting pens, rulers, etc.). After the workshop we left some additional equipment with them. They do not have adequate storage facilities for reference maps or completed maps nor do they have any photographic reproduction facilities. They do have access to a diazo machine in another office of CAPMAS.

The Geography Unit staff is much too small to handle the task of preparing the maps for the 1986 Census. The lack of anyone of the staff with university cartographic training (or equivalent experience) is a serious drawback. Such a person could provide higher level technical training to the staff as well as oversee the map production work. Equally important is the fact that they do not have the facilities or equipment needed for a large-scale (or even a modest scale) mapping program. The limited number of maps they have produced to date seem to have been used only in their publication program.

C. Suggestions for Upgrading Capabilities

1. Organization and Staffing - If CAPMAS intends to institute a mapping program for census and survey operations, it will have to greatly increase the size of its Geography Unit staff. Such a staff should be

organized into subunits in a manner similar to that suggested in Mapping for Censuses and Surveys or Popstan. For example, three major subunits could be formed to handle planning, map production, and source material acquisition (map library). It is particularly important to establish a unit to acquire source materials (maps and airphotos). This source material is essential to produce the census maps. For practical and economic reasons it is preferable, whenever possible, to copy selected information from various sources (maps or airphotos) to prepare the census maps rather than make a completely original map from field surveying. Without the ability to use this source material, preparing maps for the census would be prohibitively expensive and time consuming. All source materials must be catalogued and stored in an orderly, consistent manner and in a clean, dry environment to minimize deterioration and distortion.

The principal responsibilities of the training staff are to develop map production schedules, budgets, staffing plans, and plan equipment acquisition.

The cartographic (map production) staff should be headed by a trained cartographer. This group would be the largest staff within the Geography Unit. The drafting staff can be trained on site. It is not necessary that they be formally trained cartographers.

3. Training - The mapping workshop given in January 1983 provided training in the goals and organization of a census/survey mapping program as well as in cartography and related skills. CAPMAS would need additional training assistance when their Geography Unit staff has been enlarged and organized into functional subunits and when new equipment has been received. The training would include additional training in cartography, managing a map production program, and in the use of any new equipment (photo lab, etc.).

There are several ways that this training can be provided: a series of workshops, short-term technical assistance visits, or with a long-term cartographic advisor. The long-term advisor has the advantages of providing continuity and constant availability. The short-term visits allow greater flexibility in locating staff with the appropriate technical background for the various subject areas involved (photo lab, cartography, census geography, etc.). Ultimately some combination of the various methods may prove to be best. CAPMAS should also encourage one or more of its staff to receive formal cartographic training. This could be done in an European (University of Glasgow) or U.S. university or at the I.T.C. (Institute for Aerial Survey and Earth Sciences) in Gnschede, Netherlands. This type of training is directed at long-range needs since these people would not be available for the census map preparation work.

The Glasgow and ITC programs have one year post-graduate diploma programs. At Glasgow the major emphasis is in general cartographic principles although they also cover automated cartography. Its goal is to train cartographers. The ITC program is directed at several levels from technicians (drafters, photo lab staff, etc.) to cartographers. Their program covers both conventional and automated cartography. Both Glasgow and I.T.C. programs have committed themselves to providing training for personnel from developing countries.

The typical programs in the U.S. are a 4-year undergraduate or 2-year graduate program. These programs are heavily oriented towards training U.S. students for the U.S. market.

Another training option is the 4-month cartography program at ISPC. This program covers cartographic techniques and related subjects. This program would be most appropriate for the upper level cartographic branch staff. They would be responsible for supervising and training the drafting staff. The program is scheduled for the first and second training periods in the fall of each year. An identical program can be scheduled at another time for groups of 4 or more participants.

3. Equipment - Additional basic drafting equipment will be required depending on the final size of the drafting staff. The drafters will also need work tables appropriate for drafting as well as light tables. For a more detailed list of the types of equipment used in a census map production operation, see Appendix D-1 which was one of the handouts for the workshop.

   It is strongly suggested that the drafting medium be changed to polyester film instead of the present paper based material. The additional cost of the polyester film is offset by its much greater durability and stability. It is also strongly suggested that maps be prepared using overlays for the various classes of information (road/water patterns, place names, boundaries, etc., each on a separate overlay). This system greatly facilitates updating and also gives the flexibility to produce different maps using the same base (road/water pattern).

   In addition to the general recommendations in Appendix D-1, there are specific recommendations for the more expensive equipment. Photographic Lab facilities will be required. If a small process camera is unavailable, the lab should have at least a vacuum frame contact printer for photo reproduction work. Also, a photo typesetting machine for producing the names used on the maps can save significant amounts of time and labor over manual lettering methods. Such a machine can produce numerous sizes and styles of type (including Arabic). While the Geography Unit presently has access to a diazo machine, this arrangement may not be adequate for the needs of the census. The preparation of the census field maps will require exclusive use of one or more diazo machines capable of high production volume. Since aerial photographs are often good source material for updating old maps or preparing new maps, several reflecting projectors (or similar devices) would be useful. These devices can be used to transfer information from a map or air photo to the master map. They have the necessary capability of adjusting for differences in scale between the sources.

4. Facilities - The present facilities must be expanded to accommodate additional personnel and equipment required for the census mapping program. In the cartographic area the space should be dust free and air conditioned, if possible. The north side of the building would be a good location to lessen the effects of the summer sun. In addition to ample space for each drafter (including extra tables for layout work) space is required for material storage and map storage.

The photographic lab must be air conditioned and have constant temperature and humidity control or there is a risk of ruining expensive photographic materials. It should also be dust free.

D. Meeting the Mapping Program Objectives

One of the first tasks to be initiated (immediately) is to assign someone to begin canvassing other government agencies and private organizations for copies of maps and airphotos. This will evolve into the source material library and is essential, for reasons previously stated, before any map production can be done. There are two important map series that should be acquired by CAPMAS. The first is a series of 1:10,000 scale maps of the Nile Valley compiled under contract by Kenting Earth Sciences LTD of Canada in 1970 (400 maps) for the Ministry of Irrigation. The second is a series of 1:5,000 scale maps of Cairo completed under contract by the Institute Geographique National of France in 1979 (347) for the Ministry of Development and New Communities. These maps should provide excellent source material for the land area containing a large portion of the Egyptian population. Unfortunately, we did not learn of the existence of these maps until our return from Egypt. The information was contained in a U.S. Geological Survey report on topographic mapping in Egypt.

Since the time available before the census is short, priorities must be established to determine the order in which areas will be mapped. The suggested priority is: pretest areas, the Cairo/Ghiza metropolitan area, Alexandria, the other large urban area, the Delta, the Nile Valley, and the remainder of the country. With the exception of the pretest areas, the priority is to map those areas with the higher population concentrations first. This focuses the effort on the most important areas first in case the programs cannot be finished before the census.

In the event that maps cannot be prepared for the entire country before the census, the program should continue until complete coverage is achieved. This is necessary in order to provide a map base for designing sample surveys. It also takes advantage of the trained and experienced staff.

The work of the mapping unit is not completed when complete coverage is attained. The maps will become outdated because of the constant changes on the ground. During the intercensal period the Geography Unit (probably with reduced staff) should embark on a gradual updating program. This will avoid having to make all 10 years' worth of changes shortly before the next census. They will also have to support the sample survey program by providing maps for sample selection, sample maintenance, and field interviewing.

SOME CONSIDERATIONS IN SETTING UP A CENSUS CARTOGRAPHIC OFFICE

I. SPACE AND EQUIPMENT

A. Space

1. Environment
   a. dust free and dry
   b. temperature and humidity controlled
2. Workspace
   a. working surface of at least 2 square meters per drafter
   b. floor space of 6 square meters per drafter
      -- not including walkways, storage areas, etc.
   c. well lighted, especially over the work tables
   d. close to central map storage area
3. Storage
   a. maps and supplies easily accessible
   b. maps stored flat

B. Equipment and Materials

1. Drafting tools
   a. mechanical pens (International Standard 1503098/1 line widths)
      -- one set of pens for each drafter (set of 6-7 most used point sizes)
      -- several sets of other sizes to be shared as needed
      -- good quality black ink
   b. scribing instruments (engravers)
      -- for use with scribing materials
         -- polyester film scribing materials are more durable than tracing paper
         -- scribing gives cleaner lines than pen and ink, can be substituted for pen and ink drawing for most applications
      -- types of engravers (one for each drafter)
         -- swivel
         -- rigid
      -- scribing points
         -- either blade or needle type made from several types of materials: steel, carbon-steel alloy, or jewel
         -- plain steel tips are less expensive, but alloy and jewel points last much longer
         -- set of several point sizes required for each engraver
         -- sharpening stones required for steel points

c. pencils
   -- a selection of pencils with lead of varying hardness for each drafter

d. miscellaneous
   -- engineer scale
   -- T-square
   -- French curve set
   -- triangle set
   -- erasers
   -- drafting compass
   } each drafter should have this equipment for his/her own use

      -- for drawing circles
   -- pantograph
      -- for changing the scale of drawings
   } not necessary for each drafter but a few should be available when needed

   -- paint brushes and opaquing pens
      -- assorted sizes of animal hair brushes for opaquing
      -- should be kept clean
      -- one set for each person doing opaquing
   -- register pins and punches
      -- for use in making overlays
      -- one punch per office and one set of pins for each drafter

2. Drafting materials
   a. tracing paper
      -- suitable for planning work and rough sketches but may damage easily
      -- advantage is low cost
   b. drafting film
      -- polyester film with matte surface to accept pencil and ink
      -- much stronger than paper and suitable for most positive line drafting applications
   c. scribing materials
      -- polyester film coated with special opaque material which is removed by scribing tools to form lines, etc.
      -- stronger than paper and suitable for most negative line drawing work
   d. strip-coated film
      -- polyester film coated with opaque material on which areas can be cut and peeled away to form "open windows". Used with tint screens to apply shading to selected parts of a map
   e. opaquing materials
      -- both tape and fluids for use in making corrections on scribing materials, photographic film, and strip-coated film

3. Furniture and storage equipment
   a. drafting table
      -- one for each drafter with drawers for equipment storage
      -- humidity controlled storage case for drafting pens
      -- confortable stool
      -- drafting surface should be smooth and free of nicks and scars
   b. light table, light board, or light box
      -- for tracing
      -- one for each drafter
   c. other tables
      -- several large tables for spreading out maps for review and evaluation
   d. map storage cabinets
      -- cabinets with wide drawers for storing maps and artwork flat
      -- several maps (15-20) can be stored in each drawer
      -- steel construction preferred because it is stronger and protects maps better

4. Photography and reproduction equipment
   a. contact printer frame
      -- for making same-size copies of artwork on photographic film
      -- relatively inexpensive but cannot enlarge or reduce images
   b. process camera
      -- for making copies of artwork on photographic film
      -- can enlarge or reduce images
      -- very expensive
      -- it may be possible to use camera owned by another government agency or contract work to private company
   c. photographic darkroom
      -- for processing photographic materials
         -- must be properly ventilated
         -- must be temperature and humidity controlled to protect photographic materials
      -- water supply (temperature controlled) and special darkroom lighting required
      -- storage space for materials and chemicals
      -- processing trays, tanks, or automatic film processor (expensive but fast and uses processing chemicals more efficiently)
   d. photo mechanical transfer processor (optional)
      -- a photographic reproduction process requiring special materials which produces a final photographic positive without the need of an intermediate negative. This produces a savings in processing time and material costs.

e. reproduction equipment
   -- ammonia process equipment
      -- inexpensive in both equipment and materials
      -- not publication quality but adequate for field enumeration maps
   -- electrostatic processes
      -- equipment expensive and sizes often limited

II. PERSONNEL

A. Cartographers

-- Not everyone in office need be a formally trained cartographer. However, there should be several in highest levels to supervise and train drafting staff.

B. Cartographic Drafters

-- Can be trained by statistical office cartographers.
-- Will do most of map preparation work under supervision of cartographers.

C. Photography Laboratory and Reproduction Unit Staffs

-- Supervisory personnel should be experienced. They can then train newly-hired inexperienced staff.

UNITED STATES DEPARTMENT OF COMMERCE
Bureau of the Census
Washington, D.C. 20233

BUDGET SUPPLEMENT TO THE TECHNICAL REPORT OF THE CENSUS ADVISORY TEAM

This supplement to the "Technical Report of the Census Bureau Advisory Team" provides a detailed budget for the recommended program of activities. The overall costs are:

OVERALL SUMMARY OF PROGRAM COSTS

(thousands of dollars)

Program Element	Estimated Cost, FY83-88
Resident Advisors	$652.0
Short-term Technical Assistance	1,230.0
In-country Workshops	555.5
Overseas Training and Work Study	1,203.2
TOTAL	$3,640.6

There are two categories of items not included in this budget. Commodity procurement, such as computer equipment, cartographic equipment, vehicles, and other commodities, which will be a major budgetary item during the project, have not been included. The costs of Arabic language training for the resident advisors have also been excluded. If Arabic language capability is essential and if no Arabic speaking candidates are available, a budget for such training may need to be added.

The following tables provide a detailed estimate of the costs of the proposed program of technical cooperation and training.

BUDGET SUMMARY BY EXPENSE CATEGORY
(U.S. DOLLARS)

EXPENSE CATEGORY	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	ALL YEARS
1. RESIDENT ADVISORS							
A. SALARY (GS-15)	0	87490	123256	64930	0	0	275676
B. BENEFITS (14 PERCENT)	0	12249	17256	9090	0	0	38595
C. POST DIFFERENTIAL	0	13124	18488	9739	0	0	41351
D. TRAVEL	0	2600	0	2600	0	0	5200
E. TRANSPORTATION OF THINGS	0	15000	0	15000	0	0	30000
F. CONTINGENCY (10 PERCENT)	0	13046	15900	10136	0	0	39082
SUBTOTAL	0	143509	174900	111495	0	0	429904
G. HOUSING	0	21600	28800	14400	0	0	64800
H. EDUCATION OF DEPENDENTS	0	16200	21600	10800	0	0	48600
TOTAL.	0	181309	225300	136695	0	0	543304
2. PERSONNEL COSTS (OTHER THAN RESIDENT ADVISORS)							
A. SUPERVISORY STAFF (GM-14)	6290	15143	12699	9683	14041	12826	70682
B. SURVEY STATISTICIAN (GS-13)	23425	66570	45587	21423	56285	13372	226661
C. DATA PROCESSORS (GS-13)	19493	49865	58730	54930	70453	99779	353249
D. MATHEMATICAL STATISTIANS (GS-13)	15594	24444	13819	13732	3882	6172	77642
E. SECRETARIAL PERSONNEL (GS-5)	5240	11475	9437	8068	11698	10686	56603
F. BENEFITS (14 PERCENT)	9806	23449	19638	15097	21890	19997	109877
G. LEAVE ACCRUAL (17.5 PERCENT)	13973	33416	27984	21513	31193	28496	156575
H. MATERIALS AND SUPPLIES	1751	4187	3507	2696	3909	3571	19621
TOTAL.	95571	228549	191399	147142	213350	194900	1070911
3. TRAVEL COSTS (U.S. PERSONNEL ONLY)							
A. AIRFARE	12000	27720	14500	12800	24500	13300	104820
B. PERDIEM	21714	47586	23940	15750	35483	19026	163499
C. OTHER TRAVEL COSTS (EXCESS BAGGAGE, LOCAL TRAVEL AND CONTINGENCY)	4424	9882	5044	3746	7871	4242	35209
TOTAL.	38138	85188	43484	32296	67854	36568	303528
4. PARTICIPANT TRAINING							
A. AIRFARE	4572	13077	12155	1219	14670	11584	57278
B. PERDIEM	2591	24835	26429	1529	45344	26465	127193
C. TUITION, FEES, INS., ETC.	0	216795	402680	59502	160954	39000	878930
TOTAL.	7164	254708	441264	62250	220968	77048	1063401
5. COMPUTER AND RELATED EXPENSES (US)	2500	6120	6800	6000	7260	9700	38380
6. EMPLOYEE DEVELOPMENT	2310	5859	4546	3666	5015	4322	25719
7. OVERHEADS	43980	146064	129591	85065	106528	84143	595371
GRAND TOTAL.	189663	907796	1042384	473114	620975	406681	3640613

BUDGET FOR 1986 EGYPT CENSUS SUPPORT PROJECT

DESCRIPTION OF BUDGET ITEM	UNIT OF MEASURE	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	ALL YEARS
SHORT-TERM TECHNICAL ASSISTANCE BUDGET								
PERSONNEL TIME, BY RESOURCE CATEGORY								
SUPERVISORY STAFF (ALL CATEGORIES)	PER-WEEKS	3	10	9	8	7	8	46
SURVEY STATISTICIAN	PER-WEEKS	14	44	37	27	30	15	166
DATA PROCESSORS	PER-WEEKS	10	52	55	55	56	82	310
MATHEMATICAL STATISTICIANS	PER-WEEKS	12	35	18	17	5	7	93
SECRETARIAL/CLERICAL	PER-WEEKS	8	29	24	22	20	23	125
TOTAL, PROFESSIONAL TIME ONLY	PER-WEEKS	39	141	119	107	98	112	615
PERSONNEL COSTS, BY RESOURCE CATEGORY								
SUPERVISORY STAFF (ALL CATEGORIES)	DOLLARS	4568	17472	15671	14950	14417	17498	84577
SURVEY STATISTICIAN	DOLLARS	16452	54800	48596	37668	44365	23513	225395
DATA PROCESSORS	DOLLARS	12339	64757	72895	77268	82928	128419	438607
MATHEMATICAL STATISTICIANS	DOLLARS	13710	42980	24298	24146	6825	10852	122812
SECRETARIAL/CLERICAL STAFF	DOLLARS	3806	14556	13057	12456	12011	14579	70465
TOTAL	DOLLARS	50875	194565	174517	166489	160547	194862	941856
TRAVEL COSTS								
AIR FARE (NUMBER)	NUMBER	5	15	7	6	7	4	44
AIR FARE (COST)	DOLLARS	7873	25982	13319	12597	16074	9975	85818
PERDIEM (DAYS)	DAYS	112	308	140	98	105	56	819
PERDIEM (COST)	DOLLARS	13815	41628	20943	16074	18876	11096	122432
OTHER TRAVEL COSTS (CONTINGENCY, EXCESS BAGGAGE, LOCAL TRAVEL, ETC)	DOLLARS	2846	8872	4496	3762	4586	2765	27327
TOTAL TDY COSTS	DOLLARS	24534	76482	38757	32434	39537	23833	235577
COMPUTER TIME AND EQUIPMENT COST	DOLLARS	900	4520	4800	4800	4860	7100	26980
EMPLOYEE DEVELOPMENT	DOLLARS	1155	4227	3577	3219	2929	3353	18460
OVERHEADS (INCLUDED IN ABOVE)	DOLLARS	18156	65563	51885	48470	48760	53721	286555
COMMUNICATIONS EXPENSE	DOLLARS	752	1128	835	1158	1679	1534	7086
TOTAL, SHORT-TERM TECHNICAL ASST.	DOLLARS	78216	280922	222486	208101	209551	230682	1229958

BUDGET FOR 1986 EGYPT CENSUS SUPPORT PROJECT

DESCRIPTION OF BUDGET ITEM	UNIT OF MEASURE	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	ALL YEARS
RESIDENT ADVISORS BUDGET								
DATA PROCESSING ADVISOR	DOLLARS	0	108794	134757	123660			367211
CARTOGRAPHIC ADVISOR	DOLLARS	0	109794	134757	41220			284771
TOTAL, RESIDENT ADVISORS	DOLLARS	0	217588	269514	164880	0	0	651982
OVERSEAS TRAINING AND STUDY BUDGET								
ISPC 11-MONTH PROGRAM								
NUMBER OF PARTICIPANTS	NUMBER	0	7	14	2	4	0	27
COST PER PARTICIPANT	$/PARTIC.	25700	26985	28334	29751	31239	32800	N.A.
TOTAL COST	DOLLARS	0	188895	396680	59502	124954	0	770030
ISPC AND OTHER SHORT COURSES								
NUMBER OF PARTICIPANTS	NUMBER	0	9	2	0	6	6	23
NUMBER OF PARTICIPANT MONTHS	MONTHS	0	31	6	0	30	30	97
NUMBER OF COURSES	NUMBER	0	4	2	0	48	48	102
COST OF AIRFARE	DOLLARS	0	11880	2900	0	10500	11400	36680
COST OF PERDIEM	DOLLARS	0	28985	6120	0	33150	34425	102680
COST OF TUITION	DOLLARS	0	27900	6000	0	36000	39000	108900
TOTAL COST	DOLLARS	0	68765	15020	0	79650	84825	248260
WORK-STUDY AT CENSUS								
NUMBER OF PARTICIPANTS	NUMBER	5	4	9	1	5	2	26
NUMBER OF PARTICIPANT MONTHS	MONTHS	4	4	30	2	25	2	67
AIRFARE	DOLLARS	6000	5280	13050	1600	8750	3800	38480
PERDIEM	DOLLARS	3400	3604	28560	2006	26350	302	64222
TOTAL COSTS	DOLLARS	9400	8884	41610	3606	35100	4102	102702
CENSUS STAFF COSTS								
PERSON WEEKS	PER-WEEKS	15	18	17	0	0	0	50
COST	DOLLARS	21406	26843	26873	0	0	0	75123
COMMUNICATIONS EXPENSE	DOLLARS	750	1124	833	1155	1674	1529	7064
TOTAL, OVERSEAS TRAINING & STUDY	DOLLARS	31556	294512	481015	64263	241378	90456	1203179

BUDGET FOR 1986 EGYPT CENSUS SUPPORT PROJECT

DESCRIPTION OF BUDGET ITEM	UNIT OF MEASURE	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	ALL YEARS
IN-COUNTRY WORKSHOPS BUDGET								
PERSONNEL TIME, BY RESOURCE CATEGORY								
SUPERVISORY STAFF (ALL CATEGORIES)	PER-WEEKS	3	4	2	1	5	2	18
SURVEY STATISTICIAN	PER-WEEKS	6	32	7	0	37	0	81
DATA PROCESSORS	PER-WEEKS	18	18	23	14	28	30	131
MATHEMATICAL STATISTICIANS	PER-WEEKS	12	0	0	0	0	0	12
SECRETARIAL/CLERICAL	PER-WEEKS	8	11	7	3	14	7	49
TOTAL, PROFESSIONAL TIME ONLY	PER-WEEKS	39	54	32	15	70	32	242
PERSONNEL COSTS, BY RESOURCE CATEGORY								
SUPERVISORY STAFF (ALL CATEGORIES)	DOLLARS	4568	6745	4244	2076	10271	5055	32961
SURVEY STATISTICIAN	DOLLARS	6855	39828	9112	0	54603	0	110398
DATA PROCESSORS	DOLLARS	21936	22923	30373	19317	40952	47027	182527
MATHEMATICAL STATISTICIANS	DOLLARS	13710	0	0	0	0	0	13710
SECRETARIAL/CLERICAL STAFF	DOLLARS	3806	5620	3536	1730	8558	4212	27462
TOTAL	DOLLARS	50875	75116	47265	23124	114384	56293	367058
TRAVEL COSTS								
AIR FARE (NUMBER)	NUMBER	5	6	3	2	7	3	26
AIR FARE (COST)	DOLLARS	7873	10393	5708	3199	16074	7480	51727
PERDIEM (DAYS)	DAYS	119	154	70	28	154	70	595
PERDIEM (COST)	DOLLARS	14678	20814	10471	4593	27685	13870	92111
OTHER TRAVEL COSTS (CONTINGENCY, EXCESS BAGGAGE, LOCAL TRAVEL, ETC)	DOLLARS	2959	4095	2123	1154	5742	2801	18874
TOTAL TDY COSTS	DOLLARS	25511	35302	18302	9945	49501	24151	162713
COMPUTER TIME AND EQUIPMENT COST	DOLLARS	1600	1600	2000	1200	2400	2600	11400
EMPLOYEE DEVELOPMENT	DOLLARS	1155	1632	969	447	2087	969	7258
OVERHEADS (INCLUDED IN ABOVE)	DOLLARS	18554	26651	16076	8153	39563	19758	128756
COMMUNICATIONS EXPENSE	DOLLARS	750	1124	833	1155	1674	1529	7064
TOTAL, IN-COUNTRY WORKSHOPS	DOLLARS	79891	114774	69369	35871	170046	85542	555493
GRAND TOTAL, ALL COMPONENTS	DOLLARS	189663	907796	1042384	473114	620975	406681	3640613