



**Economic and Social Council**

Distr.  
GENERAL

E/CN.3/1983/23  
6 July 1982

ORIGINAL: ENGLISH

STATISTICAL COMMISSION  
Twenty-second session  
7-16 March 1983  
Item 10 (c) of the provisional agenda\*

TECHNICAL CO-OPERATION: STATISTICAL DATA PROCESSING

Progress report on statistical data processing

Report of the Secretary-General

SUMMARY

The present report, submitted to the Commission for information, contains a description of recent progress in implementing the United Nations technical co-operation activities in statistical data processing, executed by the Department of Technical Co-operation for Development and technically supported by the Statistical Office and the statistical divisions of the regional commissions. Paragraphs 3 to 26 of the report provide a general description of the coverage of the activities and give examples of the work being done. In paragraphs 27 to 39 the activities of the Statistical Office's software development and training projects are updated. In paragraphs 40 to 53, the exploitation of new developments in microcomputer-based systems are described and paragraphs 54 to 55 contain a summary of the report.

\* E/CN.3/1983/1.

UNSD REFERENCE FILE  
PLEASE RETURN TO THE  
UNIT OF NATURE RESEARCH

CONTENTS

	<u>Paragraphs</u>	<u>Page</u>
INTRODUCTION .....	1 - 2	3
I. CURRENT TECHNICAL CO-OPERATION ACTIVITIES IN DATA PROCESSING .....	3 - 26	3
II. DEVELOPMENT OF COMPUTER SOFTWARE FOR POPULATION CENSUSES AND SURVEYS .....	27 - 39	8
III. NEW DIRECTIONS IN TECHNOLOGY TRANSFER .....	40 - 53	10
IV. CONCLUSION .....	54 - 55	13

## INTRODUCTION

1. The present report was prepared in response to the request made by the Statistical Commission at its twenty-first session. <sup>1/</sup> It contains recent information concerning the programme in statistical data processing provided to developing countries by the United Nations and which was executed by the Department of Technical Co-operation for Development and supported substantively by the Statistical Office in collaboration with the regional commissions.

2. The document is divided into three sections. Section I contains a general description of the programme of technical co-operation in data processing during the past two years. In section II, there is a description of the continued development and dissemination of computer software for assisting population census and survey processing activities. Section III contains a review of experience with a new technique for transferring computer technology, based on the use of microcomputer systems.

### I. CURRENT TECHNICAL CO-OPERATION ACTIVITIES IN DATA PROCESSING

3. The volume of United Nations technical co-operation activities in data processing continues at a high level. Much of the volume springs from the necessity to process the large amount of data collected for national censuses of population and housing, while some of the volume comes from the desire to obtain newer and more powerful computing environments in order to mount more effective attacks on problems of social, economic and technological development.

4. The United Nations Development Programme (UNDP) and the United Nations Fund for Population Activities (UNFPA) have continued to fund the bulk of the projects for establishing and improving the computer-related capabilities of developing countries to process their statistical data. A limited amount of funding has been derived from trust funds.

5. The nature and mix of the various components of the data processing aspects of such projects have differed from country to country. However, most funds were used for the purchase of equipment, computer rentals, expert services and various forms of training for local government staff.

6. The role of software continues to become even more important in enabling countries to use computers effectively in order to process their data. UNFPA has continued to make funds available to the Department of Technical Co-operation for Development for the continued development of programs for cross-tabulation, editing and the management of census and survey processing. This development is described in section II below.

---

<sup>1/</sup> Official Records of the Economic and Social Council, 1981, Supplement No. 2 (E/1981/12), para. 171.

7. Equipment procured in support of technical co-operation projects has included data-entry equipment, integrated mainframe and mini-computer systems, microcomputer components and systems, maintenance tools, spare-parts kits and supplies, software packages and shipping cases. Related activities also often include the analysis of requirements for the physical installation of computing equipment, air-conditioning, measurement of power disturbances and specification of power-conditioning and distribution equipment. The procurement and use of microcomputer-based systems have introduced the need for system integration and testing, both at United Nations Headquarters and in the field.
8. Data processing experts are recruited and placed in field posts for short-term or long-term assignments, based on the type of assistance required. The process of recruiting experts consists of evaluating potential candidates, assessing their relative strengths, either interviewing them directly or arranging and evaluating interviews performed by others, and matching their skills, interests and availability to particular country posts. Information about the candidates who are considered acceptable is submitted to government authorities, who make the final choice.
9. Experts in posts communicate with United Nations Headquarters through a variety of mechanisms. Ad hoc requests for information and supplies are dealt with by technical advisers in the Statistical Office in co-ordination with the Department of Technical Co-operation for Development. Periodic reports are submitted by the experts and are analysed at United Nations Headquarters and the relevant regional offices. There is often a continuing and significant technical dialogue by means of correspondence between technical advisers at Headquarters and field experts. Occasionally, technical missions are dispatched to resolve difficult technical problems.
10. Almost all technical co-operation projects include a training component in order to promote the development of local substantive and technical strength and to build technological self-reliance within the country. Supporting a training component requires the evaluation and placement of candidates for training, the planning and execution of training programmes and the monitoring of post-training performance on the job.
11. At present, an interregional adviser in computer methods, attached to the Statistical Office, executes short-term missions on the uses of electronic data processing equipment, computing techniques and computer-based systems related to statistics. In addition, there are four full-time technical advisers in computer methods and data processing in the Office, who provide the substantive technical support for country projects. They also undertake country missions in order to assist in project formulation, solve technical problems and participate in project reviews. The Statistical Office has recently added to its staff an expert in computer field support who will carry out a variety of functions related to its increasing involvement in the installation, use and maintenance of microcomputer-based systems in developing countries. Further, four regional adviser posts in data processing have been established in Africa, Asia and Latin America, for the purpose of providing substantive technical support to countries in those regions. The work of the regional advisers will complement that of the technical advisers and the expert at United Nations Headquarters.

12. Some examples of projects in data processing are given below. In Nepal, for example, a new national computer centre is being built, incorporating significant modern ICL hardware to replace a 20-year-old small computer. The centre is processing data from the recently completed census of population.

13. In Peru, the national statistical office's computer has been significantly augmented by Wang VS-100 equipment in order to process effectively population census data. Useful census data processing software was taken from the Economic Commission for Latin America (ECLA) to Peru by a technical adviser and was adapted for use on the new computer configuration.

14. In Mongolia, an older Minsk-32 computer system was greatly augmented both by new Robotron 1040 and Videoton data-entry equipment, thus expanding the computing capability several-fold and, through the first data communications facility established in the country, providing the capability for decentralized statistical data entry and processing. A team of United Nations experts assisted the local staff in learning how to use the new equipment to enlarge the scope of computer-assisted statistical processes and to process data collected in the recent population census.

15. The computer-related technical skills available in the Statistical Office is being used to provide technical support to the Ministry of Foreign Affairs of Egypt, which is embarked upon an ambitious programme of using computer-based information storage and retrieval techniques to manage its substantial and growing collection of documents. A technical adviser, a number of specialized short-term consultants, an initial IBM computer system with integrated software packages and a substantial and multi-faceted short-term fellowship programme are together providing the Ministry with the technical capability to create, modify, maintain and extend a system to meet the objectives of the project.

16. In Guinea, the installation of two modern Wang VS-80 computers oriented towards general interactive computing will significantly enhance both the quantity and quality of the data processing capability compared to the previous older, batch-oriented machine. Two United Nations experts will assist in making the transition to the new machines and in using them to process data from the forthcoming population census.

17. Among all of the statistical data processing projects currently supported by the Statistical Office, the population census project in China deserves special mention. The magnitude of the operation provides an extra challenge to the United Nations technical co-operation programme. Although China had previously conducted two population censuses, the information gathered was limited and the processing of data was done manually. In order to establish a reliable base for further sample surveys of social and economic conditions of the population and for estimating population change, a general population census needed to be taken using modern methods, including automatic data processing. As China lacked both the experience and sufficient data processing facilities, the United Nations was asked to support the census operation by providing expertise and equipment.

18. The involvement of the United Nations began in 1979 with assistance in the preliminary census preparations. In 1980, a project was drawn up by China and the United Nations, specifying a work plan from 1980 to the middle of 1984 and a financial commitment by UNFPA of \$US 15.6 million. At the same time, the Government of China is contributing approximately \$US 110 million in direct census costs.

19. The census was taken on 1 July 1982. Some five million enumerators collected information in 700,000 enumeration areas, 200,000 coders are performing the required coding at 2,000 centres and approximately 3,000 data-entry operators are entering data at 28 centres.

20. The project's strategy was based on the use of decentralized processing, as is increasingly the case in the developed world. Mainframe computers and data-entry equipment have been placed at each of the centres. The Government of China has already acquired, installed and placed in operation eight Wang VS-80 computer systems with 40 on-line data-entry terminals and 50 IBM 3742 data-entry stations. The remaining 20 IBM 4331 computers, one IBM 4341 computer and 170 IBM 5280 data-entry clusters with a total of 680 workstations are being provided by the United Nations. The systems are equipped with a two-way data-transmission capability that provides for communication between the central system in Beijing and the 20 IBM systems in the provinces.

21. A number of Chinese nationals have been trained by the equipment supplier in systems design, programming, computer operation and maintenance. In addition, fellowships have been provided to nationals for 12 months of training in data processing at the training branches of census offices in developed countries. Some of those trained have been appointed as instructors in order to multiply the effects of the training among national colleagues. Software development is being done centrally and products that are ready for implementation are being distributed to the provincial centres. Adaptations are being made in order to overcome differences between the computer systems.

22. Data are being processed at the brigade level, the average population of which is 1,500. Automatic editing and correction procedures are being employed, but when the established error limits are exceeded, data for the entire brigade will be referred to manual correction and re-entry procedures. Initially, data are being verified at the 100 per cent level, but verification will be gradually reduced to a final level of 25 per cent.

23. Preliminary census counts derived from summary sheets should be available three months after the enumeration. A 10 per cent sample for advance tabulation will be selected. Processing of the sample is expected to be completed in the fourth quarter of 1983. The final results of the census are expected to be available two and one half years after the enumeration.

24. The number of statistical data processing projects supported by the Statistical Office remained at approximately 70, but their implementation was greatly affected by recent financial constraints within the two major funding agencies, UNDP and UNFPA. The projects financed by UNFPA have recently been severely curtailed by delays in the implementation of the work plan, the supply of

equipment and the provision of experts. This has complicated the provision of technical support for projects, sometimes severely. Some projects were terminated prematurely, some were suspended and others were never begun. Overall, many compromise solutions that had to be adopted were less than satisfactory in meeting the needs, but they did have the effect of continuing the implementation of the projects, although to a more limited and less effective extent.

25. Table 1 contains a summary of expenditures of the United Nations on technical co-operation in statistical data processing. It should be noted that the total value of the programme input has increased overall by a factor of three since the previous progress report was submitted to the Commission at its twenty-first session (see E/CN.3/555, table 1). A significant portion of the increase is owing to the acquisition of equipment to support the 1982 census of population of China. The increase in the over-all cost for field experts results from a number of factors: (a) a gradual shift towards the use of more senior and generally more highly compensated experts; (b) a trend towards the use of short-term experts for whom the fixed costs of travel and subsistence are spread over a much shorter period; and (c) the effect of widespread inflation upon the cost of employing experts.

Table 1. Expenditure of the United Nations, including the regional commissions, on technical co-operation in statistical data processing

(Costs in thousands of United States dollars)

Activities	1979	1980	1981	1982
<b>Headquarters staff</b>				
Work-months	49	62	126	132
Cost	245	310	579	673
<b>Field experts <u>a/</u></b>				
Work-months	317	472	457	460
Cost	1,401	1,940	3,172	3,806
Training	333	390	452	542
Equipment	3,060	7,569	11,645	12,295
Miscellaneous	-	-	196	234
<b>Total</b>	<b>5,039</b>	<b>10,209</b>	<b>16,044</b>	<b>17,550</b>

a/ Three regional advisers (in Africa, Asia and Latin America) are not included.

/...

26. It is expected that the Statistical Office will continue to provide approximately the current level of support to the technical co-operation projects that have data processing components. It is expected that, while over-all funds devoted to technical co-operation activities in the United Nations system are likely to remain depressed for several years, data processing represents a growth sector which will continue to receive active attention from developing countries as a useful technology. The balance of input is likely to shift to some extent as the effects of technical advances in hardware manufacture and increasing industrial competition continue to reduce computational costs at a dramatic rate. Thus, the delivery of computational power and capacity is almost certain to increase dramatically in the medium term, while the cost of the input required to provide the delivery effectively could well remain at the same level over the period.

## II. DEVELOPMENT OF COMPUTER SOFTWARE FOR POPULATION CENSUSES AND SURVEYS

27. The development of computer software packages by the Statistical Office, funded by UNFPA through the Department of Technical Co-operation for Development, has continued. This development is aimed at (a) supplementing existing computer packages with user-friendly packages for small and inexpensive computers, and (b) adding new capabilities to support important component activities of population censuses and surveys and the use of the resulting data.

28. This activity originated with the delivery and use of the XTALLY cross-tabulation package for processing pilot-census and census data for several countries that could not use any other software package with their computer facilities. In the absence of software for supporting the computer editing and correction of data and in view of the fundamental importance of this step in census data processing, priority was given to developing software in this area. The resulting editing package is called UNEDIT.

29. The activities of the software project consist of: (a) the delivery of available software - UNEDIT and XTALLY - to countries wanting it; (b) the enhancement of the capabilities of these two packages to satisfy better the needs of users; (c) the development and delivery of a new package called LOGMAP (logistics management and planning support) that is intended to support both the collection and use of the resulting data; and (d) the establishment of long-term arrangements for demonstration and training in the use of the software at appropriate co-operating regional or national institutions.

30. Recognizing the training value of "hands-on" use of the software by national staff having no appropriate facilities at home and wishing to process their population data at United Nations Headquarters, UNFPA has funded a training project since 1980. Each year, approximately 12 staff members from 6 developing countries can visit Headquarters or other suitable locations where they may learn to use the computer hardware and software and then process their own data.

31. The aim of the project is to inform the staff of technical co-operation projects and organizations in developing countries, both through correspondence and the publication of results in technical and professional channels, of what software



can be supplied. In addition, national staff and experts from developing countries visit Headquarters in the course of their work or while participating in training programmes; frequent demonstrations and explanations of the software packages also are provided.

32. The software systems developed in the project are suitable for use on many different computers, but the idiosyncracies of each make and model of computer require the preparation of a number of versions of each system, each version having distinct control procedures and device-specific elements. Consultants are employed, as required, for developing these versions.

33. Plans call for the establishment, if possible, of some long-term arrangements with regional or national computer-centre institutions in order to provide demonstration and training in the use of the software packages, to provide broader and better support for the dissemination of the software and to avoid perpetuating dependence upon United Nations Headquarters for demonstration and training. Towards this end, when opportunities arise, regional or national institutions are invited to collaborate in demonstration and training.

34. An attempt is made to remain aware of the important software packages that are available from other international organizations and that can be obtained by developing countries through bilateral assistance or other means; an attempt is also made to maintain mutually informative and supportive liaison with the national offices that have produced useful software and that can make it available to developing countries. For example, the use of the software project's computers has been provided to the International Statistical Programs Center of the United States Bureau of the Census in order to enable the Center to prepare an IBM S/34 version of its COCENTS package; also, users of software are encouraged to become familiar with the software tools available from other organizations, such as the National Central Bureau of Statistics of Sweden, the United States Bureau of Labor Statistics and the Institut national de la statistique et des études économiques of France.

35. The newest activity in the project has been the development of a logistics management and planning module, called LOGMAP. This small system was designed to provide computer support for the following activities common to planning and managing censuses and surveys or to organizing and using the results: (a) defining administrative and geographical entities and their composition and hierarchical relationships; (b) cataloguing administrative and geographical entities, with their important attributes; (c) cataloguing maps and other materials needed for planning, conducting operations and for interpreting and using census and survey results; and (d) enriching the summary cross-tabulations or other analyses of census and survey data by adding administrative and geographical data.

36. In operation, LOGMAP will allow the user to define the types of aggregate entities comprising the universe to be studied and to specify the important attributes of each entity type. Then, in conversational fashion, the user will be able to name each entity of each type and the LOGMAP system will compile a catalogue of entity names by type. When the catalogue is complete, LOGMAP will generate a questionnaire for each individual entity, which may be completed at appropriate levels of administration to supply further detailed input to the LOGMAP

system. The resulting data base then will be able to support further administrative and planning activities by providing status reports and a variety of important reference information, depending upon what information the user considers important and chooses to collect. In particular, the system will be able to provide computer-stored cross-references between maps and localities.

37. For organizing and using the data collected in the census or survey, LOGMAP will include locators of micro-data or summary files to facilitate the production of cross-tabulations and other analyses and will enable the production of tabulations and analyses relating to micro-data and the attributes of the parent administrative or geographical entities.

38. The basic computer programs of the LOGMAP system are under development. Programs for entering entity-type names and for specifying hierarchical relationships, composition and attribute names and characteristics are operational and some trial applications are now taking place.

39. As part of the software project, UNEDIT and/or XTALLY software has been sent to many organizations and projects in developing countries. In some cases the software has been installed by local staff following written directions, but in most cases the software has been installed and demonstrated either by staff of the software project or by a United Nations regional data processing adviser familiar with the details of the programs and computer-operating systems. The participation of regional advisory staff has been productive for everyone involved, and it is hoped that such participation will be strengthened. In addition, census or survey data for six developing countries have been processed in the project's computer facilities at United Nations Headquarters; in four cases, national staff have done most of the processing themselves after having learned to use the computer software and hardware at Headquarters.

### III. NEW DIRECTIONS IN TECHNOLOGY TRANSFER

40. The developments described in the previous report to the Commission with regard to computer hardware (E/CN.3/555, sect. III) have continued at a rapid rate. The cost of processing units and memory of all kinds has decreased by at least 50 per cent in the past two years. Units of increased capacity are being packaged in devices that have generally the same physical size as their predecessors and no greater electrical power requirements. In general, the new units are more reliable. Advances in the technology of creating devices that require very low levels of power are at the stage where major cost reductions are now occurring.

41. As a result of the advances in technology, microcomputer systems have emerged as a major component of the data processing industry and as one of its fastest growing segments. Low capital costs, a highly competitive electronics sector and a highly elastic demand for the products have created an industry whose characteristics are very different from those of the traditional computer industry. Whereas traditionally computer systems were manufactured by a relatively small number of manufacturers, microcomputer systems and components are manufactured by hundreds if not thousands of firms. Traditional manufacturers

generally supply software for their own systems, whereas microcomputer software and hardware producers operate almost entirely independently; further, much microcomputer software is marketed for a large number of possible hardware implementations. Traditional computer systems have been sold by generally well-trained professional sales teams offering a variety of pre-installation and post-installation support services, while microcomputer systems are generally sold by independent system houses and retail outlets offering a minimum of support. Traditional computer systems are repaired and tested at their installed site, while microcomputer components are often carried to a repair shop. Traditional computer hardware and software unit costs are high, while microcomputer hardware and software unit costs are low.

42. The low cost and portability of microcomputers have led to their use in an increasing number of countries in support of technical co-operation activities in statistical data processing. For the past year and a half in Cape Verde, five Billings microsystems have been used to enter and edit data collected for the 1980 population census. They have since been augmented by two multi-user Onyx microcomputer systems which perform the final editing and tabulation of the data.

43. In both the Comoros and Sao Tome and Principe, two multi-user Altos microcomputer systems are now being used in each country to perform all aspects of the data processing of their recent population censuses. The cost of each of the systems, which includes terminals for four concurrent users, a high-speed sealed disk unit and a cartridge tape unit, was about \$US 27,000, including operating system software and language translators. A smaller Altos microcomputer configuration is being used in the Cook Islands for population census data processing.

44. In Mauritania, two smaller Altos microcomputers are being used to support both general demographic research and training and the data-entry and editing of the Mauritanian fertility survey. In the Upper Volta, two IBM microcomputers have recently been installed to support demographic research and training. As part of interregional and national projects on demographic training and research, executed by the Department of Technical Co-operation for Development and substantively supported by its Population Programmes and Projects Branch, a microcomputer system has been installed at the Centre démographique ONU-Roumanie (CEDOR) at Bucharest (industrial microsystems) and is likely to be installed under similar circumstances in the future.

45. Two larger Altos microcomputer systems are installed at the Instituto Nacional de Estadística y Censos of Ecuador and support the maintenance of the register of industrial establishments and the compilation of industrial production statistics. A digital equipment-based microcomputer system has recently been installed at the Instituto Nacional de Estadística of Bolivia. Two Cromemco microcomputer systems support a variety of computer-based functions in the Ministry of Planning in Rwanda.

46. The above microcomputer systems represent only those that have been procured and installed in technical co-operation projects in statistics and demographic research, executed by the Department of Technical Co-operation for Development. Other microcomputer systems are being supplied to developing countries in projects executed by the United Nations in other substantive areas.

47. The use of microcomputers in developing countries has brought with it the need to provide both new and restructured systems of support, since there is generally no possibility of support by either the manufacturer or the seller once the computers reach the recipient country. In addition, the absence of any pre-installation support from suppliers has made it necessary for Statistical Office technical advisers and field experts to assume a number of technical responsibilities and functions that were previously either assumed by or shared with the supplier of the equipment.

48. One area in which increased support has been required is that of electrical power disturbance analysis and control. All computers, whether mainframe systems, minicomputers or microcomputers, require a source of reasonably stable and continuous electrical power. Unfortunately, the public electrical power supply in many developing countries - as well as in some areas of developed countries - is not sufficiently stable to ensure continuous and correct computer operation. Using portable power-line disturbance analysers, technical staff members of the Statistical Office have developed the capacity to perform relatively precise analyses of power conditions in any place in the world. Using the knowledge of the nature and patterns of such disturbances, they are able to specify the type and characteristics of power-conditioning equipment necessary for transforming the existing power into power that is sufficiently regular and uniform to run a specific computer configuration. While the necessity of installing working microcomputer systems has required the computer technical advisory group to assimilate and use this new technology for microcomputer installations, it has proved to be such a sufficiently valuable technique that it is often used also to assess the power-conditioning requirements for new mainframe and minicomputer installations.

49. Another area in which increased support has been required is that of hardware maintenance support. While computing hardware has become increasingly reliable over the years and promises to become even more so in the future, components do fail from time to time for a variety of reasons. When a failure occurs at a very remote location where good communication or transportation is not available, the consequences of such a failure are greatly magnified.

50. The approach taken up to the present in the microcomputer-based projects supported by the Statistical Office might be described as a multi-level strategy in dealing with the maintenance problem, in part because of the diversity of the environments involved. It is a conservative strategy, beginning with total component redundancy that will allow work to continue even though one complete system may be inoperable. In the worst case, this allows faulty systems to be returned to repair points either in the country or outside. It should be noted that the logistical problem of moving a computer component over two national boundaries and back is not trivial; it is ameliorated only somewhat if the user has access to a diplomatic pouch or similar facilities.

51. To the extent that systems are modular, it is possible to switch components, in order to determine the faulty parts and thus return for repair the smallest possible pieces of the system. This depends on having the required technical skill and understanding in order to be able to perform such isolation reliably. If more sophisticated skills are available, either through expatriate or local expertise,

diagnosis and repair at the elementary component level can be attempted, provided that a minimum of spare parts, testing equipment and tools have been provided.

52. In every microcomputer installation to date, a resident expert has been provided for a period of time. Apart from achieving the main goals of the project, the most important function of the expert is to teach the counterpart personnel about the technology and to train them in the use of computing equipment. These two objectives are to some extent conflicting, since the degree to which such training can be realized depends on the physical and intellectual infrastructure of the country. The initial results in this area have been mixed; however, the approach is essential if countries are to gain a moderate level of self-sufficiency in using this and related technology.

53. Within a computer installation, there are various aspects of training that are important. Hardware maintenance training is one aspect and it assumes significantly increased importance in a computing environment where vendor support is either weak or non-existent. Of at least equal importance is training in how to utilize computing systems effectively in the execution of a task, whether processing census data, computing a government payroll or performing water-resource calculations. An appreciation of computer systems and programs to perform these tasks depends upon a fundamental understanding of what computers consist of, what hardware and software do and do not do and what a crucial role people play in the creative process of analysing and solving problems and then designing procedures to implement the solutions. Such a fundamental understanding can best be brought about through the use of United Nations experts, working on the job with dedicated national counterparts.

#### IV. CONCLUSION

54. Technical co-operation activity in statistical data processing continues at a high level. The demand of developing countries for advice and assistance remains high, and the human resources available at United Nations Headquarters for such advice and assistance have been expanded somewhat. It is expected that this sector of technical co-operation will grow on a relative basis in spite of the temporary recession in international development assistance.

55. Progress continues in the exploitation of both software and hardware opportunities in order to increase the quality and effectiveness of computer-related tools available to national statistical offices. The software packages made available, UNEDIT and XTALLY, are being improved and made available to additional countries and installations, and new capabilities are being developed for census and survey process control and assistance in the form of LOGMAP. The rapid emergence of microcomputing technology is being exploited in a number of countries as a means of providing effective, low-cost computing in situations where often no alternative was available in the past. On balance, the picture appears to be one of moderately steady progress; there is optimism that appropriately guided and utilized technical progress can make a significant and meaningful contribution to both the technical and the statistical development of developing countries.