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REPORT ON A MISSION TO GUINEA-BISSAU

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by

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Introduction

The purpose of my mission to Guinea-Bissau was to examine the suitability of the environment for installation of a small computer to assist in the processing of Guinea-Bissau's first population census, scheduled to be taken late in 1978. The population census is being assisted by UN project GBS/76/PO2, which is executed by UNOTC and which received substantive backstopping from the UN Statistical Office.

I concentrated upon four areas: (1) whether there will exist the physical facilities to install a computer and associated equipment in Bissau; (2) whether there existed sufficient human skills and intellectual capacity to be able to absorb knowledge of computer operations and programming, and whether a locally directed post-census computer operation could be viable; (3) what interest in and demand for computer services existed in other branches of government; and (4) the nature and extent of possible cooperation with the Government of Cape Verde.

No UN experts for the Census project had yet arrived when I was in Guinea-Bissau, and I worked closely with Ms. Mary Zephirin, the UNDP Program Officer responsible for the project, on the issues discussed in this report. Annex 1 contains a list of the other persons with whom I had discussions related to the mission.

Electric Power Supply

Electricity in Guinea-Bissau is generated and distributed by the government-owned power company. Alternating current at 50 Hertz is supplied at 220 volts and 380 volts. In practice, the voltage fluctuates between 200 volts and 230 volts, and the frequency is within the range 49-51 Hertz.

Power is generated in Bissau using 3 diesel generator units at present. Their capacities are:

<u>Unit</u>	<u>Capacity</u>
A	3000 KVA
B	2100 KVA
C	1700 KVA

Unit B is now broken down, but should be fixed by July. In addition, by July 6 new units capable of generating 250KVA each will be put into service. Thus, while there is now 4700KVA of power available, after July 1977 there will be 8300KVA of power available, all in Bissau. M. Huon, a resident UNDP expert who is assisting the country to upgrade their power system, believes that after this change the power supply will be quite dependable and that less than one power outage a month should occur.

There are plans for a hydroelectric power generating station, but M. Huon estimates that it will not be in service for 8-10 years. Diesel generators will furnish all available power during the interim period.

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M. Huon believes that there will continue to be occasional voltage surges and that any computer equipment should be protected by installing a "disjoncteur magneto thermique" (voltage stabilizer) between the power supply and the computer. He also believes that a substantial fraction of problems are caused by feeder cables. This can be eliminated by installing new cabling of sufficient capacity to the computer site. Since this site will be in a building presently being renovated, proper planning should be sufficient to obtain the appropriate feeder cable connection. I estimated at that time that the power requirements of the computer and associated data preparation equipment would be at most 15 amperes at 380 volts.

The electrical plugs used in Guinea-Bissau should have 5 connector pins, 4 round pins in a square shape for lines R, S, T, and N (neutral), and two opposing rectangular connections on the circumference of the plug for connection to ground.

Computer Site Preparation

I discussed the requirements for a computer site with both the Acting Director of Statistics and the Commissaire of Economics and Planning. I estimated at that time that a room approximately 13' by 26' (4 meters by 8 meters) would be sufficient to house both the computer and the data entry equipment. They said that one of the adjacent buildings was currently being renovated and that this space could easily be made available in it. The renovation is scheduled to be completed by the end of 1977. Some air conditioning will be necessary, but temperature need not be controlled within precise limits. Humidity control is somewhat more important.

Possible Physical Requirements

If the minicomputer to be supplied is an IBM System 32, and if the data recording equipment to be used consists of two IBM 3742 Dual Station Data Recorders, as is likely, then the physical requirements for installing this equipment consists of the following:

- (1) 3 KVA (with a potential 10 KVA surge upon starting)
- (2) Air conditioning to handle 5000 BTU per hour

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It should be noted that transportation and communication for servicing the computer equipment is adequate. Assuming that the service will come from Dakar, there are 4 round trip flights between Dakar and Bissau every week. Telephone service between the two cities is quite good. There is occasional freight transport by sea, but there is a moderately good road connecting the cities which is passable by private car and by truck.

For Cape Verde, there are two weekly round trip flights between Dakar and Praia. There is only one weekly round trip flight between Bissau and Praia, but there are two other round trip possibilities if one transfers at Ilha do Sol, which is on a different island from Praia. Telephone service between Bissau and Praia is not very good.

For backup maintenance and assistance, telephone service between Guinea-Bissau and both Brazil and Portugal is good. Thus, for any serious problems, there is good communication with a number of sources of capable assistance.

Thus, it seems feasible that computer service could be provided on an "on call" basis from Dakar to both Praia and Bissau, assuming that there are no time critical jobs on either machine.

There are two major computer manufacturers with branch offices in Dakar that may be willing to supply data processing equipment to Guinea-Bissau or Cape Verde or both. They are the IBM Corporation and Honeywell-Bull. The Statistical Office will begin discussions promptly with both companies to determine what equipment and services they are willing to provide. I expect it is almost certain that purchase of appropriate equipment and "on call" service will be available from at least one company. OTC will be notified of the results of such contacts, and the Statistical Office will provide a specific recommendation as soon as all the relevant information has been collected.

While in Bissau I toured the printing facilities belonging to the Ministry of Information. There are a number of presses, about 5-6 automatic line-type machines, equipment for making fractional tones and reproducing photographs, and a medium size photo offset system. There is currently a Swedish bilateral aid project to improve the printing capacity of the Ministry. The Minister of Information has promised full cooperation with respect to the printing requirements of the Census, subject to a corresponding inter-ministerial transfer of funds. The current facilities are underutilized at the present time. I believe that the projected facilities will be more than adequate for handling all the census printing needs, including printing of the final tables directly from computer printout provided that the printout can be supplied in fully labelled and publishable form.

I conclude that the physical facilities exist in Bissau for supporting a computer operation and that the installation of the computer operation will be moderately easy. Provision should be made in the budget for a voltage stabilizer to be placed inbetween the public power source and the data processing equipment.

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Human Resources

In order to determine the likelihood of having sufficient human skills and counterpart resources in Guinea-Bissau, I talked with a number of people both inside and outside of the government.

I gave a talk at the Lycée Kwame Nkrumah to a part of the graduating class, describing the forthcoming census, its importance, the role of computers, how computers work, and what professional roles are associated with them. There was substantial interest shown, and afterwards a group of 12 students stayed to ask questions. They were very interested in receiving reading materials about computers and informatics (preferably in Portuguese) and I made a commitment to locate some and send it to them.

The class I addressed was a mathematics class, and they were studying analytic geometry and differential calculus. Based upon an understanding of their studies and their questions, I believe that some of these students are capable of learning to become computer programmers, operators, and analysts.

Secondly, there was significant interest in using the computer from the ministerial level downward wherever I went. In particular, there seemed to be a willingness to allocate some departmental resources to learning how to use the computer.

Thirdly, we were able to locate a suitable candidate for a short term intensive fellowship in informatics and who is interested in taking it and assuming a key role in the development of computing in Guinea-Bissau or Cape Verde. The individual is Mrs. Gabrielle Leite (full name cited in annex 1), who is a Cape Verde citizen living in Bissau with her husband, who is the Director of Public Works for Guinea-Bissau. Mrs. Leite has a 6-month old baby and is currently not working, but she wants to return to work at the end of this year.

Mrs. Leite has a university degree in mathematics from Portugal. She has studied calculus, differential equations, probability theory, statistics, group theory, linear systems, numerical methods and linear programming. She is very well qualified to undertake a short-term intensive introduction to informatics and to serve as the counterpart (homologue) to the UN Census Data Processing Expert.

I encouraged the Government to nominate her as a fellowship candidate, and to send with her nomination a transcript of her university training. Such a transcript will be very useful if not necessary to obtain admission to the appropriate course of study in informatics. Since Mrs. Leite is fluent only in Portuguese, I recommend that OTC, through its Fellowships Section, promptly request information from the Brazilian and the Portuguese governments regarding suitable short term programs. Information about these programs may be forwarded to the Statistical Office for evaluation.

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I believe that there are sufficient human resources to support a computer installation in Bissau. The government should be aware, however, that in order to attract local candidates to work in such a center they will have to offer incentives comparable to those available to university graduates, since they will be competing for the same caliber of person. If they offer inferior status, salary, or opportunity, or make the positions distinctly inferior in any other significant way from positions that are attainable by university graduates, then the center is quite likely to fail, and the government should reconsider whether it wishes to embark upon such an undertaking. If the government is willing to ensure status, salary, and career opportunities and progress in this area, I believe that a quite successful computer center can be established for Guinea-Bissau.

Further Uses of A Computer in Guinea-Bissau

The processing of population census data in a country takes a relatively short time compared to the economic lifetime of most digital computers. While the data processing requirements of a census often provide the "critical mass" required to introduce computing facilities in a country, there are generally other procedures which can readily take advantage of computing resources, once they are available in a country. Such an advantage is of course transient and less effective unless there is some guarantee that the facilities will be available on a permanent basis rather than just for the census data processing cycle.

Given the current price/performance characteristics of modern computers, the modular nature of capacity which can be obtained, and the part that informatics can play in the development of a country, it is reasonable to consider purchase of a mini-computer for the Guinea-Bissau census project (and possibly also for Cape Verde). Such a minicomputer can now be purchased for approximately U.S.\$60,000 or less, so that the cost saving of rental (if available as an option) is not large. Furthermore, the continued presence of some computer processing in any country taking a population census is highly desirable if the country is to be able to use the census microdata for public policy purpose after the formal printed census output has been generated.

Assuming a permanence of computing capability in Guinea-Bissau, the next thing to note is that even during the census data processing cycle there will be some excess computing capacity available for other uses. This is primarily because Guinea-Bissau and Cape Verde are relatively small countries with relatively simple censuses and it is not cost effective (nor may it be feasible) to acquire a mini-computer smaller than a certain size -- at least at the present time. While census data processing should have first priority on any computer time needed for it, other incipient computer-based applications can begin to use the computer on a lower priority basis, and can expand to use additional capacity as the census work tapers off and as experience using the computer is acquired by other ministries.

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Assuming such a pattern of future computer use in Guinea-Bissau, I attempted to talk with anyone in the country who might be a serious candidate to be a future computer user. A summary of these contacts follows.

External Trade. I discussed possible future use of a computer with M. Sergio Ramos, an UNCTAD expert who functions as the principal adviser to the Government for external trade. He has a staff of two who work on trade promotion and trade exhibitions. He is strongly interested in learning how to use a computer, and he would train at least one of his staff also if there was an opportunity to do so. He feels that he could use a moderate amount of computer time on a daily basis for the production and analysis of trade statistics and for monitoring the balance of trade. M. Ramos expects to stay in Guinea-Bissau until at least October 1978.

Central Bank. I was not able to see anyone at the Central Bank; the Governor was very sick and no one else at the Bank was ready to discuss the issue. Nevertheless, I believe that the Bank would be ready to use some computer time if it were available; banks are often early computer users because of their reliance upon timely accounting procedures involving a substantial amount of data. I visited the bank and noticed that there were a substantial number of electric calculators being used.

Ministry of Information. The Minister of Information, Manuel dos Santos, with whom I did not speak directly, was very interested in the possibility of use of a computer to be installed in Guinea-Bissau and intends to commit the time of some of his staff to learn how to use it. Mrs. Aschberg, who is one of his staff members, would like to use a computer to begin a document archive i.e., a national documentation center, for the country and to start a basic document information storage and retrieval capability to support government operations.

Treasury. I was not able to meet with the Director-General of the Treasury (Mme. Marie Louisa Cabral) due to a scheduling conflict. However I received several opinions from secondary sources that use of a computer for budget operations would probably be welcomed.

Ministry of Economics and Planning. This ministry contains the Statistical Office, which will be the initial user of the computer for the population census. However there is interest in using the computer for other statistical operations as well as supporting planning functions.

In summary, it appears to me that there are many potential uses for a permanent computer facility in Guinea-Bissau, and that such a facility would both assist the transfer of technology to the country and support its economic and social development.

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Cooperation Between the Governments of Guinea-Bissau and Cape Verde

Certain forms of cooperation between the Governemnts of Guinea-Bissau and Cape Verde in their population census projects seems to me to be reasonable, mutually beneficial, and an efficient use of resources.

Just before leaving on this mission I received a copy of the "advanced form" of the project document for CVI/76/P02, the Cape Verde census project, and I reviewed it in the field with staff members of the UNDP office in Bissau who had not yet seen it. UNDP has in the past serviced Cape Verde from Bissau with a representative in Praia (capital of Cape Verde), but they are now in the process of elevating the Praia office to have full stature. There are apparently some communications problems during this transition period.

In particular, it was noted with satisfaction that the Government of Cape Verde wishes to cooperate fully with the Government of Guinea-Bissau in census activities. However the plan for doing so caused some concern; apparently Cape Verde wants to borrow th Guinea-Bissau experts occasionally and for varying periods of time without any charge to its own project budget. It seemed that such proposed cooperation should have the concurrence of all parties involved.

Certainly there is good reason to encourage such cooperation, and it is supported historically. The native language in both countries is Portugese, and there are similar cultural traditions. An unusual circumstance is that both countries have the same political party. Further, both countries are relatively small, with a combined population of about 1 million persons.

I do not wish to comment upon the sharing of resources outside the data processing area, except to note that both Mr. Zepherin (UNDP Bissau) and I thought it was probably unrealistic for the two projects to share one project manager/census expert, given the problems of travel both within and between the countries and given the lack of a solid statistical infrastructure in either country. Therefore, the following plan is based upon the assumption that there will be a resident full-time project manager for each project.

First, on the basis of introducing a computer into Guinea-Bissau both for processing the census data and for supporting other possible computer-based government applications, I support the acquisition of a small computer for Guinea-Bissau. Also, based upon a similarity between the two countries and a shared heritage and goals (and therefore probably similar development paths), I support Cape Verde's request for their own small computer installation. Note that the savings in having only one installation are only moderate and may well be offset substantially be continuing transportation and communications costs. Further, not having a computer in Cape Verde will seriously weaken the potential of its use for day-to-day activities as well as make more ineffective any remote use. Thus, for these and other reasons, I support two small computer installations, one in Bissau and one in Praia.

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Some sharing of data entry equipment and of the census data processing adviser can be done successfully. First, the data entry workload is assumed to be the following. For Cape Verde, assuming 300,000 persons, 40 characters of information per person (including the prorated household information), a data entry speed of 6,000 characters per hour, an equal time to verify, two 8-hour shifts per day, and a working week of 5 days, then 4 data entry stations used for 3 months will do the entire job. For Guinea-Bissau, using a population estimate of 900,000 persons, 4 data entry stations for 9 months will complete the task. The above assumptions are based upon experience in similar census projects in Africa.

The plan I propose for consideration by the Governments of Guinea-Bissau and Cape Verde is illustrated in the figure, "Data Processing Schedule," included in this report. It contains the following components:

1. The data processing expert arrives in April 1978, spends most of his time for 3 months in Praia, training people how to use the computer and enter data. He splits the next 6 months between Bissau and Praia; in Bissau he repeats the training courses given in Praia, and in Praia he supervises the census data processing operations. After that he spends most of his time in Bissau until the census data processing is completed.
2. Two similar or identical computers are purchased. One is installed in Praia in May 1978, and the other is installed in Bissau in August 1978.
3. A data entry unit (consisting of two key-to-disk stations on each unit) is to be purchased and installed in both Praia and Bissau at the same time the computer is installed.
4. A third data entry unit is to be rented (rather than purchased) and installed in Praia at the same time as the other equipment, used there until the Guinea-Bissau enumeration when it is to be moved to Bissau. It is to be used in Bissau until the end of the census data processing activity and then should be returned to the supplier.
5. The holder of the informatics fellowship should study during the first three months of 1978 and then return to work as counterpart to the data processing expert initially in Cape Verde and then full-time in Guinea-Bissau.
6. If a suitable candidate for intensive training in informatics can be found in Cape Verde, his training should also take place before April 1978. Existence of such a person will help to make the Cape Verde census data processing more successful.

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If this plan is acceptable to all parties concerned, the job description of the data processing expert will have to be amended to include: (1) residence split between both countries; (2) a starting date of 1 April 1978; and (3) a duration of 18-21 months. No other changes should be required.

Software

Two types of computer software will be most required to process the census data, software for editing and software for producing tabulations. In addition, there will be a variety of auxiliary computer-based tasks for which relatively simple, special purpose programs will be needed.

The United Nations Statistical Office expects to be able to supply software for both editing and tabulation. The tabulation program, XTALLY, is currently available for a variety of small computers that support the RPG-II (Report Program Generator-II) language, and it is being used to produce census tables in a number of developing countries. A copy of the XTALLY program description was left with the Statistical Office. An edit program is also being written in RPG-II and should be available later in 1977, well in advance of the time required by either Cape Verde or Guinea-Bissau.

At an appropriate time, the Statistical Office will be pleased to make available these programs for census processing, as well as any others that it may develop in the interim period.

Conclusion

In my opinion, conditions appear moderately favorable both for the installation of computers in Guinea-Bissau and Cape Verde for the processing of their population censuses and for the establishment of initial national centers for computation. In Guinea-Bissau it appears that suitable physical facilities will be made available for such a center and that, apart from the necessity for a voltage regulator, the public power supply will be quite adequate. A good data processing counterpart who is interested in the field has been located. The government will have to ensure that sufficient incentives exist to attract qualified people into this activity.

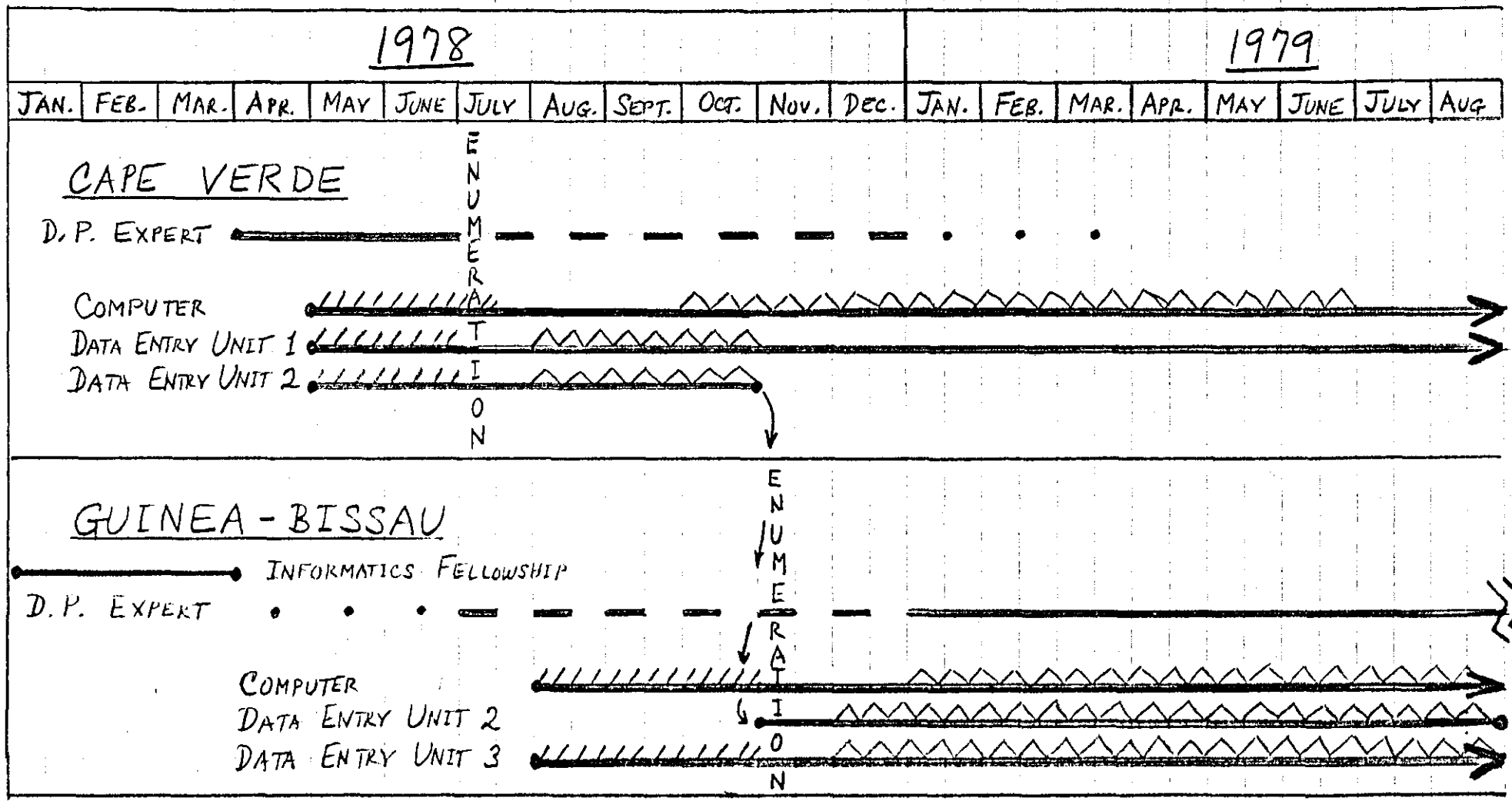
I also appears that some active cooperation is possible between Guinea-Bissau and Cape Verde, with the possible sharing of a census data processing expert and some data entry equipment. The feasibility of such an arrangement is based upon the assumption of a full-time census expert/project manager in each country.

Software for processing census data is available for many small computers, and the Statistical Office will be pleased to make it available when it is required.

MAY 18, 1977

DATA PROCESSING SCHEDULE

GUINEA-BISSAU AND CAPE VERDE POPULATION CENSUSES



ANNEX 1. Persons With Whom Discussions Were Held in Bissau

- Ms. Cecilia Antolin, Portugese Cooperant, Lycée Kwame Nkrumah, Bissau
- Mrs. Berith Aschberg, Staff Member, Ministry of Information, Bissau
- M. Vasco Cabral, Commissaire à l'Economie et à la Planification, Bissau
- M. Henri Huon, UNDP Expert in Electrical Energy (Project GBS/75/004), Bissau
- Mme. Gabrielle Augusta Vieira Ramos Nobre Leite, Mathematician, Rua
de Boer 28, Bissau
- Mr. Anders Lindeberg, UNDP Associate Expert, Statistical Office, Bissau
- M. Diogenes Olivera, Acting Director of Statistics, Bissau
- Ms. Ida Paquin, UNDP Office, Bissau
- M. Sergio Ramos, UNCTAD Expert, Bissau
- Ms. Mary Zephirin, UNDP Project Officer, Bissau