DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service
Centers for Disease Control

Memorandum

Date January 18, 1982

From Howard I. Goldberg, Ph.D., Demographer, Program Evaluation Branch, Family Planning Evaluation Division, Center for Health Promotion & Education (CHPE)

Subject Foreign Trip Report (AID/RSSA): Dakar, Senegal: October 12-18, 1981; and London, England, October 19-22, 1981.

To William H. Foege, M.D.
Director, Centers For Disease Control
Through: Horace G. Ogden
for Director, CHPE OIT

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SUMMARY

I was invited to Senegal by officials of the Senegalese Office of the Census and USAID/Senegal. I was primarily engaged in three activities while I was there. First, I attended a conference for the presentation and discussion of the results of the 1978 Senegalese Fertility Survey (SFS), at which I presented a paper primarily on use of the SFS for examining the factors which are controlling Senegalese fertility. Second, I held discussions with USAID and Senegalese officials regarding a health status-family planning survey to be conducted in 1982 in the Sine-Saloum region of Senegal. I am scheduled to return to Senegal in February 1982 to define the sampling plan, finalize questionnaire content, carry out a pretest and to further plan for the survey field work. This survey is being funded by the USAID Mission. Third, I explored the possibility of a Senegalese demographer coming to CDC with the SFS data tape so that more extensive analysis may be carried out than is able to be done in Senegal due to limited access to computer facilities. Besides these three activities, I was also involved in discussions concerning the possibility of conducting a contraceptive prevalence survey in Dakar.

Enroute to Atlanta, I proceeded to London for consultations with various people at World Fertility Survey Headquarters. I discussed and worked on several collaborative projects dealing with contraceptive prevalence survey data with Dr. John Anderson from CDC. I also talked to Dr. Benoit Ferry, a demographer with Senegalese survey experience, and with other demographers at WFS who were helpful in regard to other analyses I am working on. Lastly, at their request, I gave a seminar at WFS on an analysis of Sri Lankan WFS data I have worked on.

I. PLACES, DATES, AND PURPOSE OF TRAVEL

Dakar, Senegal, October 12-18, 1981, at the request of USAID/Senegal and Senegalese Census Office officials. The purposes of the trip to Senegal were threefold: (1) to attend and present a paper at a conference set up for presentation and discussion of the results of the 1978 Senegalese Fertility Survey (SFS), whose findings were recently released; (2) to consult with USAID/Senegal and Senegalese officials concerning the planning and implementation of a proposed health status-family planning survey in the Sine-Saloum region of Senegal; and (3) to discuss with Senegalese officials the possibility of CDC's providing assistance in performing detailed analysis of the SFS.

London, England, October 19-22, 1981, in order to: consult with Dr. John Anderson at World Fertility Survey (WFS) Headquarters regarding several collaborative projects on which we are working; to consult with Dr. Benoit Ferry of WFS regarding the aforementioned Sine-Saloum health survey; and to consult with others at WFS concerning various demographic analyses which I am carrying out at CDC.

This travel was in accordance with the Resource Support Services Agreement (RSSA) between the Office of Population, AID, and CDC/CHPE/FPED.

II. PRINCIPAL CONTACTS

USAID/Senegal
Dr. Michael White, Health, Population, and Nutrition Officer

Senegalese Census Office
Mr. Ibrahim Lamine Diop, Chief
Mr. Lamine Gueye, Demographer

World Fertility Survey (in Senegal)
Dr. Chris Scott, Chief of Data Collection
Dr. Robert Hanenberg, Demographer (SFS Coordinator)

World Fertility Survey (in London)
Dr. John Anderson, Demographer
Dr. Benoit Ferry, Demographer
Dr. John Cleland, Demographer

III. SEMINAR ON THE SENEGALESE FERTILITY SURVEY (SFS)

In 1978, a nationwide survey, the SFS, was carried out to learn about fertility, contraception, marriage, infant and child mortality, and other related topics in Senegal. This survey consisted of in-depth interviews with about 4,000 women throughout Senegal. It was carried out as part of and sponsored by the World Fertility Survey, a London-based organization which has been responsible for several dozen such fertility surveys in nations (primarily developing nations) throughout the world since the mid-1970s.

The initial findings of the 1978 SFS have recently been compiled and published. Thus, a seminar was held October 13-15 in Dakar for the purposes of officially presenting the major findings of the survey, discussing these findings and their implications, and presenting papers pertaining to the demographic situation and to population problems in Senegal (see Appendix 1 for the seminar agenda). I was invited by the seminar coordinators to attend the seminar for three reasons.

First, CDC/FPED has considerable interest in the results of the SFS because of our involvement in the evaluation of health and family planning programs in Africa. Also, the possibility had been discussed by the Senegalese and by USAID/Senegal of our working with Senegalese researchers on further analysis of SFS data; there is still a need for more extensive analysis of the data. Familiarity with the survey and discussions with those who conducted it would be a necessity if such consultation were to come about.

Second, I was asked by Senegalese census officials and by USAID/Senegal to write a paper for presentation at the conference. This paper, entitled "Use of the Senegalese World Fertility Survey to Estimate the Importance of Natural Fertility Factors," discusses how the SFS data may be used to analyze the factors which are keeping fertility from being higher than it actually is, and suggests other types of data that may be used to supplement the SFS preliminary report in such an analysis and/or data that would be needed in future surveys. This paper is included as Appendix 2 to this report.

Third, the seminar afforded the opportunity to consult with others who had recently been involved in carrying out a population-based survey in Senegal. This was important because, at the time, we were in the initial stages of planning a population-based health survey in one region of Senegal with the USAID Mission (see Section IV). Not only the Senegalese involved in the SFS, but also the Chief of Data Collection for WFS (Dr. Chris Scott) and the SFS Coordinator (Dr. Robert Hanenberg), and Dr. Henri Cantrelle, who has extensive survey experience in Senegal, attended the conference in Dakar. Conversations with all of these people proved very helpful in determining needs for the health survey as well as learning more about the SFS and the population of Senegal.

IV. THE SINE-SALOUM HEALTH STATUS SURVEY

Since 1978 USAID/Senegal has been supporting a health project in the Sine-Saloum region, an area of about 1 million people, approximately 3 hours southeast of Dakar. This project consists of the establishment of small health posts throughout the rural areas of Sine-Saloum, which provide a limited assortment of medical supplies and services. Once established, these posts are intended to be self-sustaining through the small fees paid for supplies by users of the posts.

USAID has included a survey in the Sine-Saloum region of Senegal as part of the project to determine the health status and needs of those people living in areas currently served, or which may in the future be served, by these health posts. Such a survey will provide baseline health data for women and children with no contact with the posts as well as data for those who have used them. Such data should give an idea of the kinds of health services that are needed, the coverage of the services presently being offered, and the knowledge and use of the health posts which currently exist. The survey is also intended to examine the use of maternal and child health services, levels of overall and unwanted fertility, and those factors which are likely to be significantly influencing childbearing (breastfeeding, postpartum abstinence, polygyny, spouse separation, pathological sterility, and contraception). Breastfeeding shall be studied both as it relates to health and to fertility.

It was proposed by USAID/Senegal that a demographer and a medical epidemiologist from CDC provide technical assistance to the Senegalese in conducting this health survey. During this trip, I gained familiarity with the health project and discussed the objectives of the survey as well as problems which may be encountered in doing survey work in Senegal. I also reviewed possible sample frames from which to draw samples (census maps, lists of census districts, etc.). Discussions were held with Dr. Michael White, AID/Senegal Population, Health, and Nutrition Officer, who proposed the survey; Dr. Henri Cantrelle, a French health and population expert with considerable experience in Senegal; and with officials of the Senegalese Office of the Census regarding various aspects of the survey, health conditions, and the health project itself. More specifically, subjects discussed included the topics to be covered in the survey, possible sampling strategies, the availability of sampling lists, descriptions of Sine-Saloum and its health problems, the objectives and status of the health project, and numerous other local considerations affecting the carrying out of surveys in Senegal.

After my return to the U.S., discussions were held between myself, Dr. David Heymann, medical epidemiologist who is fluent in French, Dr. Leo Morris, Chief, PEB, Mr. Jay Friedman, French-speaking PEB family planning evaluation consultant, and others regarding the proposed survey. In December Dr. Heymann was in Africa and added several days in Dakar to his itinerary for discussions with Dr. White and health officials in Senegal to further define health variables to be included in the survey. A draft questionnaire will be sent to

Senegal in January, and at this time, it is planned that Mr. Friedman and I will return to Senegal in February to finalize questionnaire content, carry out a pretest, determine the sampling plan, and explore other details concerned with field work such as transportation, the dates the survey will be carried out, interviewer availability, and making final budgetary plans.

V. OTHER SENEGAL ACTIVITIES

A. Assistance in Analyzing SFS Data.

Prior to my being invited to Senegal it was proposed by the USAID Mission that CDC might assist the Senegalese in secondary analysis of the Senegalese Fertility Survey data; only the initial analyses have been carried out to this point. The USAID Mission proposed this because the initial analysis did not include many health, fertility and mortality analyses that the Mission needs for project papers, as well as evaluation of projects. Because of very limited computer access and the small number of demographers with adequate expertise in data analysis in Senegal, it was thought that CDC could play a major role in assisting the Senegalese. It was suggested by FPED that we could bring a Senegalese demographer to CDC, along with the SFS data tape, for a period of about 2 weeks, during which time we would collaborate on any analysis they and the USAID Mission wanted to perform. After the 2 weeks, the data tape would go back to Senegal with the visiting Senegalese.

Initial conversations with Mr. Lamine Gueye, the demographer who would have come to Atlanta, led us to believe that the Senegalese were at least as eager about our proposal as we were. However, in talks later in the week with Mr. Ibrahima Diop, the Census Office Director, and Mr. Gueye, we were informed that the Senegalese were not willing to allow the SFS data tape to leave Senegal. They proposed alternately that either I work in Senegal on the analysis, or that Mr. Gueye come to Atlanta without the data tape, where an analysis plan could be worked out. The stated reasons for their rejection of our proposal were that: 1) it would not provide adequate "transfer of technology," i.e., it was felt that it would not adequately improve the ability of the Senegalese to carry out future survey data analysis on their own, and 2) it was the policy of the Statistics Directorate not to allow the tape to leave the country, apparently for fear that others might use the data for their own purposes rather than in the interests of Senegal. We assured them that they would have total control over the data tape and no need to worry about "misused" data. We also contended that doing the work in Atlanta would not only provide as much "transfer of technology" as doing it in Dakar, but would be much more efficient and productive in light of the unlimited computer access at CDC and the presence of others here who could be of assistance. The Senegalese officials, however, decided against our proposal. We left Senegal with no final decision having been made on if or how to further proceed in this matter. It was made clear to Mr. Diop and Mr. Gueye that our offer of assistance remains open to them.

B. Dakar Contraceptive Prevalence Survey (CPS)

Before the SFS seminar, some interest had been expressed by USAID/Senegal, the Senegalese and by the International Fertility Research Program (IFRP) in undertaking a CPS in Dakar. During the conference, a number of Senegalese again showed interest in such a project. In the talks between Dr. White, Mr. Diop, and myself we explored the possibilities of doing such a survey. The reason for limiting the survey to Dakar was that it is likely to be the only area of Senegal with significant use of modern contraceptive methods. (For Senegal as a whole less than 2 percent of women had ever used modern contraceptive methods, and very few show any desire to limit family size.) However, a more detailed look at the SFS results, even in the Dakar region, reveals that use of contraception is exceedingly low. This would likely make the potential benefit to be gained from a conventional CPS very small. Rather, it would probably be more useful to do a survey focusing on all the factors which are responsible for suppressing fertility, not just modern means of contraception. Such information could easily be worked into the Sine-Saloum survey, especially since it relates to health, instead of conducting a separate survey in Dakar.

VI. WORLD FERTILITY SURVEY (LONDON) ACTIVITIES

The principal purpose of visiting WFS Headquarters were discussions with Dr. John Anderson. Dr. Anderson is a demographer from CDC/CHPE/FPED/PEB who is spending a year in a work-study capacity at the World Fertility Survey (WFS) Headquarters in London. The objectives of this work-study program were spelled out in the CDC/FPED memo of July 7, 1981, which was reviewed by AID/POP/FPED and AID/POP/DEMO. He and I are involved in several collaborative projects, about which we held lengthy discussions in London. These projects include:

1. research into the use of contraceptive prevalence surveys for measuring the duration and prevalence of breastfeeding and postpartum amenorrhea;

2. a study of the relationship between breastfeeding and infant mortality in Northeastern Brazil;

3. comparisons of the results of CPSs and the detailed fertility surveys carried out by the WFS, particularly in the areas of contraceptive use, fertility, and breastfeeding;

4. research in the further development and application of "P/F ratios," which have proven to be of considerable use in determining the quality of fertility data and in measuring trends and differentials in fertility. We are modifying these ratios (ratios of completed to cumulated current fertility) to make them best suited for use with CPSs.

Discussions were also held with Dr. Benoit Ferry, a French demographer who has spent considerable time doing survey research in Senegal and even performed a demographic survey in Sine-Saloum. His knowledge of population-based survey research in Senegal and his suggestions concerning what might be included in the survey proved very useful to us. Dr. Ferry has also offered to provide assistance in the future if we feel he can be of help.

While in London, I also had a number of discussions with other demographers at WFS regarding several topics. Most noteworthy were talks with Drs. John Cleland and Iqbal Alam concerning research I have been doing on fertility change and differentials in Sri Lanka with data from the WFS conducted in that country. On my final day in London I presented a seminar to the WFS staff concerning my Sri Lankan research. The major topics of this presentation were a discussion of differentials in Sri Lankan marital fertility and an hypothesis as to why marital fertility on Sri Lankan tea estates appears so much lower than expected.

Howard I. Goldberg, Ph.D.

APPENDIX 1

MINISTERE DE L'ECONOMIE
ET DES FINANCES
-:-:-:-
DIRECTION DE LA STATISTIQUE
-:-:-:-

ENQUETE MONDIALE SUR LA FECONDITE
-:-:-:-:-
INSTITUT INTERNATIONAL DE LA STATISTIQUE
-:-:-:-:-

SEMINAIRE DE PRESENTATION
ET DE VULGARISATION DES RESULTATS DE L'ENQUETE
SENEGALAISE SUR LA FECONDITE
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DAKAR 13 - 14 OCTOBRE 1981

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CALENDRIER DU SEMINAIRE
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BEST AVAILABLE COPY

MARDI 13 Octobre

9h.30 - Discours introductif

- président de séance : Monsieur le Ministre de l'Economie et des Finances
- Orateurs : Madame la Directrice de la Statistique
  Monsieur le Directeur de l'E.M.F.
  Monsieur le Coordinateur régional du FNUAP
  Monsieur le Ministre de l'Economie et des Finances

10h.15 - 10h.30 : Pause café

10h.30 - 12h. - Point 1 de l'ordre du jour : aspects particuliers du travail sur le terrain
- Président de séance : Mme la Directrice de la Statistique
- Présentateur : Lamine GUEYE (D.STAT)
- Commentateurs :
  1 - Christ SCOTT (E.M.F, Londres)
  2 - Cheikh Sidi (Enquête fécondité, Mauritanie)
- Rapporteur : Edmond RODRIGUEZ (D.STAT)

12h - 15 h : déjeuner

15h. - 16h.30 : Point 2 de l'ordre du jour : principaux résultats de l'E.S.F.
- Président de séance : Kader FAYE (Secrétaire général de la CONAPOP)
- Présentateur : Ibrahima Lamine DIOP (D.STAT)
- Commentateurs :
  1. A. Malick SOW (Directeur du Plan)
  2. Pierre CANTRELLE (ORSTOM, Paris)
- Rapporteur : Ndiappe NDIAYE (D.STAT)

16h.30 - 16h.45 : Pause café

16.45- 18h.15 - Point 3 de l'ordre du jour : évaluation des résultats d l' E.S.F.
- Président de séance : I. Lamine DIOP (D.STAT)
- Présentateur : Mouhamadou GUEYE (D.STAT)
- Commentateurs : 1 Lamine GUEYE (D.STAT)
  2. A.B. BIOUMLA (E.Fécondité, Camerou
- Rapporteur : Alhousseynou SY (D.STAT)

MERCREDI 14 Octobre

9h.30 - 10h.30 - Point 4 de l'ordre du jour : situation démographique du Sénégal dans le monde

- Président de séance : Fatou SOW (IFAN)
- Présentateur : R. HANENBERG (EMF, Londres)
- Commentateurs :
  1. A. SADIO (D.STAT)
  2. Edmond RODRIGUEZ (DSTAT)
- Rapporteur : Sékou SEYDI (D.STAT)

10 h.30 - 10h.45 : Pause café

10h.45 - 12h. - Point 5 de l'ordre du jour : état actuel des problèmes de population au Sénégal

- Président de séance : Pr Cheikh BA (Université, Dakar)
- Présentateur : Landing SAVANE
- Commentateurs :
  1. Khardiato LO NDIAYE (Projet Population Aménagement, DAT)
  2. Fama BA (CODESRIA)
- Rapporteur : Fara Guedel MBODJ (D.STAT)

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12 h. - 15h. : déjeuner

15h. - 16h.30 - Point 6 de l'ordre du jour : problèmes de population : cas des femmes dans la région du Fleuve

- Président de séance : Fatoumata Bintou BALDE (Guinée)
- Présentateur : Fatou SOW (IFAN)
- Commentateurs :
  1. Lamine GUEYE (D.STAT)
  2. Mar GUEYE (SONED)
- Rapporteur : Cheikh MBACKE (D.STAT)

16.30 - 16h.45 : Pause café

16h.45 - 18h.15 : Point 7 de l'ordre du jour : solutions proposées aux problèmes de population au Sénégal

- Président de séance : Fr. Paul CORREA (maternité, hôpital Le Dantac)
- Présentateur : Ibrahima NDAW (Direction de l'Emploi)
- Commentateurs :
  1. Mme JOHNSON (responsable du planning familial à la PMI)
  2. Mbakhar NDOYE (CONAPOP)
- Rapporteur : A. BARRY (D.STAT)

19h.30 : diner offert au Niani par l'EMF et la D.STAT.

JEUDI 15 Octobre

9h. - 10h.30 : Point 8 de l'ordre du jour : propositions de recherche

- Président de séance : M. SOUGOUFARA (SERST)
- Présentateurs :
  1. R. HANENBERG : politique de l'E.M.F en matière d'analyses approfondies
  2. Lamine GUEYE (D.STAT)
  3. Mouhamadou GUEYE (D.STAT)
  4. etc...
- Commentateurs :
  1. Sylvère LOOKY (Coordinateur régional FNUAP)
  2. Docteur WHITE (USAID)
- Rapporteur : Mamadou SOME (D.STAT)

10h.30 - 10h.45 : Pause café

10h.45- 12h. : discours de clôture

APPENDIX 2

USE OF THE SENEGALESE WORLD FERTILITY SURVEY TO ESTIMATE THE IMPORTANCE OF NATURAL FERTILITY FACTORS

by

Howard I. Goldberg, Ph.D.
Program Evaluation Branch
Family Planning Evaluation Division
Center for Health Promotion and Education

Presented at:
The Seminar for the Presentation of the Results of
the Senegal Fertility Survey
Dakar, Senegal
October 15, 1981

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
Centers for Disease Control
Atlanta, Georgia 30333

INTRODUCTION

Evaluation of the 1978 Senegalese Fertility Survey (SFS) provides a major opportunity to study national fertility factors. The survey was well designed and executed and provides nationwide information in such quantity and detail as has rarely been available in sub-Saharan Africa. The SFS is yielding results which should prove to be extremely useful for Senegal and for those involved in fertility in general and in African demography. By working with the World Fertility Survey (WFS) to carry out a detailed nationwide survey, Senegal is likely to gain a much clearer and more extensive picture of its population processes, problems, prospects, and related areas of interest than the nations of sub-Saharan Africa which have not conducted such a survey. The availability of SFS information regarding fertility, infant mortality, nuptiality, breastfeeding, and contraceptive knowledge and use, to mention some of the most important areas covered, should aid Senegal by allowing evaluation of past and present trends and levels in numerous demographic areas. More importantly, it helps to provide a firm foundation upon which to develop a national population strategy and should be valuable in forming the policies necessary to achieve whatever population goals and, in turn, economic and social goals Senegal might set for itself.

One of the most vital subjects which the survey assesses is population growth and its components. Population growth is a process with far-reaching social, economic, and other implications for any nation. Population growth, of course, consists of three components--fertility, mortality, and migration. The focus of this presentation will be on only one of these components, fertility, and is intended to suggest means of utilizing SFS data

in ways that will enhance the knowledge of trends and levels of fertility in Senegal. I will also discuss other information which, in concert with the SFS, will be likely to contribute to the knowledge of recent Senegalese fertility patterns.

All determinants of fertility, whether biologically or behaviorally based, work through a set of 11 "intermediate variables," as they have been called by Davis and Blake (1956). Bongaarts (1978) distilled these determinants down to eight variables and collapsed them into three categories: exposure factors, deliberate marital fertility control factors, and natural marital fertility control factors (control factors not influenced by parity). Changes in any of the intermediate variables in a population will lead to corresponding changes in childbearing levels and patterns.

As societies in numerous parts of the world have modernized, their fertility has tended to fall, generally through changes in exposure (rising age at marriage) and/or deliberate fertility control measures (increased contraception sometimes combined with greater use of induced abortion). However, these two categories of fertility-depressing intermediate variables, generally associated with economic development, are by no means the only ones of importance in maintaining fertility at levels below their biological maxima; nor are they the only intermediate variables which are likely to change as modernization occurs. Most often discussions of fertility in developing countries center on why childbearing is so high relative to that in

other nations. Discussions less frequently concern why fertility is so much lower than it might be. To examine childbearing from this perspective the natural fertility control factors must be examined.

A listing of fertility rates for the nations of tropical Africa reveals at a glance that in every country one or more factors exist which hold fertility far below the biological maxima. According to the Population Reference Bureau, (1981) almost all nations have total fertility rates above five births per woman, but only a handful have rates as high as seven births per woman. Senegal's 1978 total fertility rate, estimated from the SFS, is 7.0. Such fertility levels, although high by most standards, are far below the levels which would be achieved if childbearing were controlled through neither intentional nor unintentional means. The observed range of potential fertility, according to Bongaarts (1978) is 13.5 to 17.0. Henry (1961) found that Hutterite (a non-contracepting North American population) women married at age 15 would average about 13 births apiece by the end of childbearing.

The two classes of fertility-reducing variables most important in the low fertility populations of the world, exposure and deliberate control factors, are of minor significance in keeping Senegalese women from having far more children than they actually do. Marriage among women in Senegal, as in most of sub-Saharan Africa, typically occurs early in life and is nearly universal. According to the SFS, the mean age at marriage has been about 16 years in recent decades, and over 99 percent of women eventually marry. Therefore, the exposure factor (the proportion of women in sexual unions) is of relatively minor importance in depressing fertility unless there is

considerable marriage dissolution or long-term temporary separation of spouses. Likewise, use of modern contraceptive methods is not an important factor in depressing fertility. Less than 2 percent of SFS respondents claim to have ever used effective methods. (The other intentional control factor, induced abortion, may be somewhat more important than contraception, but the SFS gathered no data on its incidence.).

When employing the results of the SFS to analyze the fertility component of Senegal's population growth, the greatest potential comes from examining the natural fertility control variables (those factors which are apparently chiefly responsible for maintaining levels of childbearing far below the biological maximum) and through determining what effects on Senegalese growth changes in these phenomena could bring about. Knowledge of the factors which shape the various aspects of fertility is vital if one expects to be able to predict future trends and levels of childbearing in the presence of social and economic changes which might occur. Therefore, much of the SFS analysis should focus on the traditional fertility-inhibiting variables in tropical Africa.

Although it is impossible to make unqualified assertions about most features of sub-Saharan Africa as a whole because of its extreme diversity of cultures, some broad generalizations about fertility control may be put forward. Use of modern methods of fertility control are notably rare in most instances. The phenomena most often attributed with suppressing fertility are prolonged breastfeeding and the practice of postpartum abstinence, which prolong

interbirth intervals, and high levels of pathological sterility or subfecundity. (Weis, et al., 1981) Some other factors which might inhibit childbearing are lengthy spouse separations, low coital frequency, and abstinence not associated with the postpartum period (e.g., the termination of sexual relations upon attaining grandmaternal status). Naturally, some of the factors are interrelated. Lesthaege, et al. (1980) present a highly insightful analysis of many of the important issues involved in child-spacing in Tropical Africa. One major premise is that fertility is kept below potential levels via long interbirth intervals rather than through the intentional cessation of childbearing. The SFS results indicate that this generalization most assuredly applies to Senegal.

One potential use that can be made of the SFS results is not only in the study of Senegalese fertility but also in the shaping of population policy. One could evaluate the roles played by various factors in maintaining long birth intervals and total fertility of only 6 to 7 births per woman in Senegal. Once the roles of various factors have been estimated, one may proceed to estimate how changes in them will influence fertility levels and birth intervals. These estimates will aid in projecting how various changes would affect, for instance, growth rates, age structure, family size, and, in turn, future requirements for food, housing, and educational facilities.

EFFECTS OF NATURAL MARITAL FERTILITY CONTROL FACTORS

One procedure for estimating the fertility-inhibiting effects of various factors consists of determining the potential total fertility rate in a population and subtracting the actual fertility. One might start with an

estimate of potential fertility (the mean number of children per woman if everyone married early, had no fecundity impairments and did nothing that would prevent childbearing, intentional or unintentional) of about 15 to 16. This difference provides an estimate of the childbearing averted by all causes combined. Then, an assessment can be made to determine to what degree various factors are responsible for the averted births. This approach closely resembles that used by Bongaarts (1978) who viewed potential fertility as consisting of actual fertility plus fertility inhibited by various causes. In the case of Senegal, the effects of some variables will be measurable from the SFS, but the survey may not provide the means to determine the effects of others. As has been mentioned, the inhibiting effects of contraception and delayed marriage are small and should be easily measured from the SFS data. The natural fertility control variables are the most important in Senegal and throughout sub-Saharan Africa and will be the focus of this discussion.

Breastfeeding

Because lactation delays the resumption of ovulation following pregnancy, it is a major contributor to the lengthy birth intervals found in populations where most children are breastfed for a considerable period of time. Throughout tropical Africa, breastfeeding is almost universally practiced, and breastfeeding durations tend to be quite long. In Senegal, less than 1 percent of SFS respondents did not breastfeed their most recent child (excluding children not surviving long enough to be breastfed), and the mean reported duration of breastfeeding was 20 months. Thus, lactational amenorrhea has undoubtedly contributed to fertility being lower than it might otherwise be

with birth intervals longer than they would otherwise be. In virtually all developed areas of the world, and more recently in some less developed areas, dependence on breastfeeding has decreased. Consequently, breastfeeding durations have fallen dramatically. Of course, such changes lessen the natural contraceptive effect provided to women by lactation.

If one could estimate the fertility which does not occur because of breastfeeding in Senegal, one could also estimate the effects on fertility of any changes in breastfeeding patterns. Bongaarts has derived a simple formula for calculating an "index of lactational infecundability," a ratio of the expected infecund period between a population being examined and a non-breastfeeding population. This measure or some variant of it should be useful in ascertaining the effects of lactation on birth intervals and, thus, on total fertility. Ideally, the age when supplementation begins and the number of times a day a baby is nursed should be taken into consideration when lactational infecundability is calculated, since lactational infecundability tends to be mediated by these and other (e.g., maternal nutrition) factors. Therefore, the amount of contraceptive protection provided by a month of lactation may vary considerably from country to country.

Postpartum Abstinence

A second factor of considerable importance in inhibiting fertility in much of tropical Africa is postpartum abstinence. However, there are some indications that this factor, which is closely related to lactational infecundability, may be less widespread in Senegal than elsewhere. Ferry (1980) reported that in

west-central Senegal "the long postpartum taboo is virtually absent and as a result, the length of the birth interval is largely a function of lactational amenorrhea," by which he may mean abstinence rarely outlasts lactational amenorrhea. Practice may differ in other regions, though. Only about 8 percent of SFS respondents reported ever having used abstinence as a contraceptive measure. However, people practicing postpartum abstinence do not necessarily view its intent as one of contraception, although it obviously prevents pregnancy. It is generally accepted that postpartum abstinence is a common practice virtually throughout Senegal.

Women were not asked about postpartum abstinence in the SFS; therefore any attempt to describe its prevalence and its effects on fertility in Senegal must be by indirect means or by use of other data sources. Most of this abstinence occurs during a period of lactationally-induced infecundability or subfecundability, so the bulk of its fertility-inhibiting effects will already have been accounted for in the breastfeeding analysis. However, in situations where abstinence continues until weaning (a common African practice), there will be a significant fertility inhibiting effect since complete infecundability rarely lasts as long as lactation. When using the methodology suggested, we can attribute the difference between potential and actual fertility not explained by other factors to the combined effects of abstinence and other variables not measurable from SFS data.

Other Variables

Fortunately, the SFS collected information on some of the most important of the other natural fertility control variables, so their individual impacts on

Senegalese fertility and birth intervals may be estimated. Pathological sterility is a major impediment to fertility in some parts of Africa. However, there is strong evidence that this is not the case in Senegal. In 1972, Ferry (1981) found that the proportion of women in Dakar over 30 years of age reporting no live births closely resembled the worldwide "normal" of 5 percent. Likewise, the Senegalese national demographic survey of 1960-61 found only slightly higher levels of sterility for Senegal as a whole. The SFS results show only about 4 percent of women over the age of 30 to be nulliparous. These figures imply that primary sterility is relatively rare. No information on secondary sterility is presented in the published SFS data, but analysis of birth intervals should demonstrate whether it is important.

Temporary separation of spouses for extended periods of time can obviously depress marital fertility. The SFS obtained from each respondent a listing of all separations lasting at least 3 months which occurred since her most recent birth or pregnancy. This information may provide good indications of the prevalence and fertility effects of spouse-separations in Senegal. This variable potentially has noteworthy impact on levels of childbearing since there is significant labor migration of males from Senegal to France and possibly to other African nations.

Polygyny, a common practice in much of Africa may also have a fertility-depressing effect. The presence of more than one wife may decrease the exposure to risk of pregnancy of each. Also, the presence of multiple wives increases the likelihood that any postpartum taboo will be observed. Almost one-half of SFS respondents reported that their husbands had more than one

wife (the sample generally included only one wife per family). Since the SFS includes information on the number of wives of each respondent's husband, the fertility-inhibiting influences of polygyny can be examined by comparing the fertility of women in monogynous and polygynous unions. It has also been suggested that polygyny increases fertility via competition between wives to produce children whereby wives can obtain greater household status and gain favor with their husband.

Unfortunately, information is not included in the SFS on all factors which could be suppressing fertility. Neither postpartum abstinence, as mentioned previously, nor other types of abstinence, such as seasonal or grandmaternal abstinence, are covered. We might obtain a crude estimate of whether grandmaternal status causes the termination of sexual activity based on whether fertility tends to end about 20 years after first birth, even when this occurs during the fecund ages. The incidence of induced abortion (which is not a natural fertility variable) cannot be estimated from the data. Evidence indicates that induced abortion, in fact, is not a rarity in Senegal. However, at present we have no way of measuring its effect on fertility levels.

SUMMARY OF PROPOSED SFS ANALYSIS

It is suggested that the SFS data be used to determine, to the extent possible, the effects of natural fertility factors on childbearing. Instead of looking at the mechanisms which limit fertility, as Bongaarts does, it may be preferable in this instance to investigate the behavorial and physiological factors themselves. For instance, Bongaarts' scheme would jointly consider

the overall effect of all variables which act to lengthen postpartum infecundability. In contrast, in Senegal, we recommend looking separately at the effects of breastfeeding, abstinence and separation. The procedure suggested in this presentation lends itself more easily to policy formation since policymakers would be most interested in the specific factors involved in fertility and to what extent those factors might be modified. It also aids in forming any models of future fertility by allowing one to estimate the results of any specific behavioral changes.

Once the current relationships between various factors and fertility has been evaluated, the next step is to estimate the fertility changes likely to occur if particular factors are altered. Models might be developed, for instance, to show the changes in fertility if the mean duration of breastfeeding were cut in half over a period of several years. It would also be useful to determine how decreases in the prevalence of polygyny or the incidence of induced abortion would alter fertility. Decreases in breastfeeding or abstinence would contribute to increased population growth, a possibility for which planners and policymakers should be prepared. It is often assumed that the forces of development act on fertility only in a downward direction; this is by no mans the case, and it is not surprising to discover at least temporary upturns in fertility in developing nations.

SUPPLEMENTAL DATA

Despite the fact that the SFS provides a substantial amount of valuable information on population processes, as with almost any broad survey, it did not deal with everything that might be considered important by analysts.

Supplementation of the data with more information in three areas, breastfeeding, abstinence, and induced abortion, would provide substantially more complete information on the inhibitors of fertility in Senegal. Additional information might make it possible almost to fully document the causes of the differences between potential and actual fertility.

The SFS data on breastfeeding is already extremely useful. However, since lactation is probably the single most important contributor to the difference between actual and potential childbearing in Senegal and is also related to infant health, it might be examined in even more detail in future health and population surveys. Questions on postpartum amenorrhea, supplemental feeding, and intensity of breastfeeding might be asked. Besides revealing greater detail about breastfeeding practices as they relate to fertility control, such additional information will help determine if changes have begun to occur in breastfeeding practices. If it cannot otherwise be shown to be of minor importance, attempts to learn more about the practice of abstinence and its effects in Senegal would be worthwhile. A simple question on when sexual relations commenced following birth should be all that is needed to determine the prevalence and duration of postpartum abstinence. Such a question has been used in a survey on health and population in Nigeria (Weis, 1981), and is apparently not so sensitive that it cannot be asked on a survey in Senegal.

Since Senegalese law forbids abortion for most reasons, there is little hope of obtaining reliable information on its occurrence by means of a household survey. However, work projected to be done in the near future on the sociomedical costs of abortion complications in Senegal might provide a crude estimate of how commonplace abortion is. Hopefully, this could be translated

into some idea of the amount of fertility reduction through abortion. The key to such an estimate would be trying to determine the proportion of those receiving abortions who seek professional treatment for complications and the proportion requiring hospitalization.

Even without additional data, the SFS affords a major opportunity for describing Senegalese fertility and possible consequences of changes in the factors related to fertility. Since social and economic changes in much of the world are occurring rapidly, one cannot be certain that all fertility variables have remained unchanged since the SFS was conducted in 1978. Therefore, future studies can provide information on whether the various fertility factors show any signs of movement, in addition to adding to the information gathered in the SFS.

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