DEMOGRAPHIC DATA INITIATIVES PROJECT

(Cooperative Agreement No. DPE-3046-A-00-8050-00)

PROGRESS REPORT NO. 4

(MARCH 1, 1991 TO AUGUST 31, 1991)

Submitted to:

Ellen H. Starbird
Project Monitor
Policy and Evaluation, S&T/POP
United States Agency for International Development
Washington, D.C. 20523

by

THE EAST-WEST POPULATION INSTITUTE
1777 EAST-WEST ROAD
HONOLULU, HAWAII 96848

SEPTEMBER 1991

TABLE OF CONTENTS

INTRODUCTION

The purpose of the Demographic Data Initiatives Project (DDI) is to promote broader and more effective utilization of demographic data and population analysis in Asian and Pacific countries.

The scope of work of the DDI cooperative agreement between the AID Office of Population and the East-West Population Institute (EWPI) calls for activities broadly grouped into four categories: technical assistance, training, collaborative research, and dissemination.

The implementation period for the cooperative agreement is August 30, 1988 to August 29, 1993. The following progress report covers the period March 1, 1991 to August 31, 1991.

During the reporting period EWPI carried out almost five and a half person months of technical assistance, produced nine research reports, and published one issue of Asian and Pacific Population Forum and two issues of Asia-Pacific Population & Policy.

SUMMARY OF PROJECT ACTIVITIES

A) Technical Assistance/Travel

During the reporting period EWPI staff performed a total of almost five and a half person months of technical assistance and other project related travel in Bangladesh, India, Indonesia, and Washington, D.C.

Bangladesh:

Research Associate John Laing made an eleven day trip (5/5/91 to 5/16/91) to complete his portion of the main report of the 1990 NGO Family Planning Fieldwork Survey and finish his participation as Study Director. During this visit he turned the project over to Research Associate Andrew Kantner who was in Dhaka for eighteen days (5/5/91 to 5/23/91) to become acquainted with the NGO Fieldwork Evaluation Project, to generate draft NGO Summary Reports and collaborate with consultant Karen Allen.

India:

Research Associate Robert Retherford spent two weeks (5/21/91 to 6/5/91) in New Delhi to design an implementation plan for a four-year project to strengthen the capabilities of the eighteen Population Research Centres (PRCs) of the Ministry of Health and Family Welfare (MOHFW). Dr. Retherford returned to India (7/21/91 to 8/17/91) to develop a tentative plan for the sample design and questionnaire design for the National Family Health Survey (NFHS) as part of the PRC-strengthening project. On the same trip he conducted a three-week training workshop on methods of analyzing fertility and mortality along with Research Fellow Norman Luther for the Office of the Registrar General, India (RGI). Dr. Luther was in New Delhi from July 27 to August 17, 1991.

Research Associate Won Bae Kim and Visiting Fellow Ved Prakash from the University of Wisconsin at Madison spent almost three weeks in New Delhi (7/1/91 to 7/19/91) to conduct a Workshop on Urbanization in India for the RGI's office. Dr. Prakash replaced former Research Associate J.R. Rele who passed away last fall.

Indonesia:

Research Associate Andrew Kantner made a one-month trip to Jakarta (4/3/91 to 5/4/91) to present a summary report highlighting major policy implications stemming from the secondary analysis of the 1987 National Indonesian Contraceptive Prevalence Survey (NICPS). Ongoing and future EWPI technical support for population and health activities was discussed with USAID/Jakarta.

Philippines:

Research Fellow Adelamar Alcantara travelled to EWPI for 18 days (7/29/91 to 8/16/91) and Research Fellow Corazon Raymundo spent three days (8/12/91 to 8/14/91) at EWPI to draft a budget and to refine the collaborative scope of work between the Philippine Department of Health (DOH), the Population Institute of the University of the Philippines (UPPI), and EWPI. They met with Research Associates Minja Kim Choe, Andrew Kantner, and James Palmore. It is anticipated that USAID/Manila will fund the scope of work as an add-on to the DDI cooperative agreement.

Washington, D.C.:

Research Associates Andrew Kantner and James Palmore attended the Demographic and Health Surveys World Conference in Washington, D.C., August 5-7, 1991. The main purpose in attending the conference was to present to selected individuals, including the Indonesian contingent at the conference, the completed report on the Secondary Analyses of the 1987 National Indonesian Contraceptive Prevalence Survey. The two researchers also discussed plans for secondary analyses of the 1991 National Indonesia Demographic and Health Survey with Indonesians attending the conference, USAID personnel, and relevant scholars and practitioners.

B) TRAINING

Three training activities were carried out during the reporting period: the 22nd Summer Seminar on Population held in Honolulu and Hong Kong; the Urbanization in India workshop held in New Delhi; and the Fertility/Mortality workshop held in New Delhi.

These training activities involved a total of eighty-six participants supported by the DDI project including representatives from fourteen countries in Asia and the Pacific: Australia, Bangladesh, China, Hong Kong, India, Indonesia, Japan, Korea, Nepal, New Zealand, Pakistan, Philippines, Sri Lanka, and Thailand.

(i) Twenty-Second Summer Seminar on Population, Honolulu and Hong Kong, June 3 to July 5, 1991

Thirty-six staff, co-coordinators and resource persons, and fifty-six participants from fourteen countries and the United States took part in the Seminar. During the Honolulu portion of the Seminar, participants selected one of three workshops: a) Family Change and Intergenerational Transfers, b) Megacities in Asia, and c) Reproductive Health and Contraception: The Integration of Quantitative and Qualitative Research Methods.

As in previous Seminars, the workshops included expert presentations on specific topics, participants' discussions of problems and possible solutions, hands-on computer programming and analysis of data, and development of research proposals.

The Hong Kong field study tour at the Institute for Asia-Pacific Studies of the Chinese University of Hong Kong provided the participants not only with an on-site view of population programs and their impact on social and economic development, but also a chance to view their training in Honolulu in an Asian

context. Lecture topics in Hong Kong included "Metroplan: Urban Hong Kong Prepares for its Future," "Intergeneration Change of Life Course and Economic Characteristics," and "Reproductive Health and AIDS."

A copy of the Summary Report of the Seminar together with a list of participants supported by the DDI project can be found in Appendix I.

(ii) Workshop on Urbanization in India, New Delhi, India, July 1-19, 1991

This workshop was attended by 12 members of the Registrar General, India, staff and was coordinated by Research Associate Won Bae Kim from EWPI, Professor Ved Prakash from the University of Wisconsin, Madison, and Mrs. Minati Ghosh of the Registrar General's Office. The workshop consisted of lectures and individual research including short exercises using personal computers. Major issues and problems of urbanization and policy responses were discussed both in general context and India-specific context. A major feature of the workshop was participants' presentations on selected states of India, applying the concepts and techniques learned in the early part of the workshop to participants' own knowledge of their individual states.

Appendix II includes a copy of the workshop report plus the agenda and list of participants.

(iii) Workshop on Methods of Analyzing Fertility and Mortality, New Delhi, India, July 27 - August 17, 1991

A three-week training workshop was conducted at the Office of the Registrar General, India, on methods of analyzing fertility and mortality. Research Associate Robert Retherford, and Research Fellow Norman Luther coordinated the workshop for seventeen participants from the Registrar General's Office. Resource persons from the Office of the Registrar General also

contributed to the workshop. Topics included life tables and model life tables; fertility estimation using the P/F ratio method, the parity-increment method, and the own-children method; indirect child mortality estimation using Brass's method; and population projections by the cohort-component method including migration. Exercises were done on hand calculators and finally on personal computers.

Appendix III includes a copy of the workshop report, the agenda, and the list of participants.

C) COLLABORATIVE RESEARCH

A total of nine research sub-projects was completed during the reporting period and copies of the research reports are included as Appendix IV.

AID Fellows, Dr. Christine Costello and Dr. Endang Achadi, visited EWPI for two weeks (6/23/91 - 7/5/91) to consult with Research Associates Chai Bin Park and Minja Kim Choe and to prepare the final report on the Secondary Analysis of the National Indonesia Contraceptive Prevalence Survey (NICPS) 1987 research on the relationship between family planning and child survival. Their reports are forthcoming.

(i) The Importance of Institutional Factors in Development: An Example from Pakistan's Forestry Sector. (And Implications for the East-West Center) by Michael R. Dove (April 1991)

Paper presented in seminar, in the East-West Environment and Policy Institute, Honolulu. This analysis was written with partial funding support from the Demographic Data Initiatives Project (DDI) through a cooperative agreement (DPE-3046-A-00-8050-00) with the United States Agency for International Development and the East-West Center.

(ii) Marriage Patterns and Cumulative Fertility in Indonesia, 1987 by James A. Palmore and Masri Singarimbum (April 1991)

Paper prepared for inclusion in a planned book on secondary analyses of data from the 1987 National Indonesia Contraceptive Prevalence Survey. In part, this paper resulted from cooperative research between the National Family Planning Coordinating Board, Jakarta, Indonesia; the Population Studies Center, Gadjah Mada University, Yogyakarta, Indonesia; and the East-West Population Institute, Honolulu, Hawaii, U.S.A. Funding from the United States Agency for International Development is gratefully acknowledged. The authors also thank Andrew Kantner and Peter Xenos for helpful comments.

(iii) The Coevolution of Population and Environment: Two Case Studies from Pakistan by Michael R. Dove (May 1991)

This analysis was written with partial funding support from the Demographic Data Initiatives Project through a cooperative agreement (DPE-3046-A-00-8050-00) with the United States Agency for International Development and the East-West Center.

(iv) The Transition from Native Forest Latexes to Hevea in Kalimantan: Lessons Regarding Peasant Independence and State Interest by Michael R. Dove (May 1991)

Presented in the panel on "Non-Timber Forest Products in the Pacific Basin", for the XVII Pacific Science Congress, Honolulu. This analysis was written with partial funding support from the Demographic Data Initiatives Project through a cooperative agreement (DPE-3046-A-00-8050-00) with the United States Agency for International Development and the East-West Center.

(v) Completeness of Contraceptive Use Data in the 1987 Thailand Demographic and Health Survey by Minja Kim Choe, Kua Wongboonsin, and Varachai Thongthai (May 1991)

Most of the analysis for this report was carried out at the East-West Population Institute, East-West Center in Honolulu with funding support provided by the Demographic Data Initiatives Project through a cooperative agreement (DPE-3046-A-8050-00) between the Agency for International Development and the East-West Center. These funds included Research Fellowships at EWPI for Kua Wongboonsin, April 1 to May 22, 1991, and Varachai Thongthai, March 25 to May 10, 1991.

(vi) Child Care in Thailand: Determinants and Health Consequences for Preschool-Aged Children by Kua Wongboonsin, Karen Oppenheim Mason, and Minja Kim Choe (May 1991)

Paper prepared for the U.S. Agency for International Development under a cooperative agreement (No. DPE-3046-A-00-8050-00) with the East-West Center. A shorter version of this paper was presented at the annual meeting of the American Sociological Association, Cincinnati, Ohio, August 1991.

(vii) Determinants of Contraceptive Use Dynamics in Thailand: An Analysis of Contraceptive Status Calendar by Varachai Thongthai, Minja Kim Choe, and Kua Wongboonsin (May 1991)

Most of the analysis for this report was carried out at the East-West Population Institute, East-West Center in Honolulu with funding support provided by the Demographic Data Initiatives Project through a cooperative agreement (DPE-3046-A-8050-00) between the Agency for International Development and the East-West Center. These funds included Research Fellowships at EWPI for Kua Wongboonsin, April 1 to May 22, 1991, and Varachai Thongthai, March 25 to May 10, 1991.

(viii) Analysis of the 1987 National Indonesian Contraceptive Prevalence Survey: Implications for Program Evaluation and Policy Formulation by Sumarsono, Sudibyo Alimoeso, Srihartati P. Pandi, and Andrew Kantner (August 1991)

Paper prepared for presentation at the Demographic and Health Surveys World Conference, August 5-7, 1991, Washington, D.C. Paper supported by the U.S. Agency for International Development under a cooperative agreement (No. DPE-3046-A-00-8050-00) and the East-West Center

(ix) So Far from Power, So Near to the Forest: A Structural Analysis of Gain and Blame in Tropical Forest Development by Michael R. Dove (August 1991)

Presented in the Conference on "Interactions of People and Forests in Kalimantan", held at the New York Botanical Garden on June 21-23, 1991; and the Summer Institute of the East-West Center's "Asian Studies Development Program", in Honolulu on August 1, 1991. This analysis was written with partial funding support from the Demographic Data Initiatives Project through a cooperative agreement (DPE-3046-A-00-8050-00) with the United States Agency for International Development and the East-West Center.

During the reporting period, two research subprojects were ongoing for which research reports are in the process of being drafted.

(i) Analysis of Data from the Thailand Demographic and Health Survey (1987) on Birthspacing and Child Health Practices: Research Coordinators, Chai Bin Park and Peter Xenos.

This is a joint research project between EWPI and the Institute of Population Studies (IPS) at Chulalongkorn University, Thailand. There are two subprojects – factors affecting birth interval and the influence of birth interval on infant mortality.

An additional month is required to complete this project. Research Associate Chai Bin Park will travel to Thailand in January to collaborate with IPS researchers Chanpen Saengtienchai and Sakol Siasakul to complete the two papers.

(ii) Analysis of 1988 Survey of Adolescent Sexuality (Thailand): Research Coordinator, Peter Xenos

This is a collaborative project between EWPI and the National Institute of Development Administration (NIDA). The project is presently in the data analysis stage with the focus on multiple indicators of pre-marital sexual experience, and the different response discrepancies among males and females. Research Associate Peter Xenos anticipates the research report will be completed during the first quarter of 1992.

D) DISSEMINATION/PUBLICATIONS

Two editions of the Asia-Pacific Population & Policy briefs and one edition of the Asian and Pacific Population Forum were produced during the reporting period. Copies are included as Appendix V.

Asian and Pacific Population Forum Vol. 4, No. 4, Winter 1990. "The AIDS Prevention Dilemma in Thailand" by Marjorie A. Muecke; "Comments on Wardlow Friesen's 'Economic Activity and Occupation in the Pacific Islands: Issues of Census Classification and Analysis'", by Eivind Hoffman and Response by Wardlow Friesen; News and Announcements: Reviews and Publication Notes (28 pages).

Asia-Pacific Population & Policy No. 16 "Economic Development and Fertility Decline: Lessons from Asia's Newly Industrialized Countries", March 1991.

Asia-Pacific Population & Policy No. 17 "Pakistan's Population Growth: The Need for Action", June 1991.

APPENDIX I

Summary Report

TWENTY-SECOND SUMMER SEMINAR ON POPULATION

June 3 to July 5, 1991

East-West Population Institute

East-West Center

Honolulu, Hawaii

September 1991

The Twenty-Second Summer Seminar on Population was partially supported by a Cooperative Agreement (No. DPE-3046-A-00-8050-00) between the East-West Population Institute and the United States Agency for International Development.

The Workshop on Megacities in Asia was co-sponsored by the United Nations University headquartered in Tokyo, Japan.

The field portion of the Seminar was hosted by the Hong Kong Institute for Asia-Pacific Studies of the Chinese University of Hong Kong.

Substantial cost-sharing for individual participants was received from the following organizations:

- Aga Khan University, Department of Community Health Services
- Australian Institute of Family Studies
- Australian National University, Child Survival Project
- Government of Thailand, Ministry of University Affairs
- Japan Institute of Labour
- Korean Research Institute for Human Settlements
- Statistics Bureau of Japan, Management and Coordination Agency
- United Nations Fund for Population Activities
- University of Pennsylvania, Population Studies Center
- World Health Organization

15

CONTENTS

INTRODUCTION

The Twenty-Second Summer Seminar on Population was held in Honolulu, Hawaii, and Hong Kong, from June 3 to July 5, 1991. The program provided an opportunity for professionals to share and increase their knowledge of population and development issues and, in some cases, to develop plans for research collaboration. In all, 67 people, including seminar coordinators, resource people, and 56 regular participants from 15 countries, took part in the seminar. This report summarizes the Honolulu portion of the seminar and includes the agenda of the Hong Kong program.

During the Honolulu portion of the seminar, participants took part in one of three workshops. The workshop topics were (1) Family Change and Intergenerational Transfers, (2) Megacities in Asia, and (3) Reproductive Health and Contraception: The Integration of Quantitative and Qualitative Research Methods. The workshops included expert presentations on specific topics, participant discussions of problems and possible solutions, and, in some cases, hands-on computer programming and analysis of data or development of written research strategies related to the workshop topics. The program of each workshop is described in detail later in this report. In addition to workshop activities, there were numerous seminar-wide activities.

On June 29, seminar participants and staff members left Honolulu for the Asian portion of the seminar, cosponsored this year by the Hong Kong Institute of Asia-Pacific Studies of the Chinese University of Hong Kong. The seminar group arrived in Hong Kong on Sunday evening, June 30.

SEMINAR-WIDE ACTIVITIES, HONOLULU

Sunday, June 2	East-West Center Orientation Valerie C. Wong, Program Officer, EWPI, and Assistant Seminar Coordinator Norma Uejo, Summer Seminar Assistant
Monday, June 4	OPENING CEREMONY Moderator: Valerie C. Wong, Assistant Seminar Coordinator Welcoming Remarks: Kenji Sumida, Interim EWC President Introduction of Seminar Staff and Coordinators: Griffith Feeney, Seminar Coordinator Introduction to Participant Services: Melinda Wood, EWC Acting Participant Services Officer Introduction of Participants: Workshop Coordinators Seminar Arrangements: Norma Uejo
Saturday, June 8	CROSS-CULTURAL ISLAND EXPERIENCE
Saturday, June 15	POLYNESIAN CULTURAL CENTER
Sunday, June 23	INSTITUTE PICNIC AT KALAMA BEACH PARK
Friday, June 28	WORKSHOP REPORTS AND CLOSING CEREMONY Opening Remarks: Robert Gardner, Acting Institute Director

Friday, June 28 (continued)

Workshop Presentations

Family Change and Intergenerational Transfers
Megacities in Asia
Reproductive Health and Contraception: The Integration of Quantitative and Qualitative Research Methods

Presentation of Certificates and Leis: Workshop Coordinators

Honolulu Departure Arrangements and Closing Remarks: Valerie C. Wong, Assistant Coordinator

WORKSHOP REPORTS

FAMILY CHANGE AND INTERGENERATIONAL TRANSFERS

Coordinators:	Nancy Riley, EWPI; S. Philip Morgan, University of Pennsylvania
Resource Persons:	Thomas Fricke, University of Michigan
Guest Lecturers:	Karen Mason, EWPI; Robert Retherford, EWPI
Participants:	Ferdousi S. Begum, Bangladesh; Angelique Chan, U.S.A.; Laura J. Duberstein, U.S.A.; Helen Glezer, Australia; Yean-Ju Lee, Korea; Zai Liang, China; Qian Liu, China; William P. Marton, U.S.A.; Vinod Mishra, India; Tee Liang Ngiam, Singapore: Bhanu B. Niraula, Nepal; Robert F. Schoeni, U.S.A.; Janardan Prasad Singh, India; Siriwan Siriboon, Thailand; Keita Takeda, Japan; Danyu Wang, China; Benedicta Alvarado Yabut, Philippines

This workshop focused on the ways in which relationships and transfers across generations are altered and maintained as families and societies change. Transfers are important for a number of reasons: they are important in accounting for levels and changes in fertility; they can be important factors affecting the welfare of individuals, especially dependent children and the elderly; and they allow some assessment of whether intra-family transfers are reduced by government transfers. More generally, transfers and changes in transfers are important markers or indicators of social relations and social change. Thus they allow tests of theories of social behavior and social change.

Morgan and Riley led the first week's discussions which were broad in scope. Discussion began with philosophy of science issues regarding the nature of science and scientific progress. These discussions provided evaluative frameworks for theories and research from anthropology, demography, economics and sociology. The coordinators next discussed broad theoretical frameworks applicable to intergenerational transfers. The concept of intergenerational transfers was treated in detail. Morgan and Riley noted the

important distinction between aggregate (including government) transfers and intrafamilial transfers. The majority of workshop time and attention was devoted to intrafamilial transfers. The coordinators argued that the study of intrafamilial transfers need take account of various flows (money, time, emotional support, etc.). Further, research and theory should specify to whom flows go (between parents and children or between sibs, for instance) and must allow for variability in frequency, magnitude and degree to which reciprocity characterizes these flows.

Other first week presentations stressed the importance of measurement for the linking of theory and empirical research. Definitions of reliability and validity were presented and strategies for assessing each were discussed. Special problems of measurement in cross-national or cross-cultural studies were explored. Morgan, Helen Glezer, William Marton and Robert Schoeni described Public Use data sets or innovative data collection strategies relevant to intergenerational transfers. One session focused on analytic techniques that are useful in studying this issue.

While the first week was aimed at broad theoretical, conceptual and methodological issues (e.g., 'charting the terrain'), subsequent sessions were oriented toward in-depth treatment of specific topics ('core drilling'). Week two included a discussion of the conflicting arguments made by Samuel Preston and Gary Becker about the 'fairness' of current U.S. aggregate intergenerational transfers. The former sees the transfers as determined by the struggle between interest groups for scarce resources; Becker argues that current transfers are fair and that government intervention is efficient. Robert Schoeni described his proposed Ph.D. dissertation work which aims to estimate the extent to which government transfer payments substitute for intrafamilial resource flows.

Later in the second week, we devoted a day each to case studies of intrafamilial transfers in China and the U.S. The discussion of family change in China focused on the on-going work of Nancy Riley and Liang Zai. Philip Morgan reviewed his work and the work of others on the 'intergenerational transmission of disadvantage' and on marital

disruption and its effects on children. These sessions were followed by discussions of joint living arrangements (which greatly facilitate intergenerational transfers). Angelique Chan presented on-going work on the living arrangements of the elderly in Malaysia and Yean-ju Lee described her work on how demographic change has affected the living arrangements of elderly women in Korea. These presentations sparked a spirited debate about the usefulness of 'modernization or convergence' theories as opposed to more 'contextualized' perspectives.

Also in the second week Siriwan Siriboon presented data on living arrangements and exchange of support in Thailand using innovative data from a recent Thai survey. Keita Takeda described research in progress which examines the role of family ties in producing return migration (U-turns) to the parents' community. Japanese business firms are apparently using the residence of parents as an incentive to lure job seekers into less urbanized environments.

The third week focused on micro-demographic research approaches. Tom Fricke introduced his project which focuses on two Nepal (Tamang) communities. He led discussions on the anthropologial approach, the micro-demographic methodology, and the importance of kinship patterns on demand for children and determinants of kin contact in the Nepal settings he studied. Bhanu Niraula and J.P. Singh also presented their research using the micro-demographic approach. Niraula's presentation focused on the value of children in rural Nepal and Singh's work focuses on similar issues in north India. Bill Marton introduced a demographic modeling approach that allows one to estimate the proportion of time spent in various family states from cross-sectional data.

In the final week we focused on issues of inequality within the family. Fricke and Riley discussed how gender differentials in intergenerational transfers vary across cultural contexts and discussed the role of systems of gender stratification and family structure in those transfers. In this area, as others, one of the key issues is whether shifts toward extrafamilial employment or urban environments produce uniform effects or convergence

across societies. A counter view stressed in assigned readings is the importance of the social context in mediating these effects. Also on the topic of intrafamily inequality, Morgan presented evidence of differential fathers' involvement with, and attention to, sons as opposed to daughters in the U.S.

The final week also featured guest presentations by Robert Retherford and Karen Mason, both of EWPI. Retherford described his work which estimated the effects of differential fertility by IQ on change in the IQ of the subsequent generation. Mason discussed child care as an intergenerational transfer and presented data on sources of childcare in Thailand and the U.S. Liu Qian presented a report on the elderly in China.

The workshop devoted part of our last two sessions to spirited 'my turn' statements by participants. Participants presented ideas and concerns which had been under-emphasized in previous sessions or revisited issues which they felt were very important. For example, Laura Duberstein led an interesting discussion of the role of love and intimacy in intergenerational transfers.

The formal workshop sessions were scheduled to run from 8:30 am until 11:30 am each day, but we seldom finished before noon. Sessions were organized around presentations prepared by coordinators or participants but sessions were very informal and were characterized by frequent and frank discussions of important points or points of disagreement. Assigned readings were read prior to each session. Participants met with the coordinators in the first week to determine what were each participant's 'out of the seminar' goals. The coordinators attempted to facilitate the individual research projects of the participants.

MEGACITIES IN ASIA

Coordinators:	Yok-shiu Lee, EWPI and EAPI; Fu-chen Lo, United Nations University
Resource Persons:	Terence McGee, University of British Columbia; Yue-man Yeung, University of Hong Kong
Guest Lecturers:	Norton Ginsburg, University of Chicago; Won Bae Kim, EWPI
Participants:	Junyu Chen, China; Namgeon Cho, Korea; Ida Ayu Indira Dharmapatni, Indonesia; Guoping Feng, China; Ernesto S. Gorospe, Philippines, Hailu Gu, China; Md. Shahed Hassan, Bangladesh; Ying Hong, China; Muthusami Kumaran, India; Kenichi Nohara, Japan; Kamla Kant Pandey, India; Romesh R.K. Puri, India; Kushum Shakya, Nepal; Samart Siriboon, Thailand; Yin-she Sun, China; Yongjian Sun, China; Hiyare Pallege Susiripala, Sri Lanka; Wing-shing Tang, Hong Kong; Daranee Thavinpipatkul, Thailand; Ram Prasad Tomar, India

The emergence of huge urban agglomerations--megacities--in Asia and around the world has become a leading topic in research and policy planning. The underlying dimensions of the growth of these cities are many: industrial transformation, intended and unintended consequences of government policies, high population growth rates, and new linkages with the world economy. In most cases, these are so formidable that attempts to slow down the growth of megacities are now seen to be unlikely to have significant impact and, to some extent, may even be undesirable.

The realization that megacities are realities to be dealt with rather than science-fiction creations to be wished away leads to a number of public policy issues and dilemmas. On one hand, the economies of these cities are generally more vibrant than those of other cities and, in many cases, are the principal focus for industrial growth and structural transformation of their national economies. On the other hand, most cities are under tremendous stress in all realms of daily living, from poor housing conditions and expanding squatter formations to city-wide problems of intensive land-use conflicts and environmental deterioration.

The purpose of the workshop was to focus on a select number of development issues

facing megacities, to gain a better understanding of the underlying forces at work, to assess current attempts to manage megacity development, and to identify new directions for research and action.

Fu-Chen Lo discussed global structural adjustments and the future of the Asia-Pacific economies during the first week. He pointed out that the availability of relatively cheap and abundant resources after the second world war led to a massive build up in production capacity. The economies of both the north and south were becoming increasingly interdependent with cross border movements of raw materials, goods, capital, and technology. The major cities began to assist in the process of globalization and integration of economies of nations.

Yok-shiu Lee reviewed major urban development policy issues confronting developing countries in Asia that are becoming increasingly urban at a rapid rate. These issues include the urban environment and environmental management, poverty and slum formations, population and labor market transformations, management of the "informal sector," and urban land management.

Each of the participants then presented a case study that focused on a particular aspect of megacity development. Some examples of the case studies included a critical appraisal of slum formation and upgrading policies in Madras, a review of water supply and sanitation in Delhi, an evaluation of population distribution and environmental management policies in Jakarta, and a discussion of the spatial features and development of Bejiing's metropolitan area.

Yue-Man Yeung reviewed a variety of approaches to delivering urban services to the urban poor and suggested that a trend seemed to be emerging for multifaceted and integrated projects to be designed with active beneficiary participation. He pointed out the major lessons learned from project experience in Asia included the failure of top-down planning, the need for community participation, the merit of strengthening local governments, the urgency of investing in leadership and training, and increasing the role

of women in the daily management of the services.

Yok-shiu Lee focused on the major urban environmental issues in developing countries and pointed out that the largest and most pressing environmental issue was to improve the housing and living environment of the underpriviledged majority of citizens. He suggested that more resources be allocated at the neighborhood and household levels where adverse health consequences for the urban poor are the most acute and also the most neglected. He agreed with Yeung on the need for greater community participation, particularly in problem identification and project design and implementation.

Terry McGee discussed the emergence of new regions of extended metropolitan regions in Asia. He suggested that distinctive areas of agricultural and nonagricultural activities were emerging adjacent to and between urban cores, and were a direct response to pre-existing conditions, time-space collapse, economic change, technological developments, and labor force transformations occurring in a different manner and mix from the operation of these factors in the Western industrialized countries in the nineteenth and early twentieth centuries. He then used a case study of Bangkok to illustrate his major arguments.

McGee also discussed the major policy issues relating to the emergence of the extended metropolitan regions. He suggested that Asian governments need to reconsider agricultural policies as they were of central importance to such regions. Asian governments also need to reconsider how to release labor from the agricultural sector, recognize the reality of these zones of intense urban-rural interactions and direct their investment to these regions, monitor the growth of such zones for incompatible land uses and environmental pollution porblems, improve the accessibility of these regions, and develop new systems of data collection that would enable them to monitor the impact of investment decisions.

During the third week, the participants formed three working groups to focus on three research topics: managing the extended metropolitan regions, urban poor and access

to basic services, and environmental planning and management. The working groups reviewed the state-of-the-knowledge on these topics and formulated research agendas. A written report and an oral presentation were prepared and given by each working group during the last week.

REPRODUCTIVE HEALTH AND CONTRACEPTION: THE INTEGRATION OF QUALITATIVE AND QUANTITATIVE RESEARCH METHODS

Coordinator:	Werasit Sittitrai, Chulalongkorn University
Resource Persons:	Tim Brown, University of Hawaii; Milton Diamond, University of Hawaii; and Andrew Kantner, EWPI
Participants:	Lubna Ansari Baig, Pakistan; Lualhati D. Bost, Australia; Jie Chen, China; Jie Guo, China; Rafat Hussain, Pakistan; Yang Li, China; Andrew S. London, U.S.A.; Toha Muhaimin, Indonesia; Surappaswamy Parasuraman, India; Thankaperumal Rajaretnam, India; Oratai Rauyajin, Thailand; Saisampun Rubkhuan, Thailand; Preeya Rungsopaskul, Thailand; Devendra Prasad Shrestha, Nepal; Rommel Jacinto D. Silverio, Philippines; Tara B.H. Soeprobo, Indonesia; Flourisa Juliaan Sudradjat, Indonesia; Sugi Sugihartatmo, Indonesia; Penpaktr Yodnamkam, Thailand

The primary objectives of this workshop were to examine the relevance of quantitative and qualitative methods to the study of reproductive health and contraception and to explore how the two approaches can complement each other when integrated into a single study. Participants were given the opportunity to learn, practice, and critique each of several techniques. Techniques covered included focus groups, in-depth interviews, and ethnographic observation on the qualitative side and telephone surveys and surveys using individual interviews with structured questionnaires on the quantitative side.

In addition to discussions of the advantages and limitations of each of the techniques when used to collect data, time was spent discussing analysis methods and computer tools to assist in this analysis. The subject areas covered ranged widely across the areas of reproductive health and contraception from injectable contraceptives and female condoms to AIDS and other sexually-transmitted diseases. Applicants were requested to bring results of either quantitative or qualitative studies which could be analyzed during the workshop and used as foundations for the design of further studies which would integrate quantitative and qualitative components. The coordinator and resource persons acted as consultants throughout the workshop working with participants individually to assist in analyzing data or in preparing research protocols.

In the first week of the workshop, the relative merits of quantitative and qualitative techniques were explored by the group. The sessions were run in an interactive fashion throughout with the participants providing many of the inputs and the coordinator and resource persons guiding the discussion to see that relevant points were covered. Each of the participants gave a brief presentation of the data they had brought and how they planned to use it during the workshop. More information on these individual data sets can be found at the end of this writeup.

Several workshop sessions were directed to acquainting the participants with aspects of sexual behavior related to population and family planning. Many objections to reliable contraceptive use and family planning methods are sex behavior dependent; to a lesser extent this also holds for concerns with infertility. In keeping with this, the participants were introduced to methods of both researching an individual's sexual concerns and effecting attitudes and practices to deal with them. Cross-cultural considerations were addressed.

Similarly the AIDS pandemic and HIV disease, as related to population, family planning, and sexual behavior were presented. The participants quickly recognized the applicability of this area to long term population considerations. In response to requests from the participants, time was devoted to teaching instructional skills for both sex and AIDS education. This training focused on the basics of such education, as well as how to train trainers and reach general lay audiences.

In the second week, the attention turned to qualitative techniques. Sessions were devoted to focus groups, participant/non-participant observation, and in-depth interviews. Role-playing had a major role in each of these, giving the participants the opportunity to encounter first-hand many of the problems which arise in the field. Once these methods had been covered, attention turned to the techniques used to analyze their outcomes. The techniques of coding, code mapping, and summary grids were presented and the Ethnograph software for analysis of qualitative data was introduced. Participants were

given hands-on experience with the Ethnograph on a set of in-depth interview data on preferred family size in Thailand.

The early part of the third week was devoted to quantitative research design and analysis. James Dannemiller of SMS Research and Marketing opened the week with a presentation on telephone surveys. A handout of quantitative research design, sampling, and questionnaire design was distributed. Over the next couple days, the participants were given hands-on experience with SPSS in analyzing two data sets provided by the participants: contraceptive use in Shanghai (provided by Mr. Jie Chen) and a KAP (knowledge, attitudes, and practices) survey of Thai adolescents' sexuality (brought by Ms. Preeya Rungsopaskul). Quantitative analysis techniques covered included frequencies and cross-tabulations, multiple regression models, and logistic regression models.

The week closed with a discussion of the integration of qualitative and quantitative techniques in study design. Rapid assessment packages integrating minisurveys, focus groups, and interviews with key informants were outlined. The class assisted in the design of a minisurvey for the collection of data on AIDS knowledge in a low HIV-prevalence community.

The final week of the seminar was left for the participants to work individually on the analysis of their data set or the design of a small study which integrated quantitative and qualitative techniques. In reality, the groundwork for this was laid in the first week, when the resource persons began working with each of the participants to set up their data sets for computer analysis and to determine what type of analysis they desired to carry out. With enthusiastic effort on the part of each of the participants, the outcome of this process was a set of small papers and proposals upon which each of them can expand at home. Several of these are planned to be submitted as research proposals in the participant's home country. The following is a list of the papers and proposals prepared by the participants, grouped by country.

Participant Papers and Proposals

Australia

Lualhati Bost. Covariates of Contraceptive Method Choice in the Philippines: A Multinomial Logistic Regression Model.

China

Jie Guo (see Tara Bakti H. Soeprobo, Indonesia)

India

Surappaswamy Parasuraman. Analysis of Data Related to Resettlement of Population.

Thankaperumal Rajaretnam. A Proposal on Study of the Impact of Nutritional Status of Mothers on Reproductive Health.

Indonesia

Toha Muhaimin. Knowledge and Attitudes of Young and Older Women, Medical and Paramedical Personnel on Abortion in Five Big Cities in Indonesia.

Tara Bakti H. Soeprobo and Jie Guo. Rural Fertility: A Case Study of Gunung Kidul-Central Java and Serang-West Java, Indonesia.

Flourisa J. Sudradjat. A Survey of Norplant Acceptors in Indonesia Following Five Years of Use.

Sugihartatmo. Family Life Study of Indonesia (The Integration of Qualitative and Quantitative Methods).

Nepal

Devendra Prasad Shrestha. Sexual Behavior Among Women with Unmet Needs for Family Planning in Nepal.

Pakistan

Lubna Baig. Situation Analysis of the Population Planning Programs in Pakistan.

Rafat Hussain. Correlates of Childhood Mortality Using Multivariate and Logistic Regression.

Thailand

Oratai Rauyajin. Women's Participation in AIDS Prevention and Control Programs at Udon Thani Province.

Saisampun Rubkhuan. Survey to Assess Knowledge and Practices Concerning AIDS and Intervention Trials Among the Cavalry in Thailand.

Preeya Rungsopaskul. Age at First Intercourse and Sexual Contact with Prostitutes of Young Males in Thailand.

Penpaktr Yodnamkam. Evaluation of Condom Promotion on AIDS Prevention and Control Programme in Thailand.

United States

Andrew S. London. HIV-Antibody Testing in the United States, 1985-Present.

Rommel Silverio. An Analysis of an Adolescent Sexuality Survey in Hong Kong.

SEMINAR FIELD PORTION, HONG KONG

Monday, July 1

10:00 a.m.	Opening Addresses Dr. Lee-Jay Cho, Director, EWPI and Vice-President, East-West Center Professor Yue-man Yeung, Director, Hong Kong Institute of Asia-Pacific Studies (HKIAPS), CUHK
11:00 - 12:30 p.m.	**Lecture Session I:** Integeneration Change of Life Course and Economic Characteristics Dr. Paul C.K. Kwong
2:30 - 4:00 p.m.	**Lecture Session II:** Metroplan: Urban Hong Kong Prepares for Its Future Dr. E.G. Pryor
7:00 p.m.	Welcome dinner hosted by HKIAPS

Tuesday, July 2

9:00 - 10:30 a.m.	**Lecture Session III:** Reproductive Health and AIDS Dr. K.A.M. Boursicot
11:00 - 12:30 p.m.	**Lecture Session IV:** Issues in the Development of Gender Studies in Chinese Societies Dr. Fanny Cheung
2:00 - 6:00 p.m.	Field trip to Taikooshing (a modern private housing/shopping complex), Central Business District and Victoria Peak

Wednesday, July 3

Whole day field trip. Highlights include visit to Hong Kong Housing Department, public housing estates new towns, light rail system and container port.

Thursday, July 4

9:30 a.m.	Visit Hong Kong Family Planning Association Office
Afternoon	Ferry to an outlying island, Cheung Chau

Friday, July 5

9:00 a.m.	Discussion and Evaluation
10:00 a.m.	Closing Ceremony
	Closing Remarks: Professor Yue-man Yeung, HKIAPS
	Dr. Griffith Feeney, EWPI Seminar Coordinator

PARTICIPANTS

Australia

Ms. Lualhati D. Bost
Ph.D. Candidate
Demography Program
Research School of Social Sciences
The Australian National University
GPO Box 4
Canberra, ACT 2601, Australia
Phone: (61) 62-2493032
Telex: 62694 SOPAC AA
FAX: (61) 62-2571893

Ms. Helen Glezer
Fellow
Australian Institute of Family Studies
300 Queen Street
Melbourne, Victoria 3000, Australia
Phone: (61) 3-6086888
FAX: (61) 3-6000886

Mr. Bhanu B. Niraula
Ph.D. Candidate
Graduate Program in Demography
Australian National University
Canberra, ACT 2601, Australia
Phone: (61) 62-249306 or 249701
Telex: 61364 AJRC AA
FAX: (61) 62-672886

Bangladesh

Ms. Ferdousi S. Begum
Advisor, Social Development
Canadian Resource Team
58 Kalabagan, 1st Lane
Dhaka 1205, Bangladesh
Phone: (880) 2-324149 or 314487
Telex: 642892 ASTDK BJ
FAX: (880) 2-813137

Dr. Md. Shahed Hassan
Assistant Director
Department of Sociology
University of Dhaka
Dhaka 1000, Bangladesh
Phone: (880) 2-500352

China

Mr. Jie Chen
Head
Population Information and Research Office
Shanghai Population Information Center
122 Shaan Xi Road(S)
Shanghai 200040, China
Phone: (86) 21-2472262
FAX: (86) 21-2792083

Mr. Guoping Feng
Research Staff
State Family Planning Commission
No. 4, Cixiansi Xizhimenwai
Beijing 100044, China
Phone: (86) 1-8312421
Cable: FPOFIC Beijing
Telex: 222298 SFPC CN
FAX: (86) 1-8312424

Mr. Hailu Gu
Project Officer
State Family Planning Commission
No. 4, Cixiansi Xizhimenwai
Beijing 100044, China
Phone: (86) 1-8312421
Cable: FPOFIC Beijing
Telex: 222298 SFPC CN
FAX: (86) 1-8312424

Miss Ying Hong
Assistant Researcher
Population Research Institute
Chinese Academy of Social Sciences
5 Jianguomen Neidajie
Beijing, China
Phone: (86) 1-5137744
Ext. 3184/3146

Mr. Qian Liu
Ph.D. Candidate
Room 235, Building 29
Peking University
Beijing, China
Phone: (86) 1-256116 Ext. 3511

China (continued)

Mr. Yin-she Sun
Lecturer
Department of Geography
Peking University
Beijing 100871, China
Phone: (86) 1-2561166 Ext. 3573

Mr. Yongjian Sun
Research Official
Department of Policy and Legislation
State Science and Technology Commission
54 Sanlihe Road
Beijing 108862, China
Phone: (86) 1-8011833
Telex: 22349 SSTCC CN
FAX: (86) 1-8371091 or 8012594

Ms. Danyu Wang
Assistant Researcher
Population Research Institute
Chinese Academy of Social Sciences
Beijing, China
Phone: (86) 1-5137744 Ext. 2756
Telex: 22061 CASS CN

Hong Kong

Mr. Wing-shing Tang
Assistant Lecturer
Department of Geography
The Chinese University of Hong Kong
Shatin, N.T., Hong Kong
50301 CUHK HX
FAX: (852) 6035006

India

Mr. Muthusami Kumaran
9, Vidyasagar Street
Chelli Nagar
Selaiyur
Madras 600059, India

India (continued)

Mr. Kamla Kant Pandey
Senior Research Officer
National Institute of Urban Affairs
11, Nyaya Marg, Chanakyapuri
New Delhi 110021, India
Phone: (91) 11-3014580

Dr. Surappaswamy Parasuraman
Reader
Tata Institute of Social Sciences
Sion-Trombay Road
Deonar, Bombay 400088, India
Phone: (91) 22-5510400
Cable: FERNSTALK

Mr. Romesh R.K. Puri
Deputy Director of Census Operations
c/o Registrar General, India
4/19, Asaf Ali Road
New Delhi 110002, India
Phone: (91) 11-3275257 or 3274863

Dr. Thankaperumal Rajaretnam
Deputy Director
Population Research Centre
JSS Institute of Economic Research
Vidyagiri, Dharwad 580004
Karnataka State, India
Phone: (91) 41553
Cable: RESEARCH DHARWAD

Dr. Janardan Prasad Singh
Reader and Head
Department of Sociology
Patna College
Patna 800005, India
Phone: (91) 51589

Mr. Ram Prasad Tomar
Deputy Director of Census Operations
Office of the Registrar General and Census Commissioner, India
2A Mansingh Road
New Delhi 110011, India
Phone: (91) 11-381917

Indonesia

Ms. Ida Ayu Indira Dharmapatni
Research Associate
ITB Institute for Urban and
Regional Studies
c/o Tommy Firman
Jurusan Planologi ITB
Jl. Ganesha 10
Bandung 40132, Indonesia
Phone: (62) 22-82263 or 87735
Telex: 28763 LPPITB IA
FAX: (62) 22-82263

Dr. Toha Muhaimin
Head of Population Simulation and
Computer Laboratory
Population Science and Biostatistics
Department
Faculty of Public Health
University of Indonesia (FPH-UI)
at Depok
Bogor, Indonesia
Phone: (62) 21-7270037 or 7270014
FAX: (62) 21-3105583

Mrs. Tara B.H. Soeprobo
Junior Research Associate
Demographic Institute
Faculty of Economics
University of Indonesia
Jl. Salemba 4
Jakarta 10430, Indonesia
Phone: (62) 21-336434 or 336539
Cable: FEKODEM
FAX: (62) 21-3102457

Mrs. Flourisa Juliaan Sudradjat
Research Staff
National Family Planning
Coordinating Board
Jl. Permata No. 1
Jl. Raya Halim Perdana Kusuma
Jakarta, Indonesia
Phone: (62) 21-819308 Ext. 283
Cable: NFPCB
Telex: 48181 BKKBN IA

Indonesia (continued)

Mr. Sugi Sugihartatmo
Chief
Sub-Division of Data Collection
National Family Planning
Coordinating Board - Pujak
P.O. Box 1186
Jakarta 13630, Indonesia
Phone: (62) 21-8191308 Ext. 265
Cable: NFPCB
Telex: 48181 BKKBN IA

Japan

Mr. Kenichi Nohara
Official
Population Census Division
Statistics Bureau
Management and Coordination Agency
19-1 Wakamatsu-cho, Shinjuku-ku
Tokyo 162, Japan
Phone: (81) 03-5273-1152
FAX: (81) 03-5273-1183

Mr. Keita Takeda
Researcher
Japan Institute of Labour
Kamishakuji-i 4-8-23, nerima-ku
Tokyo 177, Japan
Phone: (81) 03-3594-1111
FAX: (81) 03-3594-1110

Republic of Korea

Mr. Namgeon Cho
Associate Research Fellow
Korea Research Institute for Human
Settlements
10-2 Youido-Dong, Yongdungpo-Gu
Seoul 150-010, Korea
Phone: (82) 02-784-2560-6
Cable: KRIHS
FAX: (82) 02-785-4519

Nepal

Mrs. Kushum Shakya
Assistant Lecturer
Tribhuvan University
(Padma Kanya Campus)
5/475, Ombahal, Tole
Kathmandu, Nepal
Phone: (977) 2-11769

Mr. Devendra Prasad Shrestha
Lecturer
Central Department of Economics
Tribhuvan University
P.O. Box 2206
Kathmandu, Nepal
Phone: (977) 2-72571

Pakistan

Dr. Lubna Ansari Baig
Instructor
Community Health Sciences Department
The Aga Khan University
P.O. Box 3500, Stadium Road
Karachi 74800, Pakistan
Phone: (92) 21-420051 Ext. 2509
Telex: 23667 AKHMC PK
FAX: (92) 21-414294

Dr. Rafat Hussain
Senior Instructor
Community Health Sciences Department
The Aga Khan University
P.O. Box 3500, Stadium Road
Karachi 74800, Pakistan
Phone: (92) 21-503352

Philippines

Mr. Ernesto S. Gorospe
Director
Regional Development Coordination Staff
National Economic and Development Authority
7th Floor, NEDA Building
Amber Avenue
Pasig, Metro Manila, Philippines
Phone: (63) 1-3708
Telex: 29058 NED PH
FAX: (63) 1-0969

Philippines (continued)

Mrs. Benedicta Alvarado Yabut
Statistician III
Population Studies Division
National Statistics Office
R. Magsaysay Boulevard, Sta Mesa
1008 Manila, Philippines
Phone: (63) 61-36-45 Loc. 134
Cable: NOSPHIL

Singapore

Dr. Tee Liang Ngiam
Senior Lecturer
Department of Social Work and Psychology
National University of Singapore
Kent Ridge
Singapore 0511
Phone: (65) 7723812 or 7723813
Telex: 33943 UNISPRO RS
FAX: (65) 7781213
Bitnet: SWKNTL@NUSVM

Sri Lanka

Mr. Hiyare Pallege Susiripala
Assistant Director/Planning
Urban Development Authority
27, D.R. Wijewardane Mawatha
Colombo 10, Sri Lanka
Phone: (94) 1-693744 or
(94) 1-692021

Thailand

Dr. Oratai Rauyajin
Associate Professor
Faculty of Social Sciences and Humanities
Mahidol University at Salaya
Nakornprathom 73170, Thailand
Phone: (662) 4419324
FAX: (662) 4419738

Thailand (continued)

Miss Saisampun Rubkhuan
Chief
Health Education Research Section
Health Education Division
Ministry of Public Health
Bangkok, Thailand
Phone: (662) 2829977
FAX: (662) 2828231

Miss Preeya Rungsopaskul
Researcher
Institute of Population Studies
Chulalongkorn University
Bangkok 10330, Thailand
Phone: (622) 2511133
Cable: POPCHULA Bangkok
Telex: 20217 UNICHUL
FAX: (662) 2551469

Mr. Samart Siriboon
Instructor
The School of Humanities
Bangkok University
Rama IV Road
Bangkok 10110, Thailand
Phone: (662) 5168540-9 Ext 221

Miss Siriwan Siriboon
Researcher
Institute of Population Studies
Chulalongkorn University
Bangkok 10330, Thailand
Phone: (662) 2511133
Cable: POPCHULA Bangkok
FAX: (662) 2551469

Dr. Daranee Thavinpipatkul
Assistant Professor
Department of Urban and Regional Planning
Faculty of Architecture
Chulalongkorn University
Phyathai Road
Bangkok 10330, Thailand
Phone: (662) 2515941
FAX: (662) 2524171

Thailand (continued)

Miss Penpaktr Yodnamkam
Technical Officer 5
Division of AIDS
DCDC
Ministry of Public Health
Bangkok 10200, Thailand
Phone: (662) 2826620-3
FAX: (662) 2828351

United States

Ms. Angelique Chan
Pre-Doctoral Hewlett Fellow
Rand Corporation
1700 Main Street
Santa Monica, California 90406
U.S.A.
Phone: (213) 393-0411 Ext. 6492
Bitnet: Angelique_Chan@rand.org

Mr. Junyu Chen
Graduate Student
East-West Population Institute
East-West Center
EWC Box 1211
1777 East-West Road
Honolulu, Hawaii 96848, U.S.A.
Phone: (808) 944-7859
FAX: (808) 944-7490

Ms. Laura J. Duberstein
Population Studies Center
1225 South University Avenue
Ann Arbor, Michigan 48104, U.S.A.
Phone: (313) 998-7270
FAX: (313) 998-7415
Bitnet: USER 6TFK&UMICHUB

Ms. Jie Guo
Department of Sociology
University of Washington
Seattle, Washington 98195, U.S.A.
Phone: (206) 543-5033

United States (continued)

Dr. Yean-Ju Lee
Post-Doctoral Fellow
Population Research Center
University of Chicago
1155 E. 60th Street
Chicago, Illinois 60637, U.S.A.
Phone: (312) 702-0249
FAX: (312) 702-3788
Bitnet: YLEE@CICERO.
UCHICAGO.EDU

Mr. Zai Liang
Ph.D. Candidate in Sociology
Population Research Center
NORC/University of Chicago
1155 E. 60th Street
Chicago, Illinois 60637, U.S.A.
Phone: (312) 702-9730
Bitnet: ZAI@OEDIPUS.
UCHICAGO.EDU.

Mr. Andrew S. London
Ph.D. Candidate
Population Studies Center
University of Pennsylvania
3718 Locust Walk
Philadelphia, Pennsylvania 19104-6298
U.S.A.
Phone: (215) 898-6441
FAX: (215) 898-2124

Mr. William P. Marton
Population Studies Center
University of Pennsylvania
3718 Locust Walk
Philadelphia, Pennsylvania 19104-6298
U.S.A.
Phone: (215) 898-6441
Bitnet: POPMARTN@PENNDRIS

Mr. Vinod Mishra
Ph.D. Candidate
East-West Population Institute
East-West Center
EWC Box 1255
1777 East-West Road
Honolulu, Hawaii 96848, U.S.A.
Phone: (808) 944-7846
FAX: (808) 944-7490

United States (continued)

Mr. Robert F. Schoeni
Ph.D. Candidate in Economics
Population Studies Center
University of Michigan
1225 South University Avenue
Ann Arbor, Michigan 48104, U.S.A.
Phone: (313) 988-7270
FAX: (313) 998-7415
Bitnet: BOB_SCHOENI@UM.CC.
UMICH.EDU

Mr. Rommel Jacinto D. Silverio
Ph.D. Candidate
East-West Population Institute
East-West Center
EWC Box 1726
1777 East-West Road
Honolulu, Hawaii 96848, U.S.A.
Phone: (808) 944-6378
FAX: (808) 944-7490

WORKSHOP COORDINATORS

Dr. Yok-shiu Lee
Research Associate
EWPI and EAPI
Phone: (808) 944-7251
Telex: 230 989171 EWC UD
FAX: (808) 944-7970

Dr. Fu-chen Lo
Senior Program Officer
Social and Policy Sciences
United Nations University
Toho Seimi Building 29F
15-1, Shibuya 2-chome
Shibuya-ku, Tokyo 150, Japan
Phone: (81) 3 499-2811
FAX: (81) 3 4992828

Dr. S. Philip Morgan
Associate Professor of Sociology
Population Studies Center
University of Pennsylvania
3718 Locust Walk, CR
Philadelphia, Pennsylvania 19104
U.S.A.
Phone: (215) 898-7879
Bitnet: PMORGAN@PENNDRLS

Dr. Nancy Riley
Fellow
EWPI
Phone: (808) 944-7435
Telex: 230 989171 EWCUD
FAX: (808) 944-7490
Bitnet: RILEYN@EWC

Dr. Werasit Sittitrai
Assistant Professor
Institute of Population Studies
Chulalongkorn University
Bangkok 10500, Thailand
Phone: (662) 2511133
FAX: (662) 2551469

WORKSHOP RESOURCE PERSONS

Dr. Tim Brown
Assistant Professor
Electrical Engineering
University of Hawaii
Holmes Hall 483
2540 Dole Street
Honolulu, Hawaii 96826, U.S.A.
Phone: (808) 956-7576
FAX: (808) 956-3427

Dr. Milton Diamond
Professor of Anatomy and Reproductive Biology
John A. Burns School of Medicine
University of Hawaii
Auxiliary 208
1951 East-West Road
Honolulu, Hawaii 96826, U.S.A.
Phone: (808) 956-7400 or 956-5480

Dr. Thomas E. Fricke
Assistant Research Scientist
Institute for Social Research
University of Michigan
Room 3100
426 Thompson Street
Ann Arbor, Michigan 48106-1248, U.S.A.
Phone: (313) 763-1500
Telex: 5320815
FAX: (313) 747-4575

Dr. Andrew Kantner
Research Associate
EWPI
Phone: (808) 944-7426
FAX: (808) 944-7490

Dr. Terence McGee
Professor of Geography and
Director
Institute of Asian Research
University of British Columbia
W1871 Westbrook Mall
Vancouver, B.C. V6T 1W5, Canada
Phone: (604) 228-4688
FAX: (604) 228-5207

Dr. Yue-man Yeung
Director
Hong Kong Institute of Asia-Pacific Studies
Chinese University of Hong Kong
Shatin, N.T., Hong Kong
Phone: (852) 695-2018
Telex: 50301 CHUK HX
FAX (852) 692-4774

WORKSHOP GUEST LECTURERS

Dr. Norton Ginsburg
University of Chicago
1155 E. 60th Street
Chicago, Illinois 60637
U.S.A.

Dr. Won Bae Kim
Research Associate
EWPI

Dr. Karen Mason
Research Associate
EWPI

Dr. Robert D. Retherford
Research Associate
EWPI

SEMINAR STAFF, HONOLULU

Dr. Griffith Feeney
Coordinator, Summer Seminar

Ms. Valerie C. Wong
Assistant Coordinator, Summer Seminar

Ms. Norma Uejo
Summer Seminar Assistant

Ms. Wendy Nohara
Summer Seminar Secretary

Ms. Loretta Koga
Assistant Summer Seminar Secretary

Ms. Phyllis Tabusa
Research Information Specialist

Ms. Terese A. Leber
Junior Resource Materials Specialist

Ms. Audrey Minei
Resource Materials Technician

Ms. Kathleen O'Connor
Resource Materials Technician

Ms. Jerilyn Sumida
Junior Resource Materials Specialist

Ms. Kathleen Yamane
Library Clerk

Ms. Victoria C.H. Ho
Supervisory Computer Specialist

Ms. Judith Ann L. Tom
Computer Specialist

Ms. Gayle Yamashita
Computer Specialist

Mr. Ho Lom Lee
Computer Programmer

Ms. Juliet Batalon
Secretary

Mr. Jon Miyahara
Student Assistant

GUEST LECTURERS, HONG KONG

Dr. K.A.M. Boursicot
Department of Obstetrics and Gynecology
Queen Mary Hospital
Pokfulam
Hong Kong

Dr. Fanny Cheung
Department of Psychology
Chinese University of Hong Kong
Shatin, New Territories
Hong Kong

Dr. Paul C.K. Kwong
Department of Sociology
Chinese University of Hong Kong
Shatin, New Territories
Hong Kong

Dr. E.G. Pryor
Planning Department
Hong Kong Government
3/F, Murray Building
Garden Road
Hong Kong

SEMINAR STAFF, HONG KONG

Hong-Kong Institute of
Asia-Pacific Studies
Chinese University of Hong Kong
Shatin, N.T., Hong Kong

Dr. Yue-man Yeung
Director

Dr. Siu-kai Lau
Associate Director

Dr. Maurice Brosseau
Research Officer

Ms. Po-san Wan
Research Officer

Dr. Kin-sheun Louie
Research Officer

Ms. Janet Wong
Senior Personal Secretary
to the Director

Ms. Loretta Chan
Personal Secretary to the
Associate Director

APPENDIX II

July 25, 1991

MEMORANDUM

TO: Lee-Jay Cho

FROM: Won Bae Kim

SUBJECT: Trip Report, New Delhi, India, July 1 to 19, 1991

The main purpose of the trip was to conduct a workshop on Urbanization in India organized by the Office of the Registrar General, India, and the East-West Population Institute, with the support of USAID/New Delhi, from July 1-19, 1991. The workshop was attended by 12 participants from the Registrar General's Office. Professor Ved Prakash from the University of Wisconsin at Madison and I coordinated the workshop with Mrs. Minati Ghosh, Registrar General's Office. The workshop consisted of two parts: lectures and individual research. Lectures usually occurred in the morning, and individual research including short exercises using personal computers was done in the afternoon. Participants were requested to read assigned articles before each session (see attached list of reading materials).

Lectures were divided into three major themes (see attached workshop agenda). Key concepts, definitions, and techniques regarding urbanization were introduced in the first week. The urbanization process and prospects at the global, regional, and country level were discussed. The focus of the second week was urbanization and national development. The association between urbanization and national development was examined with cross-country and individual country examples. Major issues and problems of urbanization and policy responses were discussed both in general context and India-specific context. In the third week, the discussion was centered on urban infrastructure and shelter and major approaches toward problem solution. In addition, there were specific discussions on data base and data analysis.

Some of the salient features of India's urbanization were highlighted by guest lectures. The two lectures were supplementary to the main lectures conducted by EWPI coordinators. One distinguishing feature of the workshop was to include participants' presentations on selected states of India, i.e., applying those concepts and techniques introduced in the earlier part of the workshop and interpreting the results with participants' intimate knowledge of their states. In a few months, the coordinator in India will compile the participants' reports to make a workshop volume.

In the final analysis, the workshop brought out major issues of urbanization in India as well as research needs, particularly in connection with the 1991 census results. Potential topics for further research were identified as follows:

* Level and speed of urbanization in India over the past four decades (1950-90), especially in association with socio-economic development.

* The nature, direction, and volume of migration in the 1970s and 1980s. The analysis can be carried out at three levels: national, state, and district. Push and pull factors can be identified and their association with those migration streams analyzed.

* The pattern and growth of metropolises in India with an emphasis on their role and structure.

* Regional urban systems including key dimensions of structure, size, location, linkages, and system dynamics.

On the whole, the workshop proceeded smoothly and participants were satisfied (see attached participant's evaluation). Some participants expressed their concern with the content of the workshop, i.e., more connection with the mapping of information. This was an understandable concern because most of the participants were from the Map Division of the Registrar General's Office. However, the content of the workshop focusing on analytical aspects of urbanization seemed to help the participants who had not previously been exposed to policy issues. Comments by the Registrar General, Mr. Nanda, at the end of the workshop were to the point, stating that a better understanding of those analytical techniques, policy issues, and general urban processes will undoubtedly raise participants' skills to organize and present relevant information from census results to scholars, researchers, policymakers, and the public.

Attachments: Participant List
Workshop Agenda
Reading List
Evaluation Form

cc: Robert Retherford
Robin Loomis

Workshop on Urbanization in India

Tentative Agenda

July 1-19, 1991
New Delhi, India

Coordinators:

Dr. Won Bae Kim, Research Associate, East-West Population Institute
Dr. Ved Prakash, Professor of Urban and Regional Planning, University of Wisconsin-Madison and Project Fellow, East-West Population Institute

Resource Persons:

Professor Mahendra Kumar Premi, Jawahar Lal Nehru University
Professor Amitabh Kundu, Jawahar Lal Nehru University

Format:

The workshop will be composed of lectures and individual research including short excercises using personal computers.

Topics:

Week 1	URBANIZATION PROCESS AND PROSPECTS
JULY 1	Concepts, Definitions, and Analytical Techniques (VP)
July 2	Urbanization Process and Prospects: International Comparisons (WBK)
July 3	Urbanization in India: Past, Present, and Future (VP)
July 4	Evolution and Growth of Urban Settlements in India (VP)
July 5	Mapping of Urban Centers from Census Data: Growth and Functional Characteristics (WBK)
Week 2	URBANIZATION AND NATIONAL DEVELOPMENT
July 8	Strategic Urban Development Issues: Causes and Consequences of Urbanization (WBK)
July 9	Evolution of Urbanization Policies in India (VP)
July 10	National Urban Development Strategies (Scope, elements, and the role of national and subnational governments) (VP)

July 11	Measurement of Urbanization and Socio-Economic Indicators of Urban Development (WBK)
July 12	Problems and Issues of Urban Growth (Guest Lecture by Professor Mahendra Kumar Premi)
Week 3	URBAN INFRASTRUCTURE AND SHELTER
July 15	Infrastructural Development and Socio-Economic Life in Urban Places: A Critical Appraisal of Census/Survey Data
July 16	Depiction of Housing Problems and Other Urban Deficits of Selected Towns: Need Assessment (WBK/VP) (Guest Lecture by Professor Amitabh Kundu)
July 17	Shelter and Services for the Urban Poor: Growth of Squatter and Slum Settlements--Issues and Options (VP)
July 18	Data Base for the Study of Urbanization in India (WBK)
July 19	Population Projections for Infrastructure Planning (WBK)

WORKSHOP ON URBANIZATION IN INDIA

July 1-20, 1991
New Delhi, India

WEEK 1 URBANIZATION PROCESS AND PROSPECTS

July 1 Introduction and Outline of the Workshop, and Conecepts, Definitions, Data Needed, and Analytical Techniques

Reading Assignment:

Ashish Bose. 1974. "Basic Data Needed for the Study of Urbanization: A Case Study of the Indian Census," in Sidney Goldstein and David Sly (eds), Basic Data Needed for the Study of Urbanization. Liege, Belgium: International Union for Scientific Study of Population. pp.71-93.

July 2 Urbanization Process and Prospects: International Comparisons

Reading Assignments:

George S. Tolley and V. Thomas (1987). "An overview of urban growth: problems, policies, and evaluation," in Tolley and Thomas eds., The economics of Urbanization and Urban Policies in Developing Countries. Washington, D.C., World Bank, pp. 49-59.

Philip M. Hauser and Robert W.Gardner. 1982. "Urban Future: Trends and Prospects," in Hauser et. al. (eds) Population and the Urban Future. Albany, NY: State University of New York Press. pp.1-58.

Lee-Jay Cho and John G.Bauer. 1987. "Population Growth and Urbanization: What Does the Future Hold?" in Roland J. Fuchs, Gavin Jones, and Ernesto M. Pernia (eds) Urbanization and Urban Policies in Pacific Asia. Boulder, CO: Westview Press. pp.15-37.

Fu-chen Lo and Kamal Salih. 1987. "Structural Change and Spatial Transformation: Review of Urbanization in Asia, 1960-80" in Fuchs, et. al (eds) Urbanization and Policies in Pacific Asia. pp.38-64.

July 3 Urbanization in India: Past, Present, and Future

Reading Assignments

Report of the National Coomission on Urbanization. 1988. New Delhi. Vol.II, pp.1-54.

D.M.Sukthankar and P.S.A. Sundaram. 1987. "Country Paper: India" in Asian Development Bank, Urban Policy Issues (Regional Seminar on Major National Urban Policy Issues, held in Manila, February, 1987), pp.393-429.

Rakesh Mohan. 1985. "Urbanization in India's Future," Population and Development Review, 11(4), pp.619-645.

July 4 Evolution and Growth of Urban Settlements in India

Reading Assignment:

Edwin S. Mills and Charles M.Becker. 1986. Studies in Indian Urban Development. Oxford University Press. pp.13-72.

July 5 Mapping of Urban Centers from Census Data: Growth and Functional Characteristics

Reading Assignment:

Brian J.L. Berry, ed. 1972. City Classification Handbook: Methods and Applications. New York: Wiley-Interscience, pp. 11-57.

Brian J.L. Berry and Frank E. Horton. 1970. Geographic Perspectives on Urban Systems. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., Chapters 5 & 6, pp. 106-168.

Week 2 URBANIZATION AND NATIONAL DEVELOPMENT

July 8 Strategic Urban Development Issues: Causes and Consequences of Urbanization

Reading Assignments:

George S. Tolley. 1987. "Market Failures as Bases of Urban Problems." ... Washington D.C. World Bank. pp.49-59.

B.K.Lee. 1987. "Major Urban Development Issues: An Overview in Asian Development Bank, Urban Policy Issues (Manila. pp.15-60.

Gavin W. Jones. 1990. "Structural Economic Change and its Relationship to Urbanization and Population Distribution Policies." Regional Development Dialogue, Vol.11, No.1, Spring, pp.1-22.

Johannes F. Linn. 1982. "The costs of urbanization in developing countries," Economic Development and Cultural

Change 30: 625-48.

July 9 Evolution of Urbanization Policies in India

Reading Assignments

Dennis A. Rondinelli. 1990. "Policies for Balanced Urban Development in Asia: Concepts and Reality." Regional Development Dialogue, Vol.11, No.1, Spring, pp,23-59.

Edwin S. Mills and Charles M.Becker. 1986. Studies in Urban Development. Oxford University Press. pp.137-153.

July 10 National Urban Development Strategies and the Role of National and Subnational Governments

Reading Assignment:

Report of the National Coomission on Urbanization. 1988. New Delhi. Vol.1, pp,1-27.

Bertrand Renaud. 1987. "Urban Development Policies in Developing Countries." Tolley and Thomas eds. The Economics of Urbanization and Urban Policies in Developing Countries. Washington D.C. pp.60-72.

July 11 Measurement of Urbanization and Socio-Economic Indicators of Urban Development

Reading Assignments

George S. Tolley. 1987. "Urbanization and Economic Development." Tolley and Thomas. eds. pp.15-31.

Eduardo Arriga. 1975. "Selected measures of urbanization," in Goldstein and Sly eds., The Measurement of Urbanization and Projection of Urban Population. International Union for the Scientific Study of Population, Liege, pp.19-87.

July 12 Problems and Issues of Urban Growth (Guest Lecture by Professor Mahendra Kumar Premi).

Week 3 URBAN INFRASTRUCTURE AND SHELTER

July 15 Shelter and Urban Infrastructure

Reading Assignment:

Harry W. Richardson. 1987. "The cost of urbanziation: a four-country comparison." Economic Development and Cultural Change 35: 562-580

Shankar N. Acharya and Rakesh Mohan. 1990. "An Analysis

of Projected Urban Infrastructure Costs in India." Review of Urban and Regional Development Studies, Vol.2, No.1, January, pp.3-22.

World Bank. 1980. Shelter: Poverty and Basic Needs Series. Washington D.C.

National Institute of Urban Affairs

July 16 Infrastructural Development and Socio-Economic Life in Urban Places: A Critical Appraisal of Census/Survey Data (Guest Lecture by Professor Amitabh Kundu).

July 17 Shelter and Services for the Urban Poor: Alternative Approaches (Normative vs Basic Needs vs Policy Analysis)

Reading Assignment:

Ved Prakash. 1985. "Affordability and Cost Recovery of Services for the Urban Poor." Regional Development Dialogue. Vol.6, Autumn, pp.1-41.

World Bank. 1980. Shelter: Poverty and Basic Needs Series. Washington D.C.

July 18 Data Base for the Study of Urbanization in India

Report of the National Commission on Urbanization. 1988. New Delhi. pp.315-323.

Timothy J. Cartwright. 1990. The Management of Human Settlements in Developing Countries. London: Routledge, pp.131-141.

July 19 Population Projections for Infrastructure Planning

Kalman Tekse. 1975. "Projections of urban population," in Goldstein and Sly eds., The Measurement of Urbanization and Projection of Urban Population. pp. 89-142.

Richard K. Brail. ed. 1987. Microcomputers in Urban Planning and Management. Rutgers, The State University of New Jersey. pp. 49-72.

Workshop on Urbanization in India

July 1-20, 1991
New Delhi, India

Coordinator from the Office of the Registrar General

Smt Minati Ghosh
Assistant Registrar General (Map)
Map Division
Office of the Registrar General, India
West Block-I, Wing-II, 2nd Floor
Ramakrishnapuram
New Delhi 110066, India
Phone: 600743

Participants

Mrs. Suman Prashar
Assistant Director of Census Operations (Technical)
Social Study Division
C/o Registrar General, India
R.K. Puram, New Delhi
Pocket 'B' 104, Sukhdev Vihar
New Delhi 110025, India

Mr. R.P. Misra
Senior Geographer
Map Division
Registrar General's Office
West Block-I, R.K. Puram
New Delhi 110066, India

Mr. S.K. Kar
Cartographer
Map Section
Meghalaya Census Directorate
Shillong 793001, India

Dr. R.C.S. Taragi
Map Division
c/o The Registrar General, India
West Block-I, R.K. Puram
New Delhi 110066, India

Dr. K. Kumar
Geographer
Map Division
c/o The Registrar General, India
West Block-I, R.K. Puram
New Delhi 110066, India

Mr. V.K. Jain
Investigator
Social Studies Division
c/o The Registrar General, India
West Block-I, R.K. Puram
New Delhi 110066, India

Mr. R. Joseph
Geographer/Cartographer
Director of Census Operations
304/305 Anna Salan, Teynampet
Madras-60018, Tamil Nadu, India

Mr. Autar Singh
Senior Geographer
c/o Max Division
Office of the Registrar General, Indiua
West Block-I, R.K. Puram
New Delhi 110066, New Delhi

Mr. M.G. Mangala
Geographer/Cartographer
Directorate of Census Operations
27/1, Mission Road
Bangalore 560027, Karnataka, India

Mrs. Surnan Gupta
Cartographer
Map Division
c/o The Registrar General, India
West Block-I, R.K. Puram
New Delhi 110066, India

Dr. R.K. Sharma
Senior Geographer
Map Division
c/o Office of the Registrar General, India
West Block-I, R.K. Puram
New Delhi 110066, India

Mr. M.K. Jain
Senior Research Officer (SS)
Social Studies Division
c/o The Registrar General, India
116, Sewa Bhavan
R.K. Puram
New Delhi 110066, India

APPENDIX III

TRIP REPORT

Norman Y. Luther
Destination: New Delhi
Dates: July 27 - August 17, 1991

1. PURPOSE AND SUMMARY

The principal purpose of the trip was to conduct a three-week training workshop at the Office of the Registrar General, India (RGI), on methods of analyzing fertility and mortality. Bob Retherford and Norman Luther coordinated the workshop. Resource persons from the Office of the RGI also contributed to the workshop.

2. EWPI'S COOPERATIVE PROJECT WITH THE OFFICE OF THE RGI

Bob Retherford and Norman Luther coordinated a Fertility-Mortality Workshop for the Registrar-General, India (RGI). The workshop was held July 29 - August 16. Topics covered were life tables and model life tables; fertility estimation using the P/F ratio method, the parity-increment method, and the own-children method; indirect child mortality estimation using Brass's method; and population projections by the cohort-component method including migration.

After the methodology, underlying assumptions, and analytical pitfalls were presented in lecture for each method, participants were then given exercises to be done on hand calculators. The exercises were designed to test understanding of the methods. Only then did participants proceed to learn computer programs for these methods that were implemented on six PCs rented for the workshop. Most of the participants had never worked on PCs before. Participants were furnished data sets from their own states for the work on PCs. The workshop generated a great deal of enthusiasm and hard work.

Seventeen participants attended the workshop, representing RGI offices in several states as well as the central office in New Delhi. A participant list is attached.

A workshop agenda is also attached.

3. PERSONS CONTACTED

USAID MISSION/NEW DELHI

Street Address: B/28, Institutional Area Qutab Hotel Rd. New Delhi-110016	Tel: 91-11-686-5301 Fax: 91-11-677012 or 91-11-686-8954 Telex: 31-72131 AID IN
Dr. Constance A. Carrino Acting Director, HPN	
Dr. James R. Kirkland, Chief, Health Services Division	
Mr. J.K. Raman, Program Specialist, HPN Services Division	Home: 91-11-638143
Mrs. Padmini Srinivasan, Secretary	

OFFICE OF THE REGISTRAR GENERAL AND CENSUS COMMISSIONER, INDIA

Street Address: 2A Mansingh Rd. New Delhi-110011	
Mr. A.R. Nanda, Registrar General & Census Commissioner	Tel: 91-11-383761 or 383145 Res:D11/C-9, Moti Bagh
Mr. N. Rama Rao, Deputy Registrar General for Census Operations	Tel: 91-11-386761 Home: 91-11-600075
Mr. V.S. Swamy, Deputy Registrar General, Vital Statistics	Tel: 607616
Mr. O.P. Sharma, Advisor	Tel: 383761 or 386583 Home: 91-11-555-4505
Mr. K.S. Natarajan, Deputy Registrar General, Demography Division	Tel: 327-4860 Home: 550-7094
Mr. K.N. Unni, Demographic Division	
Mr. C.S. Arora, Director (EDP) Pushpa Bhawan, E Wing New Delhi - 110062	Tel: 6420295 Home: 6439394

MINISTRY OF HEALTH AND FAMILY WELFARE

Street Address: Nirman Bhawan
Maulana Azad Rd.
New Delhi-110011

Tel: 91-11-301-6730

Mr. R.L. Narasimhan, Deputy Secretary
tel:301-7740

Room 259,

Home: 605470

OTHERS

Dr. K. Srinivasan, Director
International Intitute for
Population Sciences, Govandi Station Rd
Deonar, Bombay-400 088

Home: 91-22-551-2708

Street Address: Deccan Gymkhana
Pune 411 004, Maharashtra

Tel: 0212/342579,
0210/344287

Dr. D.C. Wadhwa, Director, Gokhale
Institute

Dr. P. Venkatramaiah, Joint
Director, Gokhale Institute

Dr. K. Balasubramanian, Acting
Head, Population Research Centre,
Gokhale Institute of Politics and
Economics, Deccan Gymakhana,
Pune-411 004

Tel: 0212/342579
0210/344287

Dr. Mahendra Premi, Center for the Study
of Regional Development, Jawaharlal
Nehru University, New Mehrauli Rd.,
New Delhi-110067
(President, Indian Association for
the Study of Population)

Tel: 667676, 667557
Home: 657996
Tx: 031-73167 JNU IN
Fax: 686-5886

Mr. P. Subramaniyam, Director
Centre for Development Research
and Training (CFDRT)
15, North Crescent Road, T. Nagar
Madras - 600 017

Tel: 8250305 / 8250345

Dr. Aslam Mahmood
Associate Professor, Centre for
the Study of Regional Development,
Jawarharlal Nehru University
New Delhi-110067

Tel: 667676 X261

WORKSHOP ON ANALYSIS OF FERTILITY AND MORTALITY

July 29 - August 16, 1991

New Delhi

TENTATIVE AGENDA

Daily Timings: 10:00 - 11:15; tea break; 11:30 - 1:15
Lunch break
2:30 - 3:45; tea break; 4:00 - 5:15

Opening remarks, inaugural session, Monday, July 29, 10:00 a.m.

A.R. Nanda
Robert Retherford
Norman Luther
Introduction of participants

TOPICS:

July 29, Monday

Lexis diagrams

Distribute:
1. MORTPAK manual and diskette
2. EASWESPOP manual and diskette
3. FIVFIV-SINSIN manual and diskette
4. Handout on Lexis diagrams
5. Problem set on Lexis diagrams

July 30, Tuesday

Life tables
Discusson of data on children ever born

Distribute:
1. Handout on life tables
2. Problem set on life tables
3. Handout on children ever born (Manual 10)
4. Handout on fertility estimation methods

July 31, Wednesday

Life tables, including model life tables (continued)
Stationary population

Distribute:
1. Handout on stationary population
2. Problem set on survival ratios and reverse-survival ratios

August 1, Thursday

Stationary population (continued)
P/F ratio methods
Introduction to PCs

August 2, Friday

Children-ever-born and children-surviving data in India (K.S. Natarajan)

P/F ratio methods (continued)
Life tables (using MORTPAK program)

August 5, Monday

P/F ratio methods (continued)
Parity-increment method

August 6, Tuesday

P/F ratio methods (continued)
Parity-increment method (continued)
Child mortality estimation

Distribute: Handout on child mortality estimation

August 7, Wednesday

Child mortality estimation (continued)
Own-children method of fertility estimation

Distribute: Handouts on own-children method

August 8, Thursday

Child mortality estimation (continued)
Own-children method (continued)

Distribute: 1. Handout on population projections
2. Problem set on own-children method

August 9, Friday

Child mortality estimation (continued)
Own-children method (continued)
Population projections

August 12, Monday

Own-children method (continued)
Population projections (continued)

August 13, Tuesday

Fertility and mortality estimation from the Sample Registration System (V.S. Swamy)

Population projections (continued)

August 14, Wednesday

Completion of computer work

63

August 15, Thursday

Holiday

August 16, Friday

Concluding session

WORKSHOP ON FERTILITY AND MORTALITY

OFFICE OF THE REGISTRAR GENERAL, INDIA
SEWA BHAWAN, R.K. PURAM, NEW DELHI-110066, INDIA

JULY 29 - AUGUST 17, 1991

LIST OF PARTICIPANTS

COORDINATORS

EAST-WEST CENTER

Dr. Norman Y. LUTHER
Research Associate
East-West Population Institute
East-West Center
1777 East-West Road
Honolulu, Hawaii 96848, U.S.A.

Dr. Robert D. RETHERFORD
Research Associate
East-West Population Institute
East-West Center
1777 East-West Road
Honolulu, Hawaii 96848, U.S.A.

REGISTRAR GENERAL'S OFFICE, INDIA

Mr. Kalad Sundaram NATARAJAN
Deputy Registrar General
Demography Division
Office of the Registrar General
India
2A Mansingh Road
New Delhi 110011, India

Mr. Nott Rama RAO
Deputy Registrar General
Census and Tabulation Division
Office of the Registrar General,
India
2A Mansingh Road
New Delhi 110011, India

Mr. K. Narayanan UNNI
Senior Research Officer
Office of the Registrar General,
India
2A Mansingh Road
New Delhi 110011, India

PARTICIPANTS

Mr. Mahendra Singh BHATI
Investigator
c/o the Registrar General, India
2A, Mansingh Road
New Delhi 110011, India

Mr. A. Roy CHOUDHURY
Investigator
Directorate of Census Operations, Andhra Pradesh
Dunoon Compound
Kenchestrace
Shillong 793013, India

Mr. Dhirendra Nath DIXIT
Assistant Director
Registrar General's Personal Section
Office of the Registrar General, India
2A, Mansingh Road
New Delhi 110011, India

Mr. Amiya Kumar GHOSH
Investigator
Directorate of Census Operations, West Bengal
214/207, Parnasree Pally
(Milan Sarani)
Calcutta 700060, India

Mr. Syed Mohammed HOSSAIN
Assistant Director
Directorate of Census Operations, Bihar
Bihar State Co-operative
Bank Building, Ashok Rajpath
Patna, India

Mr. Prabhakar Diwakar JOSHI
Deputy Director
Vital Statistics Division
Office of the Registrar General, India
West Block I, Rama Krishna Puram
New Delhi, India

Mrs. Chembath KAMALAM
Assistant Director
Director of Census Operations, Kerala
Kowdiar
Thiruvanantha Puram, India

Mrs. Bimla MALHOTRA
Assistant Director
Office of the Registrar General, India
1/11, Ashok Nagar
New Delhi 110018, India

Mr. R. Lakshmi NARAYANAN
Investigator
Director of Census Operations, Tamil Nadu
304-305, Annasalai
Madras 600018, India

Mr. Anand NIGAM
Investigator
Directorate of Census Operations, Uttar Pradesh
Lucknow, India

Mr. Rama Kant Narayan PONGURLEKAR
Assistant Director
Directorate of Census Operations, Maharashtra
2nd Floor, Exchange Building
Sprott Road, Ballard Estate
Bombay 400038, India

Mr. Om PRAKASH
Investigator
Office of the Registrar General, India
Vital Statistics Division
West Block I, Rama Krishna Puram
New Delhi, India

Mr. Vedantam Lakshmi Pati SASTRY
Investigator
Directorate of Census Operations, Andhra Pradesh
Pioneer House, Somaji Guda
Hyderabad 500482, India

Mr. Pran Nath SHARMA
Investigator
Office of the Registrar General, India
4/21, Lodi Colony
New Delhi 110003, India

Mr. Dinesh Prasad SINHA
Investigator
Directorate of Census Operations, Uttar Pradesh
25, Naval Kishore Road
Lucknow, India

Mr. Niranjan Singh SOAM
Assistant Director
Office of the Registrar General, India
47/4A, Sector 2
D.I.Z. Area, Gole Market
New Delhi 110001, India

Mr. Prasad TRIPATHY
Investigator
Directorate of Census Operations, Orissa
Matrubhaban
Cuttack 753013 (Orissa), India

APPENDIX IV

THE IMPORTANCE OF INSTITUTIONAL FACTORS IN DEVELOPMENT: AN EXAMPLE FROM PAKISTAN'S FORESTRY SECTOR.

AND IMPLICATIONS FOR THE EAST-WEST CENTER

East-West Center
East-West Population Institute
1777 East-West Road
Honolulu, Hawaii 96848

April 1991

THE IMPORTANCE OF INSTITUTIONAL FACTORS IN DEVELOPMENT: AN EXAMPLE FROM PAKISTAN'S FORESTRY SECTOR.

And Implications For The East-West Center.

Presented in seminar,
In the East-West Environment and Policy Institute,
Honolulu, 11 April 1991.

By

Michael R. Dove
East-West Population Institute
Honolulu, Hawaii

Submitted to:

Ms. Ellen Starbird
Policy Development Division
Office of Population
Agency for International Development
Washington, D.C. 20523

This analysis was written with partial funding support from the Demographic Data Initiatives Project through a cooperative agreement (DPE-3046-A-00-8050-00) with the United States Agency for International Development and the East-West Center.

TABLE OF CONTENTS

I. INTRODUCTION

I spent my first two years in Asia studying a more-or-less traditional anthropological topic, the agricultural ecology of a tribal group in the center of Kalimantan. When I completed my dissertation on this topic and returned to Asia, I was based at a government research institute on a university campus in Java. While casting about for an appropriate topic for my next study, I noticed that questions were being raised in the offices in which I worked that were more puzzling - and thus interesting - than anything that I had found among the headhunters of Borneo. Why, for example, had no agronomic studies been carried out on swidden agriculture - publicly labelled a national scourge - since colonial times? Why did government officials categorize Imperata cylindrica as useless, while many farmers valued and even managed it for fodder and a soil-restoring ground cover? Why did the government extension service act as if the smallholder rubber sector - although producing over 80 percent of Indonesia's rubber exports - did not exist?

I spent the subsequent nearly ten years studying these and similar questions, while working within government institutions in both Indonesia and Pakistan. I based these studies on two important premises: first, the policies of government bodies have the same legitimacy as the beliefs of any of the more usual subjects of social scientific study, in that there is always an underlying rationale (albeit often an implicit one) that can be

studied and understood; and second, such study and understanding can inform resource management policy and improve the implementation of development programs.

I intend in this talk to present the results of one of my more recent studies, which seeks to answer the question: why do Pakistani foresters disavow small farmers interest in tree cultivation? The answer had direct implications for national resource management policy in Pakistan, it suggests an added dimension for studies of environment and policy in general, and it even affords a new perspective on the "comparative advantage" of the East-West Center.

Before beginning, I would note that while the approach taken in this study is somewhat novel, there are a few notable examples of its use elsewhere. One is Blaikie's (1985) study of the political economy of soil erosion. One quotation will suffice to show his approach. He writes (1985:51):

> Our starting point lies in the identification of the social factors which help to shape the <u>perception</u> of the problem of soil erosion by those who attempt to intervene in land-use decisions through government action. Most of the attempts to include social factors in the study of erosion and conservation...imply that the social problems start with 'them', the land-users themselves. Here we argue that a comprehensive analysis should broaden the scope of the

analysis to include conservationists and governments.

A second illustrative study is by Thompson, Warburton and Hatley on uncertainty over the extent of resource degradation in the Himalaya. They write (1986:33):

> This uncertainty, we would argue, is not inherent in the bio-physical properties of the system, nor is it generated just by accident, nor is it generated just for its own sake. It is generated by institutions for institutions.

II. BACKGROUND: THE FORESTRY PLANNING & DEVELOPMENT PROJECT

For the case study to be presented here, I will draw data from three and one-half years of research conducted under the auspices of the first major social forestry project in Pakistan, the 'Forestry Planning & Development Project'. The goal of the project was to expand tree planting and thus the production of fuelwood, fodder, and timber on private farmlands, thereby increasing rural welfare and sustaining the long-term economic and ecological viability of small farms. In addition to training and research programs, the project included a field component to demonstrate the viability of agro-forestry systems for small farmers. This consisted of providing farmers with extension advice and free tree seedlings for on-farm planting.

Implementation of this field component encountered immediate problems, centering on the selection of farmers to participate. Many of the project foresters initially contacted only large

farmers, a selection that they justified by saying that only 'progressive farmers' - a euphemism for the rural elite - could be expected to embrace a new technology like farm forestry. The 'progressive' rural elite's response to this outreach effort was, in the event, anything but an embrace. Under the terms of the project, the foresters could give participating farmers up to 5,000 free seedlings and extension advice, nothing more. If larger farmers wanted more resources (e.g., more than 5,000 seedlings), they had to purchase them. In contrast to the modest resources offered, the rural elite demanded the sorts of benefits that they were used to receiving from the government: tens of thousands of free seedlings and, in particular, free government labor to plant them and the labor and barbed wire to protect them - and even in some cases free tractors, tube-wells, credit, and so on (cf. Cernea 1985:276-277).[1]

The aggrieved response from their traditional clientele led many of the foresters to lobby for a redesign of the project. To the suggestion that the problem lay not in the project design but in the incorrect selection of farmers - large instead of small - for participation, the foresters replied that there were no 'small farmers' in Pakistan, and if there were they certainly were not interested in tree cultivation. This dismissal of small farmer interest in on-farm forestry provided some of the stimulus to my conduct of a base-line study of village and household variables relevant to the development of farm forestry in Pakistan.[2] In

addition to a wide variety of background information on farm ecology and economy, the study included questions on whether the farmers were interested in participating in the Forestry Planning and Development Project; and if so, how many seedlings they wanted, of what species, and for what eventual purpose.[3]

The farmers' answers to these and related questions (supported by field observations of actual farmer behavior) can be compared with the foresters' beliefs on a point-by-point basis.[4] The data on the foresters' beliefs were gathered in the course of my daily participation over three and one-half years in meetings, workshops, and field trips with the project foresters, and by analysis of project documents prepared by the Forest Department.

III. SMALL FARMER INTEREST IN FARM FORESTRY

Forester belief is at odds with farmer behavior on six key questions.

1. Do Small Farmers Hold Anti-Tree Attitudes?

Many foresters believed that small farmers were traditionally not 'tree-minded', did not like or understand trees, and could only be convinced otherwise (if at all) through extensive extension efforts. This was the rationale for the foresters' misgivings over a popularly-oriented farm forestry program. In the base-line study, however, 87 percent of farm households reported significant numbers of trees already on their lands. Of more importance, on

about one-half of these farms, at least some of the trees were reported to have been planted as opposed to naturally grown (Table 1). These findings clearly suggested

Table 1. Source of existing on-farm trees.

	Source of Existing On-Farm Trees		
	All Natural	Natural/Planted	Planted
% of Farms	50 %	27 %	22 %

that there is an existing on-farm tree orientation upon which Forest Department extension efforts could successfully build.

2. Will Farmers Plant Trees on Their Farms?

Many foresters believed that only a small minority of farmers could be persuaded to plant trees, and that the targets of the project for involving farmers were unrealistic. Among farmers interviewed in the base-line studies, however, fully 66 percent reported interest in planting trees.[5] The foresters also believed that the only farmers who would be interested in tree cultivation would be the most "progressive" ones, meaning those with the most land, best facilities and highest education - thus the foresters' initial attempts to focus on the rural elite. The base-line study showed that interest in farm forestry was not confined to "progressive" farmers, however, and that in some cases interest was even higher among other farmers. For example, although higher interest in planting trees was indeed found to be associated with larger farms, on which it is easier to plant trees without displacing valuable

crops, it does not necessarily follow that large farmers were more interested in the project per se.[6] While small farmers were generally satisfied with the government's offer of free seedlings and extension advice, the large farmers continually demanded resources that the project was not offering, as mentioned earlier. In addition, since small farmers predominate in the countryside, their interest in tree-planting is potentially more important. Similarly, while greater interest in planting trees was found among those with more education (Fig. 3), even among illiterate farmers - who constitute a majority of the rural population - a majority (56%) were found to be interested in planting trees. Thus, literacy - like large farm size - is not a prerequisite to 'tree-mindedness'.

3. What Are the Major Obstacles to Farm Forestry?

Many foresters believed that the major obstacle to tree cultivation by small farmers was the farmers' own lack of interest and experience in raising trees. As a result, some foresters proposed to devote large amounts of project resources to 'farmer motivation'. The base-line study showed, on the contrary, that the average farmer's major perceived obstacles to raising trees are lack of water, difficulty of protecting them from livestock, and anxiety about their perceived negative impact on nearby food crops (Fig.1).[7] This finding suggests that what the farmers need is not motivation but rather technical research and extension efforts.

4. What Kind of Trees Do Farmers Want?

Many foresters believed that farmers would only be interested in planting large plantations of marketable species like Eucalyptus and Poplar, and so little attention was initially given to either indigenous trees or indigenous patterns of tree planting. The base-line study found that most farmers were not interested in market-oriented plantations, however, but in smaller and more subsistence-oriented plantings: the large majority of farmers surveyed requested fewer than 1,000 seedlings, and the average was less than 500 (Table 2). As for species, while many farmers

Table 2. Number of trees requested per farmer.

% of Households Requesting	Number of Seedlings Requested			
	< 100	100-1000	1000-2000	> 2000
	35 %	51 %	9 %	5 %

did indeed request seedlings of Eucalyptus (apparently not because they had specific plans for the Eucalyptus but only because they - like the foresters - were impressed with its rate of growth), there were more requests for the indigenous multi-purpose trees, especially Acacia nilotica and Dalbergia sissoo - the two most popular native trees for use as fuel or timber.

5. What Do Farmers Want Trees For?

Many foresters believed that the farmers would only plant trees that they planned eventually to sell in the market. They did not believe that the farmers would plant trees for use as fuel - a

belief shared by many who work in social forestry. This resulted in an initial (and to some extent persevering) orientation of the project towards analyzing and/or stimulating market demand for tree products, and then organizing on-farm production to meet it. However, when asked in the base-line study what they planned to use the planted trees for, the single use most often mentioned by farmers was "fuel", followed by "timber for construction". "Market sale" was a distant third (Fig. 2).[8] While the single use most often mentioned by farmers was fuel, most farmers in fact indicated that they planned to use the trees for two or more purposes (Table 3). That is, the farmers typically said that

Table 3. Number of intended uses of tree-products.

% of Households Reporting:	Number of Tree-Uses Requested Per Household			
	One	Two	Three	Four
	22%	46%	24%	8%

they wanted to grow trees for use as fuel plus one or two other uses. Based on these findings, the obvious focus for extension efforts is subsistence-oriented cultivation of multi-purpose trees.

6. What Type of Farmer Should Social Forestry Programs Focus On?

As previously discussed, many foresters believed that the Forestry Planning and Development Project should focus on those farmers with whom the Forest Service had worked in the past, those who were likeliest to embrace a new technology, those who were most interested in serving the needs of Pakistan's timber markets. Need

to participate in the project was not a consideration, if anything its absence was the consideration: there was conscious selection for farmers whose prior experience with agroforestry obviated the need for extension advice, who were sufficiently wealthy to have purchased seedlings if they had not been given them by the government, and who were not experiencing shortages of fuelwood, fodder, or timber. The net impact of working with this group of farmers was likely to be relatively very low.

The net impact of working with small farmers is likely to be far different. The base-line study documented not only that small farmers wanted but needed to participate in farm forestry. The study found that the farmers with the least land had the least adequate supplies of fuelwood and construction timber (Fig. 3). The farmers with the least land also reported the greatest difficulty gathering fuelwood, which is also reflected in their greater use of child and female labor for this task (Fig. 4).[9] Because of poorer supplies and greater difficulty in gathering, farmers with less land are more likely to have to purchase both fuelwood and construction timber (Fig. 5)[10], although they are also less capable of paying for it. To make matters worse, they typically have to pay a higher price for fuelwood than better-off farmers (Fig. 6), because they have neither the resources to buy in large quantities nor the reserve supplies to postpone purchasing until the seasons of the year when market prices are lowest. In short, the greatest need for - and thus the greatest potential

impact of - the products of farm forestry development lies with Pakistan's small farmers.

IV. ANALYSIS: FORESTER BELIEFS VS. FARMER BEHAVIOR

The analysis and dissemination of the findings of the base-line studies did not, in itself, terminate the debate about the interest of small farmers in farm forestry, because this was at heart a debate about the broader socio-economic structure of forest service careers. The Pakistan Forest Service traditionally had very different relations with two very distinct clienteles. From one clientele, the peasantry, the Forest Service extracted fees for approved uses of forest resources (grazing cattle and gathering fuelwood) and fines and informal payments for unapproved uses[11]; for the other clientele, the principal landlords in each district, the Service provided 100 percent subsidized tree-plantings, in the context of a broader pattern of reciprocal economic and political ties between the government and the rural elite.[12] The foresters had a vested interest in retaining these traditional relations, which were essentially reversed by the Forestry Planning and Development Project: the rural poor were to be assisted to grow their own trees, and the rural elite were to be denied the kind of assistance that they had received in the past. The economic implications of this reversal for the foresters is reflected in the fact that during at least the first two years of operation of the project, many of the officers assigned to it were sent there for disciplinary reasons.[13] This superficially humorous story is a

legitimate, institutional fact, one that directly supports the arguments being made here; and one that could have been used to foretell and forestall many of the problems subsequently experienced by the project.

The impact on the professional reward structure, of transforming a bureaucracy based on patronage into a public service-oriented department, is a legitimate problem for the bureaucrats involved. Its legitimacy is not recognized - and certainly not addressed - in most development programs, and the Forestry Planning and Development Project was no different in this respect. Little if any provision was made in the design of the project to offset the economic consequences to personnel transferring from traditional forestry posts to project posts.[14] The principal reason for this seems to be that many of these consequences related to not formal but informal reward structures. In order to address the income differential between the foresters with traditional duties and those with duties in the Forestry Planning and Development Project, the project design - and by extension the Pakistani and U.S. governments - would have had to officially recognize the unofficial reward structure - something that would have been especially difficult for the U.S. government to do. Few U.S. government agencies have the analytical capacity to cope with the pervasive distinctions in Asia between official and unofficial, or formal and informal, social realities. This analytical shortcoming is reinforced by a cultural tradition that

rejects accommodation with social realities falling outside of the "law" (e.g., bribery), and by a political-economic tradition that is slow to recognize the political interestedness of its international aid recipients.[15] These shortcomings have been the cause of many development assistance failures. That they were not responsible for failure in the case of the Forestry Planning and Development Project was due to a combination of factors.

The limited efforts that were made by the Forest Service to contact common farmers were very successful (disconcertingly so from the viewpoint of those foresters opposed to the project). The manifest enthusiasm of common farmers for the project made the claim that the project was ill-designed increasingly less tenable. At the same time a rising tide of supportive rhetoric from elsewhere in South Asia and the rest of the developing world was making social forestry a "buzz word" in the higher echelons of the Pakistan government. Finally, in the midst of the debate over the project design, a man of unusual vision was appointed to head the Pakistan Forest Service. With obvious support from both farmers and high-level officials for social forestry, and with the evidence of the farmer studies before him, the new Inspector General of Forests concluded that the project was basically sound and terminated most internal debate over its design. Part of the value of the farmer studies may have been that they kept the debate going long enough for the popular appeal of agroforestry development to make itself evident.

V. DISCUSSION: THE STUDY OF INSTITUTIONS

The value of gathering and analyzing data on the farmers, from an analytical point of view, lay in showing that the problem did not involve the farmers at all. This discovery led to the key question: why were farmers being construed as a problem? It was important, therefore, to not stop with the question, "Are farmers interested in tree cultivation?", but to further ask "Why do foresters maintain that they are not?" Such questions are more than problems needing solutions; they are, in the words of Thompson et al. (1986), extremely effective "development guideposts". Resolution of the impasse in the Forestry Planning and Development Project began with the realization that the impasse was important, not just because of its impact on project activities, but because it revealed important institutional contradictions within the project. Disagreement over farmer needs, government intentions, and development strategies are commonly seen as obstacles to research, when they should be seen as the first research priority.

Institutional facts should be accorded this priority because few other types of facts as frequently or as seriously affect the course of development. As Thompson et al. (1986:73) write:

> Our approach, in essence, is defined ... by the mild and unremarkable observation that the scientist ... is continually finding that it is institutional forces that muddle his attempts to analyze and solve what, at first, appear to be

technical problems.

This was certainly the case in the Forestry Planning and Development Project: the single most important constraint on the initial implementation of the project was institutional opposition to the public service ideal that it embodied.[16]

One of the advantages of a focus on institutions is ease of work. Thompson et al. (1986: 95) write: "While it is extraordinarily difficult to come up with any useful and valid physical facts, it is quite easy to come up with useful and valid institutional facts." Facts like the foresters' insistence that the principal constraint on tree cultivation by common farmers was attitudinal in nature, and their bias towards market- versus subsistence-oriented tree cultivation, revealed themselves repeatedly in the Forestry Planning and Development Project. In three and one-half years not a single biophysical fact was unearthed of equal significance to the project - neither regarding species selection, nor the technology of planting and after-care, nor the analysis and mitigation of environmental constraints.

The conspicuous absence of important biophysical data was due, in part, to the fact that institutional difficulties - which are temporally prior in the development process - were inhibiting implementation of the project. Efforts to fine-tune the spatial, temporal, and technological aspects of tree-planting (e.g.) could have little impact if institutional constraints, before the fact,

kept trees out of the hands of the farmers who wanted and needed them. When the principal institutional difficulties in the project are all resolved, then biophysical facts will likely become the primary constraints on project implementation and, thus, the primary determinants of project success.

In the interim, the focus on institutional problems does not mean that the biological or physical problems more familiar to foresters must be neglected. On the contrary, as Thompson et al. write [24]: 'One of the key strategic implications of this institutional approach is that it helps to pinpoint the sorts of physical facts that it would be most valuable to know.' In the case of the Forestry Planning and Development Project, this approach helped to identify a number of different biophysical topics that merited attention and that were in fact being ignored (because they are constraints on tree cultivation by small not large farmers). These included ways of coping with water stress on rainfed lands, protecting tree seedlings from livestock, minimizing crop-tree competition on intensively cultivated lands, and propagating superior varieties of native multi-purpose trees.

VI. CONCLUSIONS

The approach taken in this paper is a versatile one. It can provide an added dimension to the study of many environment and policy-related issues. Consider three research questions currently being pursued in the EAPI (and any other three could have served

equally well as examples): "Why is there little interest in the urban environment in Asia?", "Why has the concept of sustainability not caught on?", and "Why do stove improvement programs fail?" In addition to investigating the utility of the concepts of urban environment and sustainability, and the structure of stove programs, the approach taken here calls attention to potentially relevant institutional characteristics of the issues involved - the institutional disagreeability of the concept of urban environment and sustainability - which explains why these concepts do not sell - and the institutional agreeability of stove improvement programs - which explains why these programs do sell). The concepts of urban environment and sustainability are institutionally disagreeable because the former undercuts the myth of urban expertise in environmental management and the latter tends to highlight the advantages of local-level resource-use versus the disadvantages of national-level resource extraction. The institutional agreeability of stove improvement programs lies in the fact that they locate the source of energy problems in politically harmless poor rural households and promise programmatically appealing "magic bullet" solution" to these problems.

This paper's approach also has the virtue of being "transcendental". The principles involved lend themselves to use across disciplinary or institute boundaries. My current work in the Population Institute, comparing the perception of population/

resource pressure by government officials and farmers, is an example. The Institute of Culture and Communication could provide another example. One of the main conclusions of the Pakistani case study is that the foresters' statements about farmer interest in forestry are more rhetorical than empirical in nature. It appears, indeed, as if this sort of mis-representation or mis-communication is generally characteristic of (if not the cause of) development impasses of institutional origin. The suggestion that issues of communication are central to development problems should be of special interest, given the emphasis on communication in the East-West Center's charter.

Finally, a word on the comparative advantage of the East-West Center. In a world of proliferating institutions involved in international development, education, and research, it behooves the Center to distinguish itself by emphasizing what it can do that other institutions cannot. With its unique network of institutional ties, its perception as an apolitical institution, and its unusual status as neither donor nor recipient, the East-West Center is well-positioned to study what other institutions either cannot or will not - and certainly do not - the role of institutional factors in resource management and policy.

RESEARCH ACKNOWLEDGEMENTS

This analysis was written during the tenure of fellowships at the East-West Center's Population Institute (partially supported by the 'Demographic Initiatives Project', under agreement #DPE-3046-A-00-8050-00 with the U.S. Agency for International Development) and Environment and Policy Institute (under the 'Land, Air and Water Management' and 'Habitat and Society' programs). The field research upon which this analysis is based was supported by the Forestry Planning and Development Project, funded by the Government of Pakistan and the U.S. Agency for International Development, under the direction of the Office of the Inspector General of Forests in the Ministry of Food, Agriculture and Cooperatives, and under contract to the Winrock International Institute for Agricultural Development. The author was assisted in the field research by Jamil Qureshi, Riaz Ahmad, Sarfraz Ahmad, Nisar Ahmed, Abul Hassan, Zafar Masood, Shamsul Qamar, Nadeem Shahzad, Gul M. Umrani, and Nazir Marvat. The author is grateful for helpful comments on this paper to Carol Carpenter, Robert Fisher, Jefferson Fox, and A. Terry Rambo. The author alone is responsible for the final analysis presented here.

REFERENCES CITED

Blaikie, Piers
1985 The Political Economy of Soil Erosion in Developing Countries. New York: Longman Inc.

Bokhari, A.S.
1989 Pakistan: A Review and Analysis of Forest Policy and Legislation. Islamabad: Report for the World Bank.

Cernea, Michael M.
1985 Alternative Units of Social Organization Sustaining Afforestation Strategies. In Putting People First: Sociological Variables in Rural Development, Michael M. Cernea ed., pp. 267-293. New York: Oxford University Press.

Chambers R. and M. Leach
1989 Trees as Savings and Security for the Rural Poor. World Development 17,3: 329-342

Dove, Michael R.
In press a The 'Humor' of Shade: The Peasant Epistemology of Tree Shade in Pakistan. Human Ecology.

In press b The Anthropology of Development vs. the Application of Anthropology to Development: Mediating the Forester-Farmer Relationship in Pakistan. Practicing Anthropology.

In press c Foresters' Beliefs about Farmers: An Agenda for Social Science Research in Social Forestry. Agroforestry Systems.

Foley and Barnard
1984 Farm and Community Forestry. London: Earthscan and International Institute for Environment and Development.

Jambulingam R. and E.C.M. Fernandes
1986 Multipurpose Trees and Shrubs on Farmlands in Tamil Nadu State (India). Agroforestry Systems 4: 17-32

Thompson, M.; M. Warburton; and T. Hatley
1986 Uncertainty on a Himalayan Scale: An Institutional Theory of Environmental Perception and a Strategic Framework for the Sustainable Development of the Himalaya. London: Ethnographica.

ENDNOTES

1. Large farmers in villages close to government offices are used to receiving government attention; small farmers in remote villages are not. We visited remote villages where we were told that no government officers had visited since partition, and where the offer of free seedlings from the government was greeted with great enthusiasm. It should come as no surprise that those who do not need development assistance - and are too often its recipients - are indifferent to it, while those who truly need it - and too rarely receive it - are not.

2. The study comprised five successive stages: (1st) group interviews focussing on gross village characteristics in 118 villages; (2nd) interviews on basic household characteristics in 1,132 households in 63 villages; (3rd) in-depth interviews on farm ecology and economics in 589 households in 40 villages; (4th) in-depth interviews on village ecology with 40 groups of key informants and mullahs in 40 villages; and (5th) monitoring of daily activities for 18 months in 13 households of key informants.

3. This study, which I carried out in stages between 1986 and 1989, was concentrated in - as was the project itself - the barani 'rainfed' region of Pakistan, comprising the Salt range, Pothwar plateau, and plains of northern Punjab province and southern Northwest Frontier province.

4. Other results of the base-line surveys are being published in Dove (in press a,b,c).

5. Wide interest in on-farm forestry among contemporary farmers is neither uncommon nor inexplicable. For example, high interest in agroforestry was found among farmers in India's Tamil Nadu province and was attributed to: (i) stable demand and high prices for tree products as opposed to food crops, (ii) the low cost of labor and other inputs compared with food crops, (iii) greater resistance to drought compared with food crops, (iv) government pressure on absentee landlords to bring land into use, and (v) provision of government credit for participation in agroforestry programs (Jambulingam and Fernandes 1986).

6. 'Large' farmer is somewhat arbitrarily defined in Figure 2 as one with over 50 acres of land. For the purpose of the discussion in this paper, such a precise definition is unnecessary. The farmers whom the foresters term 'progressive' typically own hundreds if not thousands of acres, possess such obvious symbols of wealth as motor cars, and wield political as well as economic clout. No violence will be done to the sociological realities of rural Pakistan if we term farmers with these attributes 'large farmers' and farmers without them 'small farmers'.

7. This list should not be considered definitive, since on-farm forestry is affected by some factors that are not known to the farmers - including some factors within government. Chambers and Leach (1989), for example, write: 'The major obstacle to tree planting by small and poor farmers on their lands lies not with them but with officials and other outsiders, with laws and regulations, and with their implementation.'

8. Only 7 percent of the farmers interviewed reported past sales of fuelwood, in contrast to the 34 percent who reported past purchases of fuelwood.

9. The incidence of women joining in fuelwood gathering is likely under-reported in the data presented here, because of cultural proscriptions against discussion of a household's women with male visitors. However, the under-reporting bias is probably sufficiently constant across households to allows the use of the data to analyze inter-household differences.

10. While the data in this paper generally show small farmers behaving one way and big farmers behaving another, Figure 5 shows evidence of some differences in behavior between landless farmers and small landowning farmers. This is due to the unique position of landless tenants: on the one hand they are given (or take) some farm forestry products from their landlords, and on the other hand they have little incentive to invest in the long-term production of these resources on the landlord's land.

11. Cernea (1985:271) reports that at the time of his study in Azad Kashmir, one out of every five households was involved in ongoing litigation with the Forest Service.

12. The predominance of large farmers in past tree cultivation efforts is reflected in a 1972 report from a government committee, which noted that the only obstacle to tree-planting by farmers was possible obstruction of the flight of plant protection aircraft over the farmers' fields (Bokhari 1989:36).

13. Compare with Blaikie's (1985:86) observation that 'Many mediocre and/or failed bureaucrats tend to be 'promoted' to [soil] conservation by their more thrusting and successful colleagues.'

14. Cf. Foley and Barnard (1984:145) on the potential benefits foregone when foresters join social forestry projects.

15. Cf. Blaikie's (1985:61) observation that "There is seldom [in the design of foreign aid projects] any serious political analysis either of the ruling class(es) and how they express their interests through the state and its institutions."

16. Other important constraints, such as the lack of a dependable mechanism for moving project funds through the government bureaucracy, were also institutional in nature.

Fig. 1. Major perceived obstacles to farm forestry.

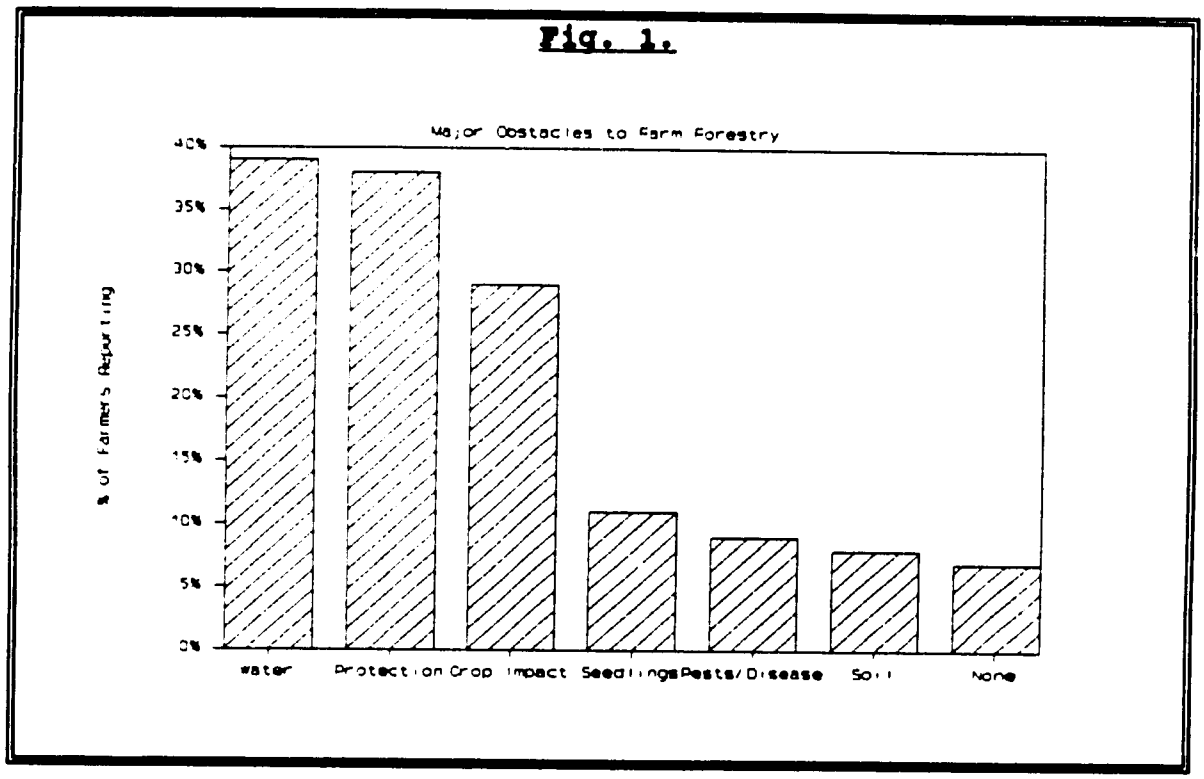


Fig. 2. Proposed uses of project trees.

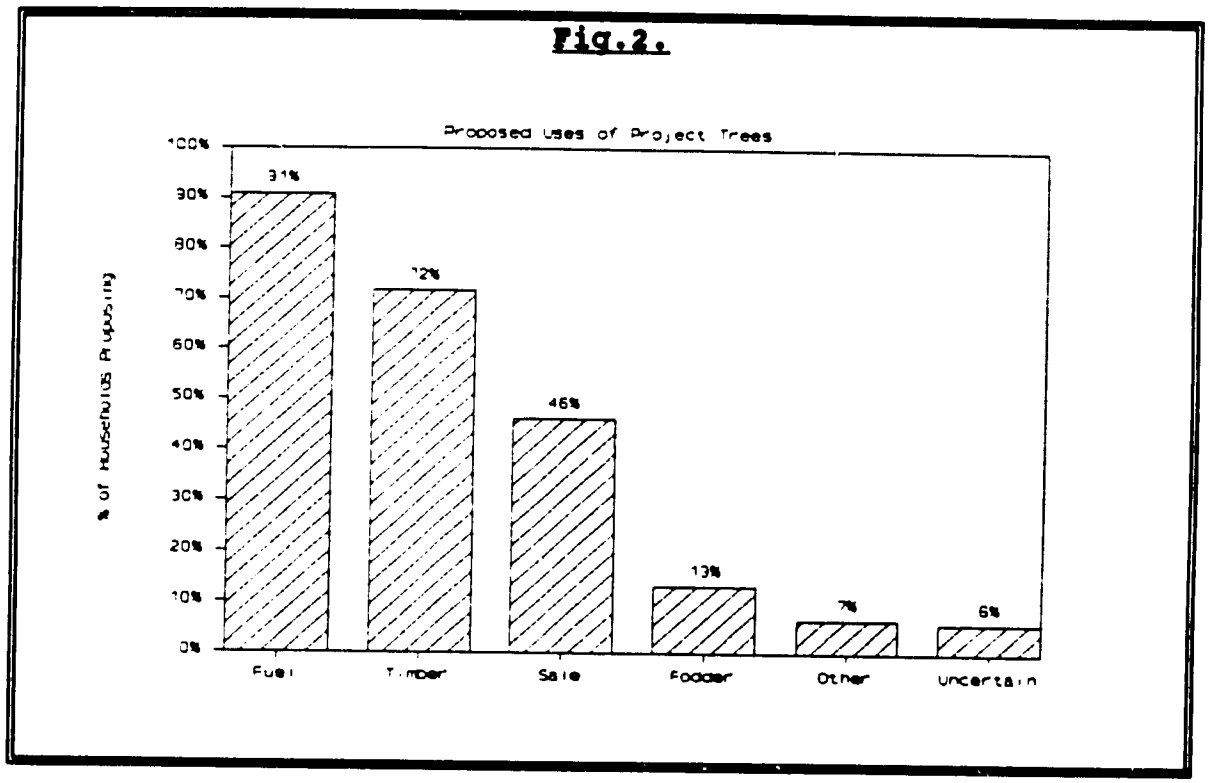
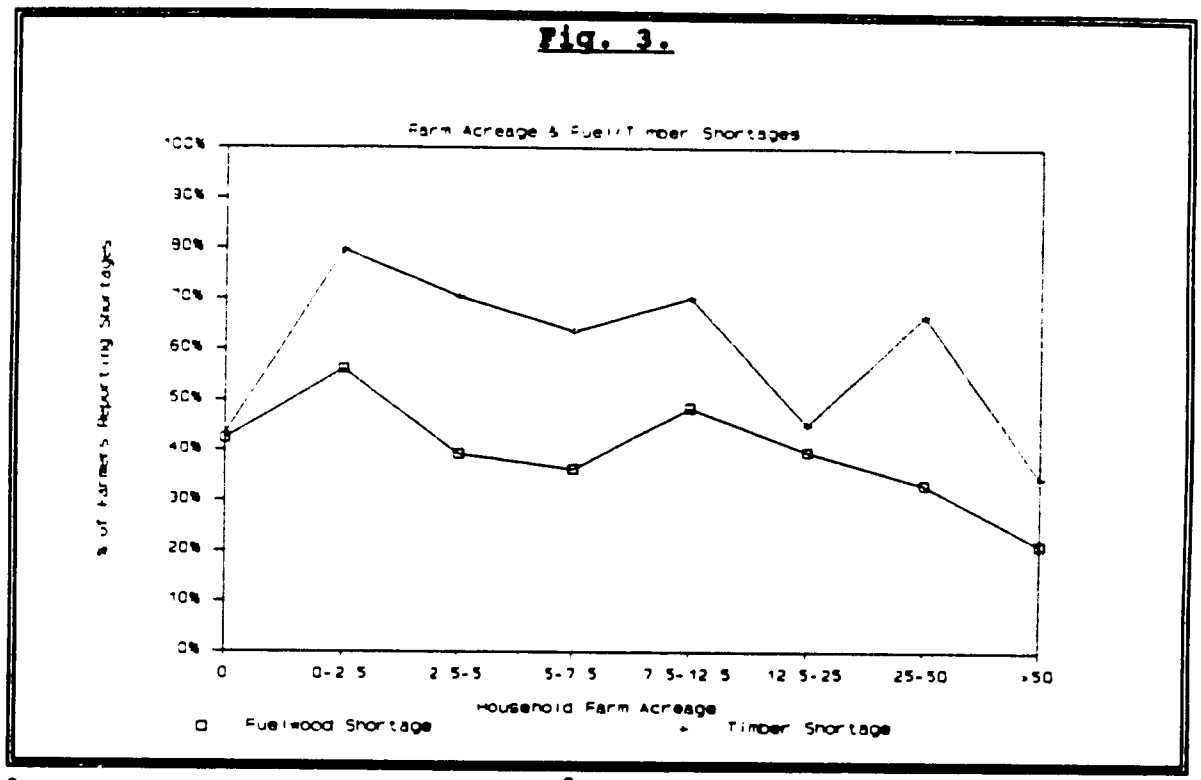
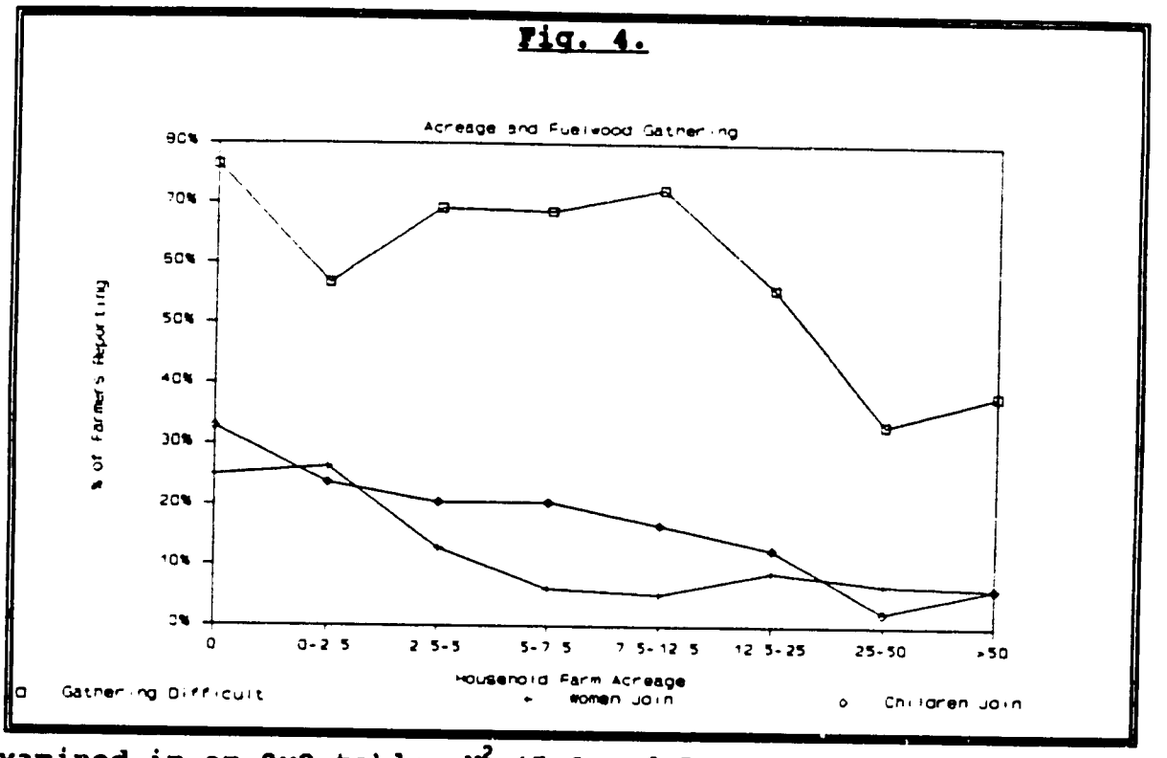


Fig. 3. Household farm acreage and fuel/timber shortages.[a]



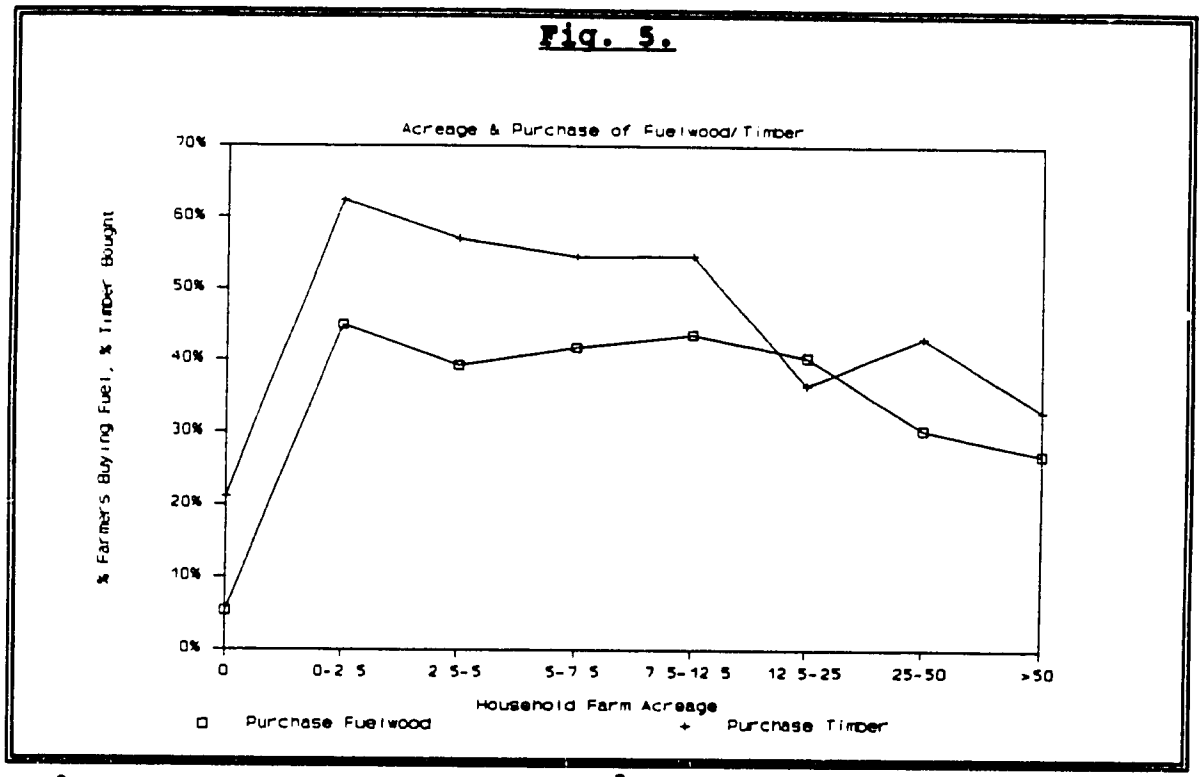
[a] Examined in an 8x2 table, X^2=17.5 and P<.025 for n=607 households for fuel shortages; and X^2=51.5 and P<.001 for n=596 households for timber shortages.

Fig. 4. Household farm acreage and gathering fuelwood: difficulty, use of childrens' labor, & use of womens' labor.[a]



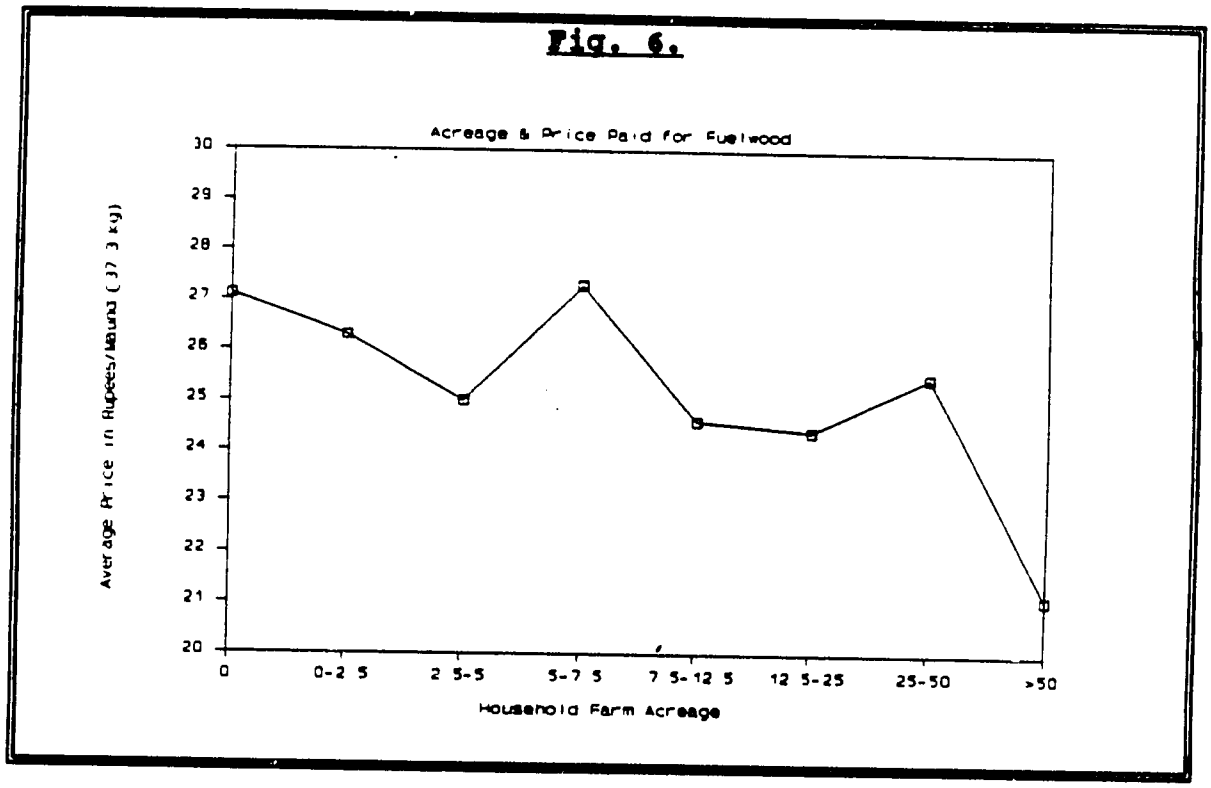
[a] Examined in an 8x2 table, X^2=45.8 and P<.001 for n=550 households for difficulty gathering; X^2=34.0 and P<.025 for n=560 households for women joining in gathering; and X^2=31.9 and P<.0 for n=560 households for children joining in gathering.

Fig. 5. Household farm acreage and purchasing fuelwood & timber.[a]



[a] Examined in an 8x2 table, X^2=61.3 and P<.001 for n=607 households for difficulty gathering; X^2=133.9 and P<.001 for n=1,723 timber purchases.

Fig. 6. Household farm acreage and prices paid for fuelwood.[a]



[a] Examined in an 8x2 table (comparing the price paid by each acreage category with the median price of 25.2 rupees/maund), $X^2=23.4$ and $P<.005$ for n=167 households.

MARRIAGE PATTERNS AND CUMULATIVE FERTILITY IN INDONESIA, 1987

East-West Center
East-West Population Institute
1777 East-West Road
Honolulu, Hawaii 96848

April 1991

MARRIAGE PATTERNS AND CUMULATIVE FERTILITY IN INDONESIA, 1987*

James A. Palmore
Population Studies Program and Department of Sociology
University of Hawaii
and
East-West Population Institute
East-West Center

Masri Singarimbum
Population Studies Center
Gadjah Mada University

5 April 1991

* Paper prepared for inclusion in a planned book on secondary analyses of data from the 1987 National Indonesia Contraceptive Prevalence Survey. In part, this paper resulted from cooperative research between the National Family Planning Coordinating Board, Jakarta, Indonesia; the Population Studies Center, Gadjah Mada University, Yogyakarta, Indonesia; and the East-West Population Institute, Honolulu, Hawaii, U. S. A. Funding from the United States Agency for International Development is gratefully acknowledged. The authors also thank Andrew Kantner and Peter Xenos for helpful comments.

Abstract

While the age at first marriage for women has been rising and divorce rates have been declining, two features still stand out when comparing Indonesia's marriage patterns to those elsewhere in Asia: many Indonesian women marry young and divorce and remarriage rates are relatively high. Marriage for women was virtually universal in 1987. Among all women ages 15-49 in 1987, close to one fifth had married before age fifteen and 45 percent had married before age eighteen. The percentage of currently married women who had been married more than once was seven percent for women ages 15-24, fifteen percent for women ages 25-34, and twenty nine percent for women ages 35-49.

These nuptiality patterns are important in their own right but their effects on fertility also need to be assessed. Earlier marriage ages lead to higher fertility; being married more than once leads to lower fertility. Among women 35-49, for example, being married more than once lessened cumulative fertility by more than one child. Those who married under age fifteen had cumulative fertility almost three quarters of a child higher than those married after age eighteen in the same age group.

After statistically controlling for eight socio-economic variables related to both fertility and nuptiality in a multivariate analysis, a one year delay in age at first marriage was associated with having .22 fewer children. A five year delay, hence, led to having 1.1 fewer children net of all the other variables. Being married more than once had a net regression coefficient of -2.08, a very strong negative effect on cumulative fertility.

Both marriage variables were correlated with contraceptive use, with contraceptive use apparently reinforcing the age at first marriage effect (lower fertility for those marrying later) and low contraceptive use for those married more than once.

If past trends continue, rising age at marriage will lower fertility rates but lower divorce rates will tend to increase fertility.

Two features stand out when comparing Indonesia's marriage patterns to those elsewhere in Asia: Indonesian women have generally married young and divorce rates have been relatively high (see, for example, Smith 1980, Hull and Hull 1985, McDonald 1985, and Palmore 1985). Part of this pattern has been argued to result from mate selection determined by parents rather than by the man and woman getting married (Geertz 1961; Cheung et al. 1985; National Research Council 1987). Recently, as the marriage partners themselves have had more influence in selecting their own mates, however, marriage ages have been increasing and divorce is becoming somewhat less common (McNicoll and Singarimbum 1983; Hull and Hull 1985 and 1987; Keyfitz 1985; Hugo et al. 1987; National Research Council 1987; Taj 1989; Williams 1990). The increase in age at first marriage may also have been influenced by the 1974 Marriage Law that established 16 years as the minimum age at marriage for women and 18 years for men, with parental permission required for anyone marrying under age 21 (Central Bureau of Statistics, National Family Planning Coordinating Board, and Demographic and Health Surveys, Institute for Resource Development/Westinghouse 1989[1]: 14; McDonald and Kasto 1978), although significant proportions of women are still marrying at young ages. These trends in nuptiality are important in their own right, but their effects on fertility should also be assessed. Early first marriage is usually associated with high fertility. High divorce rates, on the other hand, are usually

---

[1] Hereinafter, this citation is referred to as CBS 1989.

associated with lower fertility.

For both of these marriage variables (age at first marriage and the number of times married), one explanation for the association with fertility is a standard demographic concept: length of exposure to the risk of conception. Earlier marriage lengthens the period of exposure to the risk of conception. Divorce, because there is typically less intercourse before it occurs and because there is usually a delay between successive marriages, shortens exposure (Palmore and Ariffin bin Marzuki 1969).

A complicating fact is that earlier marriage is often correlated with greater chances of being married more than once (see Palmore and Ariffin bin Marzuki 1969 for Malaysia; Mamas 1978 and 1989 for Indonesia). Hence, the net effect on fertility of the two marriage variables can be either positive or negative. The correlation between age at marriage and divorce may, in part, be due to the fact that couples, and particularly the woman in the couple (Taj 1989), first defer to their parents and marry a partner selected by the parents. If this marriage is unsuccessful, they might then divorce and remarry "someone more of their own choosing" (Williams 1990: 57; Ihromi et al. 1973).

In this chapter, we first review 1987 marriage patterns in Indonesia and briefly describe recent trends. Second, we turn to considering the effects of the marriage variables on fertility. Third, we look at the relationship of the marriage variables with various socio-economic determinants. Fourth, we consider the net

effects of the marriage variables on fertility, controlling for appropriate socio-economic factors. Fifth, we discuss the interrelationships between marriage patterns and contraceptive use, both in the past and at present.

Marriage Patterns in Indonesia, 1987

Between 1980 and 1985, the singulate mean age at marriage for Indonesian women rose more than a year (Mamas 1989: 52; Xenos 1990), and, between 1980 and 1987, the percentage of women ages 15-49 who had never married rose by almost five percent (from 21.5% to 26.4% -- CBS 1989: 14). Nevertheless, marriage for women was virtually universal in 1987 (more than 98 percent of those over age forty had been married) and substantial proportions of Indonesian women in 1987 will still marrying at young ages (Table 1). Almost one fifth of women ages 15-19 were married and almost two thirds of those ages 20-24 were married. Among all women ages 15-49 in 1987, close to one fifth married before age 15 (18.9%) and 45 percent married before age 18 (CBS 1989: 15).

The percentage of women who had married more than once has also shifted dramatically in recent years but is still high. Among currently married women in 1976, the percentages who had been married more than once were: 15 percent for ages 15-24, 28 percent for ages 25-34, and 37 percent for ages 35-49 (Mamas 1989: 82). Eleven years later in 1987 the proportions of

Table 1. Percentage Distribution of All Women by Current Marital Status and Age, Indonesia, 1987

Age	Current Marital Status				
	Never Married	Currently Married	Divorced	Widowed	Total
All women, 15-49	26	68	3	3	100
Ages					
15-19	81	18	1	0	100
20-24	35	62	3	0	100
25-29	11	85	3	1	100
30-34	4	90	4	2	100
35-39	3	89	3	5	100
40-44	1	88	3	8	100
45-49	1	80	4	14	100

Source: Central Bureau of Statistics, National Family Planning Coordinating Board, and Demographic and Health Surveys, Institute for Resource Development/Westinghouse. 1989. Table 2.1, page 13.

currently married women who had been married more than once were much lower but still very high relative to most other countries in Asia: 7 percent for ages 15-24, 15 percent for ages 25-34, and 29 percent for ages 35-49 (see Table 2).

Age at first marriage and the number of times married were strongly related in both 1976 (Mamas 1989) and 1987. Among currently married women ages 35-49 in 1987, for example, the percentage married more than once was more than twice as high for women who first married before age 15 than it was for women who married after age 18 (Table 2, panel 1). Another way of noting the same phenomenon is to compare the mean ages of first marriage for women married more than once to the mean ages for women married only once: women married more than once married more than two years earlier on the average (Table 2, panel 2).

Marriage Patterns and Fertility: An Overview

Both of the marriage variables had notable relationships with cumulative fertility. Among women ages 35-49, for instance, being married more than once lessened cumulative fertility by more than one child. Those who married under age 15 had cumulative fertility almost three quarters of a child higher than those married after age 18 in the same age group (Table 3). In the younger age groups, the effect of early marriage was even more pronounced.

These relationships are, however, confounded by the fact

Table 2. Percentage Married More Than Once by Age and Age at First Marriage and Mean Age at First Marriage by Age and Number of Times Married: Ever Married Women Ages 15-49, Indonesia, 1987

Age at First Marriage or Number of Times Married	Age		
	35-49	25-34	15-24
	Percentage Married More Than Once		
All women	29	15	7
First Married at Ages			
Under 15	45	31	21
15-17	30	16	6
18-20	18	6	2
21 or more	###	1	1
	Mean Age at First Marriage		
All women	16.6	17.4	16.7
Number of Times Married			
Once	17.4	17.8	16.9
More Than Once	14.8	14.6	14.5

= less than 25 cases, no percentage presented

(all other percentages and means based on 75 or more cases)

Table 3. Mean Number of Live Births by Age, Number of Times Married, and Age at First Marriage: Ever Married Women Ages 15-49, Indonesia, 1987

Times Married and Age at First Marriage	Age 35-49	25-34	15-24
All women	5.1	2.9	1.3
Married Only Once, First Married at Ages			
Under 15	5.9	3.7	1.7
15-17	5.9	3.4	1.4
18-20	5.2	2.8	1.0
21 or more	###	1.1	0.6
Married More Than Once, First Married at Ages			
Under 15	4.6	3.1	1.4
15-17	4.8	2.6	1.4#
18-20	3.9	2.1#	###
21 or more	###	###	###

\# = mean based on 50-74 cases
= mean based on 25-49 cases
= less than 25 cases, mean not presented

(all other means based on 75 or more cases)

that the marriage variables are closely related to other variables that affect fertility. Hence, it is necessary to examine socio-economic differentials in marriage patterns and then assess the net effects of the marriage variables on fertility.

Socio-Economic Differentials in Marriage Patterns

Age at first marriage is highly associated with many socio-economic factors. Rural women married younger than urban women. Women in Java and Bali married younger. Muslim women, women with less education, women who did not work before marriage, women who lived primarily in a village before age 12, and woman whose language of interview was Javanese, Sundanese, or Maduran all married substantially younger (Tables 4 for age group 35-49, Table 5 for age group 25-34, and Table 6 for age group 15-24[2]). The differences in social groups are often large. For the 35-49 age group, consider: the contrast between the women of Java and Bali and those living on the outer islands, with the women on Java and Bali marrying roughly a year and half earlier; the comparison of Muslim women and women of other faiths, with the Muslim women marrying more than four years earlier; the very early marriage of women who were interviewed in Maduran (a mean

[2] Separate tables are presented for ten year age groups for two reasons. First, age is related to the marriage variables and, second, the estimates for the younger age groups are influenced by the fact that some women who will marry later had not yet married at the survey date (censoring).

Table 4. Percent Who First Married Before Certain Ages, Mean Age at First Marriage, and Percent Married More Than Once, by Age of Wife and Selected Social and Demographic Characteristics: Ever Married Women Ages 35-49, Indonesia, 1987

Age and Social or Demographic Characteristic	Percent first married at ages				Mean age at first marriage	Percent married more than once
	under 15	15-17	18-20	21 or more		
Women 35-49 Years Old						
All women	37	40	23	0	16.6	29
Current Residence						
Rural	40	40	21	0	16.1	32
Urban	29	41	30	0	17.9	22
Region						
Java or Bali	41	39	10	0	16.2	35
Outer Islands I	29	42	30	0	17.5	19
Outer Islands II	21	50	30	0	18.0	21
Religion						
Muslim	38	40	21	0	16.3	31
Not Muslim	12	34	54	0	20.5	10
Language of Interview						
Bahasa Indonesia	27	44	29	0	18.0	20
Javanese	39	39	23	0	16.2	34
Sundanese	43	45	12	0	15.1	45
Maduran	70	22	8	0	13.3	47
Balinese	16	40	44	0	19.0	15
Wife's Education						
None	45	35	19	0	15.8	34
Some primary	39	42	18	0	15.9	32
Primary completed	24	48	28	0	17.0	27
Secondary or more	10	37	53	0	20.5	12
Whether Wife Worked for Money Before Marriage						
Yes	34	39	27	0	17.4	29
No	39	41	20	0	16.0	30
Wife's Primary Residence Before Age 12						
Village	39	39	22	0	16.3	31
Town or City	28	43	29	0	18.1	21

Table 5. Percent Who First Married Before Certain Ages, Mean Age at First Marriage, and Percent Married More Than Once, by Age of Wife and Selected Social and Demographic Characteristics: Ever Married Women Ages 25-34, Indonesia, 1987

Age and Social or Demographic Characteristic	Percent first married at ages				Mean age at first marriage	Percent married more than once
	under 15	15-17	18-20	21 or more		
Women 25-34 Years Old						
All women	28	39	29	5	17.4	15
Current Residence						
Rural	31	40	25	4	16.8	17
Urban	20	34	39	7	18.7	10
Region						
Java or Bali	32	38	26	4	16.9	18
Outer Islands I	19	41	34	5	18.2	8
Outer Islands II	18	34	41	7	18.4	10
Religion						
Muslim	29	39	28	4	17.1	16
Not Muslim	10	31	47	12	20.4	4
Language of Interview						
Bahasa Indonesia	19	38	36	8	18.5	11
Javanese	29	41	27	4	16.9	16
Sundanese	35	41	22	2	16.1	22
Maduran	67	26	6	2	13.8	31
Balinese	8	37	50	4	18.6	3
Wife's Education						
None	38	36	22	4	16.2	18
Some primary	33	41	23	2	16.4	18
Primary completed	20	42	33	5	17.5	14
Secondary or more	5	27	53	16	20.7	4
Whether Wife Worked for Money Before Marriage						
Yes	22	39	32	8	18.3	12
No	32	39	26	2	16.6	17
Wife's Primary Residence Before Age 12						
Village	30	39	27	4	16.9	17
Town or City	20	36	37	7	18.7	9

Table 6. Percent Who First Married Before Certain Ages, Mean Age at First Marriage, and Percent Married More than Once, by Age of Wife and Selected Social Demographic Characteristics: Ever Married Women Ages 15-24, Indonesia, 1987

Age and Social or Demographic Characteristic	Percent first married at ages				Mean age at first marriage	Percent married more than once
	under 15	15-17	18-20	21 or more		
Women 15-24 Years Old						
All women	20	43	30	7	16.7	7
Current Residence						
Rural	23	44	28	5	16.4	9
Urban	9	41	36	15	17.8	4
Region						
Java or Bali	23	42	28	7	16.5	9
Outer Islands I	13	45	34	8	17.1	4
Outer Islands II	15	45	29	11	17.1	3
Religion						
Muslim	20	43	30	7	16.6	8
Not Muslim	8	35	41	17	17.9	5
Language of Interview						
Bahasa Indonesia	12	44	34	11	17.3	6
Javanese	18	42	33	7	15.7	14
Sundanese	31	45	22	3	15.7	14
Maduran	46	43	10	0	17.5	12
Balinese	6	39	38	16	17.9	1
Wife's Education						
None	30	44	23	3	15.8	16
Some primary	25	44	27	4	16.2	9
Primary completed	18	47	28	6	16.7	5
Secondary or more	3	33	43	20	18.4	2
Whether Wife Worked for Money Before Marriage						
Yes	15	43	32	10	17.1	7
No	23	43	28	5	16.3	8
Wife's Primary Residence Before Age 12						
Village	21	44	29	6	16.5	8
Town or City	14	38	35	14	17.4	5

age at first marriage of 13.3 years); and the large educational differentials.

In fact, even in a multivariate analysis, most of the variables just discussed were significantly associated with age at first marriage (Table 7[3]) and twenty-seven percent of the variance in age at first marriage is explained by this small set of variables. Only the respondent's primary residence before age 12 (village or non-village) was not significant in the multiple regression analysis, undoubtedly because that variable is so strongly correlated with current residence and current residence is a significant independent variable.

The number of times married is also closely connected with many socio-economic characteristics: the same groups that married at younger ages were also more likely to have higher proportions who had been married more than once. Here, again, the differences appear to be substantial but in this case they are large only without multivariate controls. Two examples suffice, taken from the 35-49 age group: Muslim women were three times more likely to have been married more than once than women of other faiths; women with no education were almost three times as likely to have been married more than once than women who had completed their secondary education or more.

These findings are, however, altered when one considers the results of a multivariate analysis that includes the variables of

---

[3] Tables 7, 8, and 12 are all restricted to women ages 25 and older. This is to eliminate some of the effects of censoring mentioned in footnote 2.

Table 7. Multiple Regression Parameter Estimates and Standard Errors for Estimating Age at First Marriage Using Selected Social or Demographic Characteristics: Ever Married Women Ages 25-49, Indonesia, 1987

Variable	DF	Parameter Estimate	Standard Error
Intercept	1	20.134002*	1.02963308
Urban	1	0.547796*	0.09450949
Java or Bali	1	-0.534038*	0.20280856
Outer Islands I	1	0.180466	0.18992927
Muslim	1	-2.025056*	0.14807627
Javanese	1	-0.393040*	0.11625608
Sundanese	1	-1.120690*	0.13832943
Maduran	1	-2.187902*	0.18596228
Balinese	1	-0.074610	0.31092573
Wife's Education	1	0.283881*	0.00885357
Whether Wife Worked for Money Before Marriage	1	1.236424*	0.07350025
Wife's Primary Residence Before Age 12	1	0.128216	0.10293039
Wife's Age	1	-0.142120*	0.05682260
Wife's Age Squared	1	0.001805*	0.00077914

R^2 = .27, $p < .0001$

* = $p < .05$

115

Tables 4, 5, and 6 along with age at first marriage in estimating the number of times married (Table 8). The independent variables used in this analysis explain only thirteen percent of the variance in the number of times married. With few exceptions, the independent variables have relatively small net effects on the number of times married. Being Muslim has no statistically significant effect in the multivariate analysis. Being urban, living in Java or Bali, educational attainment, work before marriage, living primarily in a village before age 12, work before marriage, and language of interview (with one exception) have small net regression coefficients. The important net effects are for those interviewed in Balinese (eleven percent less likely to be married more than once), age (each year of age adding two percent to the percentage married more than once), and age at first marriage (each year's delay in age at first marriage subtracting two percent from the percentage married more than once). In other words, the relationship between age, age at first marriage, and the remaining variables (with the exception of being interviewed in Balinese) is what accounts for the large percentage differences reported in Tables 4, 5, and 6.

Marriage Patterns, Socio-Economic Factors, and Cumulative Fertility

Given the extensive inter-relationships between the socio-economic variables, age at first marriage, and the number of

Table 8. Multiple Regression Parameter Estimates and Standard Errors for Estimating Number of Times Married Using Selected Social or Demographic Characteristics and Age at First Marriage: Ever Married Women Ages 25-49, Indonesia, 1987

Variable	DF	Parameter Estimate	Standard Error
Intercept	1	0.003321	0.11726806
Urban	1	-0.025976*	0.01056762
Java or Bali	1	0.064667*	0.02263919
Outer Islands I	1	-0.033100	0.02119583
Muslim	1	0.020131	0.01668806
Javanese	1	-0.016863	0.01298093
Sundanese	1	0.060767*	0.01548994
Maduran	1	0.047103*	0.02090412
Balinese	1	-0.106163*	0.03469521
Wife's Education	1	-0.002334*	0.00104088
Whether Wife Worked for Money Before Marriage	1	0.020282*	0.00832712
Wife's Primary Residence Before Age 12	1	-0.032997*	0.01148838
Wife's Age	1	0.023643*	0.00634581
Wife's Age Squared	1	-0.000197*	0.00008701
Wife's Age at First Marriage	1	-0.023596*	0.00115439

R^2 = .13, $p < .0001$

* = $p < .05$

times married, how do these variables together associate with cumulative fertility? A first attempt at an answer is found in Tables 9, 10, and 11 which cross-tabulate the mean number of live births by age at first marriage, the number of times married, and each socio-economic variable separately. There are a number of striking results shown there. First, note the consistency with which age at first marriage is related to cumulative fertility, controlling for age and number of times married, in almost every socio-economic subgroup in the population. Second, note the same consistency for the number of times married variable: women married more than once have lower cumulative fertility in almost every socio-economic subgroup, controlling for age and age at first marriage. Third, note that some of the differentials in socio-economic subgroups are small after age, age at first marriage, and number of times married have been controlled.

It is not surprising, then, that a multiple regression analysis incorporating all these variables (Table 12) shows very strong net effects for the marriage variables and thirty-six percent of the variance being explained[4]. A one year delay in age at first marriage leads to having .22 fewer children net of all the other variables. A five year delay, hence, leads to having 1.1 fewer children net of all the other variables. Being married more than once has a net regression coefficient of -2.08,

---

[4] The relatively high explained variance figure is, of course, partly due to the inclusion of age as one of the explanatory variables.

Table 9. Mean Number of Live Births by Age at First Marriage, Number of Times Married, and Selected Social and Demographic Characteristics: Ever Married Women Ages 35-49, Indonesia, 1987

Age and Social or Demographic Characteristic	Married Only Once, first married at ages				Married More than Once, first married at ages				All Women
	under 15	15-17	18-20	21 or more	under 15	15-17	18-20	21 or more	
Women 35-49 Old									
All women	5.9	5.9	5.2	###	4.6	4.8	3.9	###	5.1
Current Residence									
Rural	5.9	5.9	5.2	###	4.6	4.9	4.1	###	5.2
Urban	5.8	6.0	5.0	###	4.5	4.4	3.3##	###	4.8
Region									
Java or Bali	5.4	5.4	4.6	###	4.4	4.5	3.5	###	4.6
Outer Islands I	7.1	6.7	5.8	###	5.7#	5.5#	4.9##	###	5.9
Outer Islands II	7.5##	7.0	6.0	###	###	6.0##	###	###	6.1
Religion									
Muslim	5.9	5.9	5.2	###	4.6	4.8	3.8	###	5.1
Not Muslim	7.4##	5.6	5.2	###	###	4.4##	###	###	4.7
Language of Interview									
Bahasa Indonesia	6.7	6.5	5.5	###	5.0	5.5	5.3##	###	5.4
Javanese	5.3	5.3	4.6	###	4.4	4.2	3.5#	###	4.6
Sundanese	6.2	5.6	5.0##	###	5.2	4.8	###	###	5.2
Maduran	4.1#	###	###	###	3.2#	###	###	###	3.5
Balinese	###	5.5	4.3	###	###	###	###	###	4.5
Wife's Education									
None	5.7	5.5	5.0	###	4.4	5.0	3.9#	###	5.0
Some primary	6.3	6.4	5.3	###	4.8	4.4	3.6##	###	5.4
Primary completed	5.4	5.8	5.2	###	4.6#	5.0	4.1##	###	5.1
Secondary or more	###	5.6	5.1	###	###	4.8##	###	###	4.4
Whether Wife Worked for Money Before Marriage									
Yes	5.8	6.0	5.0	###	4.4	4.9	4.0	###	4.9
No	6.0	5.9	5.3	###	4.7	4.6	3.9#	###	5.2
Wife's Primary Residence Before Age 12									
Village	5.8	5.8	5.2	###	4.6	4.8	3.9	###	5.1
Town or City	6.2	6.4	5.1	###	4.8	4.6	###	###	5.0

\# = mean based on 50-74 cases
\## = mean based on 25-49 cases
\### = less than 25 cases, mean not presented

(all other means based on 75 or more cases)

Table 10. Mean Number of Live Births by Age at First Marriage, Number of Times Married, and Selected Social and Demographic Characteristics: Ever Married Women Ages 25-34, Indonesia, 1987

Age and Social or Demographic Characteristic	Married Only Once, first married at ages				Married More than Once, first married at ages				All women
	under 15	15-17	18-20	21 or more	under 15	15-17	18-20	21 or more	
Women 25-34 Years Old									
All women	3.7	3.4	2.8	1.1	3.1	2.6	2.1/	///	2.9
Current Residence									
Rural	3.6	3.4	2.8	1.0	3.1	2.5	2.1//	///	3.0
Urban	4.0	3.5	2.9	1.1	3.0/	3.0/	///	///	2.8
Region									
Java or Bali	3.5	3.1	2.7	1.0	3.0	2.4	1.8//	///	2.7
Outer Islands I	4.4	4.0	3.2	1.1//	3.5//	3.7//	///	///	3.3
Outer Islands II	4.5//	4.1	3.2	///	///	///	///	///	3.3
Religion									
Muslim	3.7	3.4	2.8	1.1	3.1	2.6	2.2/	///	3.0
Not Muslim	4.3//	3.3	2.8	1.1//	///	///	///	///	2.5
Language of Interview									
Bahasa Indonesia	4.2	3.9	3.0	1.1	3.4	3.0	2.8//	///	3.0
Javanese	3.5	3.0	2.6	1.0/	3.0	2.1/	///	///	2.7
Sundanese	3.7	3.2	2.9	///	3.6//	2.6//	///	///	3.1
Maduran	2.8/	2.5//	///	///	2.2//	///	///	///	2.4
Balinese	///	2.9	2.5	///	///	///	///	///	2.6
Wife's Education									
None	3.8	3.3	2.9	1.2//	2.8/	2.6//	///	///	3.0
Some primary	3.8	3.5	2.8	0.8//	3.4	2.8	1.9//	///	3.2
Primary completed	3.4	3.4	2.9	1.3//	2.4//	2.2/	///	///	2.9
Secondary or more	///	3.3	2.8	1.0	///	///	///	///	2.4
Whether Wife Worked for Money Before Marriage									
Yes	3.9	3.4	2.7	1.1	3.1	2.8	2.2//	///	2.8
No	3.6	3.4	3.0	1.0/	3.0	2.5	2.0//	///	3.1
Wife's Primary Residence Before Age 12									
Village	3.6	3.4	2.8	1.1	3.0	2.6	2.0/	///	3.0
Town or City	4.2	3.6	2.9	1.0	3.6//	2.8//	///	///	2.9

/ = mean based on 50-74 cases
// = mean based on 25-49 cases
/// = less than 25 cases, mean not presented

(all other means based on 75 or more cases)

Table 11. Mean Number of Live Births by Age at First Marriage, Number of Times Married, and Selected Social and Demographic Characteristics: Ever Married Women Ages 15-24, Indonesia, 1987

Age and Social or Demographic Characteristic	Married Only Once, first married at ages				Married More than Once, first married at ages				All women
	under 15	15-17	18-20	21 or more	under 15	15-17	18-20	21 or more	
Women 15-24 Years Old									
All women	1.7	1.4	1.0	0.6	1.4	1.4‡	###	###	1.3
Current Residence									
Rural	1.7	1.3	1.0	0.6	1.4‡	1.4‡‡	###	###	1.3
Urban	2.0‡	1.6	1.1	0.6	###	###	###	###	1.3
Region									
Java or Bali	1.7	1.2	0.9	0.6	1.4‡	1.3‡‡	###	###	1.2
Outer Islands I	1.9‡‡	1.6	1.2	0.6‡‡	###	###	###	###	1.4
Outer Islands II	2.1‡‡	1.6	1.3‡	0.4‡‡	###	###	###	###	1.4
Religion									
Muslim	1.7	1.4	1.0	0.6	1.4	1.4‡	###	###	1.3
Not Muslim	###	1.2	1.2	0.6‡	###	###	###	###	1.2
Language of Interview									
Bahasa Indonesia	2.0	1.5	1.1	0.6	###	###	###	###	1.3
Javanese	1.8	1.2	0.9	0.7‡	###	###	###	###	1.2
Sundanese	1.6	1.0	0.9‡	###	###	###	###	###	1.2
Maduran	1.3‡‡	1.0‡‡	###	###	###	###	###	###	1.1
Balinese	###	1.6‡	1.2‡	0.7‡‡	###	###	###	###	1.3
Wife's Education									
None	2.0‡	1.5	1.0	###	###	###	###	###	1.5
Some primary	1.7	1.5	1.1	0.6‡‡	1.2‡‡	1.3‡‡	###	###	1.4
Primary completed	1.5	1.1	1.0	0.7‡	###	###	###	###	1.1
Secondary or more	###	1.3	1.0	0.6	###	###	###	###	1.0
Whether Wife Worked for Money Before Marriage									
Yes	1.8	1.4	1.0	0.6	1.6‡‡	1.4‡‡	###	###	1.3
No	1.7	1.3	1.0	0.6	1.3‡	1.4‡‡	###	###	1.3
Wife's Primary Residence Before Age 12									
Village	1.7	1.3	1.0	0.7	1.4‡	1.5‡‡	###	###	1.3
Town or City	1.9‡	1.5	1.1	0.5	###	###	###	###	1.3

‡ = mean based on 50-74 cases
‡‡ = mean based on 25-49 cases
= less than 25 cases, mean not presented

(all other means based on 75 or more cases)

121

Table 12. Multiple Regression Parameter Estimates and Standard Errors for Estimating Number of Children Ever Born Using Selected Social or Demographic Characteristics, Age at First Marriage, Number of Times Married, and the Interaction Between Number of Times Married and Age at First Marriage: Ever Married Women Ages 25-49, Indonesia, 1987

Variable	DF	Parameter Estimate	Standard Error
Intercept	1	-1.580772*	0.62431370
Urban	1	0.021007	0.05620591
Java or Bali	1	-0.897630*	0.12041697
Outer Islands I	1	-0.173664	0.11269251
Muslim	1	0.090568	0.08890710
Javanese	1	-0.424697*	0.06902243
Sundanese	1	-0.003151	0.08242715
Maduran	1	-1.609693*	0.11138168
Balinese	1	-0.088558	0.18458295
Wife's Education	1	-0.008270	0.00554761
Whether Wife Worked for Money Before Marriage	1	-0.004672	0.04428378
Wife's Primary Residence Before Age 12	1	0.137672*	0.06110189
Wife's Age	1	0.421057*	0.03376918
Wife's Age Squared	1	-0.003486*	0.00046287
Wife's Age at First Marriage	1	-0.218423*	0.00676569
Number of Times Married	1	-2.084315*	0.24375950
Interaction**	1	0.069250*	0.01568803

R^2 = .36, $p < .0001$

* = $p < .05$

** = Interaction between age at first marriage and number of times married.

a very strong negative effect on cumulative fertility.

The other strong net effects are living in Java or Bali (fewer children), being interviewed in Javanese or Maduran (fewer children), rural background (more children), and age (more children with increasing age). Interestingly, neither the wife's educational attainment nor her work experience before marriage have statistically significant effects on the number of children ever born after the marriage and other variables have been controlled.

The regression analysis also tested for the interaction between number of times married and age at first marriage. While statistically significant, the net regression coefficient for the interaction term was smaller than the main effects. Nevertheless, the term is not trivial and is a positive .07. This implies that for women married more than once, the later their first marriage the higher their cumulative fertility net of all the other variables. One may speculate that this effect is due to attempts to "catch up" in fertility in second and later marriages.

Marriage Patterns and Contraceptive Use

Clearly, both of the marriage variables had strong effects on cumulative fertility in Indonesia. To what extent might this have been due to differential contraceptive use? Unfortunately, this question can not be suitably addressed in a multivariate

analysis because of confusion in arguments about causality. The relationship between children ever born and contraceptive use is definitely both cause and effect. Some women use contraception because they have already had a large number of children. Some women have used contraception in the past and, hence, have fewer children. Without a complete pregnancy and contraceptive use history, unavailable in the 1987 National Indonesia Contraceptive Prevalence Survey, it is difficult to unravel the causality issue.

It is possible, however, to simply look at the association between the marriage variables and contraceptive use (Table 13). It is obvious from that table that women who were married more than once used (both in the past and currently, in 1987) contraception and sterilization less than those married only once. Since cumulative fertility for women married more than once was substantially lower than for women married only once, this result seems compatible with the idea that using contraception for terminating childbearing was not appropriate and that the earlier remark about possible "catching up" behavior may have been occurring.

The relationship between age at first marriage and contraceptive use is less clear cut. For women ages 35-49, women who married later had higher contraceptive use rates. For women under age 25, however, the relationship was negative (the higher the age at first marriage, the less contraceptive use), undoubtedly reflecting the relatively short marriage durations

Table 13. Percent Who Had Ever Used Contraception or Were Sterilized and Percent Who Were Currently Using Contraception or Were Sterilized by Age, Number of Times Married, and Age at First Marriage: Ever Married Women Ages 15-49, Indonesia, 1987

Times Married and Age at First Marriage	Ages 35-49	25-34	15-24
		Ever Used	
All women	56	72	56
Married Only Once, First Married at Ages			
Under 15	47	72	66
15-17	61	76	56
18-20	63	79	54
21 or more	###	52	38
Married More Than Once, First Married at Ages			
Under 15	45	62	24
15-17	49	61	38#
18-20	52	74#	###
21 or more	###	###	###
		Current Use	
All women	37	53	40
Married Only Once, First Married at Ages			
Under 15	28	56	51
15-17	41	56	38
18-20	46	60	41
21 or more	###	42	29
Married More Than Once, First Married at Ages			
Under 15	25	42	24
15-17	27	41	38#
18-20	33	42#	###
21 or more	###	###	###

= percentage based on 50-74 cases
= less than 25 cases, percentage not presented

for these women at the time of the survey.

Overall, however, it seems safe to say that marriage patterns in Indonesia were related to contraceptive use and to speculate that contraceptive use may have played a reinforcing role for the effect of marrying later but the opposite role for those marrying more than once.

Discussion and Conclusions

Clearly, knowing about trends and differentials in the age at first marriage and divorce and remarriage rates are critical to understanding fertility trends and differentials in Indonesia. After statistically controlling for eight socio-economic variables related to both fertility and nuptiality, a five year delay in age at first marriage was associated with bearing 1.1 fewer children. Being married more than once, in the same multivariate analysis, was associated with having 2.1 fewer children. Both marriage variables were also correlated with contraceptive use, with contraceptive use probably reinforcing the effect of later marriage (lower fertility) and low prevalence rates among women who had been married more than once.

If past trends continue into Indonesia's future, rising age at marriage will lead to lower fertility and lower divorce rates will lead to higher fertility. The net influence of the two marriage variables is, however, difficult to predict since it is impossible to know which trend (rising age at marriage or

lessening divorce rates) will predominate. Nevertheless, it is obvious that the national family planning program needs not only to encourage later marriage but also to strengthen its efforts to increase contraceptive use among those married more than once. While their fertility is lower than among those married only once, it is still high and their rates of use are quite low.

References

Central Bureau of Statistics, National Family Planning Coordinating Board, and Demographic and Health Surveys, Institute for Resource Development/Westinghouse. 1989. National Contraceptive Prevalence Survey: 1987. Jakarta, Indonesia, and Columbia, Maryland: Central Bureau of Statistics, National Family Planning Coordinating Board, and Demographic and Health Surveys, Institute for Resources Development/Westinghouse.

Cheung, Paul, Josefina Cabigon, Apichat Chamratrithirong, Peter F. McDonald, Sabila Syed, Andrew Cherlin, and Peter C. Smith. 1985. "Cultural Variations in the Transition to Marriage in Four Asian Societies." In International Union for the Scientific Study of Population. International Population Conference, Florence, 1985. Liege, Belgium: International Union for the Scientific Study of Population. Vol. 3: 293-308.

Geertz, Hildred. 1961. The Javanese Family. New York: Free Press.

Hugo, Graeme J., Terence H. Hull, Valerie J. Hull, and Gavin W. Jones. 1987. The Demographic Dimension in Indonesian Development. New York: Oxford University Press.

Hull, Terence H., and Valerie J. Hull. 1985. "Changing Marriage Behavior in Java." Canberra, Australia: Australian National University. (Mimeographed). Paper presented at the 1987 annual meetings of the Population Association of America, Boston.

Hull, Terence H., and Valerie J. Hull. 1987. "Changing Marriage Behavior in Java: The Role of Timing of Consummation." Southeast Asian Journal of Social Science. 15 (1): 104-119.

Ihromi, T. O., M. G. Tan, J. Rahardjo, M. Wanjudi, S. Djuarini, and A. Djahri. 1973. The Status of Women and Family Planning in Indonesia. Jakarta: National Training and Research Center, Evaluation Division, Indonesian Planned Parenthood Association.

Keyfitz, Nathan. 1985. "An East Javanese Village in 1953 and 1985: Observations on Development." Population and Development Review. 11 (4): 695-719.

Mamas, Si Gde Made. 1978. "Age at Marriage and Fertility Differentials in Indonesia." Honolulu: Department of Sociology, University of Hawaii. (Mimeographed).

Mamas, Si Gde Made. 1989. Regional Fertility Differentials in Indonesia: A Multi-Level Analysis. Honolulu: Department of Sociology, University of Hawaii. (Ph. D. dissertation).

McDonald, Peter. 1985. "Social Organization and Nuptiality in Developing Societies." In John Cleland and John Hobcraft, editors. Reproductive Change in Developing Countries. New York: Oxford University Press.

McDonald, Peter, and Kasto. 1978. "The New Indonesian Marriage Law: Some Impressions from Village Level Research." Yogyakarta, Indonesia: Gadjah Mada University. (Mimeographed).

McNicoll, Geoffrey, and Masri Singarimbum. 1983. Fertility Decline in Indonesia. Washington, D.C.: Committee on Population and Demography, National Academy Press. Report No. 20.

National Research Council. 1987. Recent Trends in Fertility and Mortality in Indonesia. Honolulu: East-West Population Institute and Committee on Population and Demography (Panel on Indonesia), National Research Council. Papers of the East-West Population Institute. No. 105.

Palmore, James A. 1985. "The Country Effect: A Six Nation Overview of the Determinants of Nuptiality and Cumulative Fertility." In Economic and Social Commission for Asia and the Pacific, United Nations. Multivariate Analysis of Nuptiality and Fertility Data for Selected ESCAP Countries. Bangkok: United Nations. U. N. Publication No. ST/ESCAP/314. Asian Population Studies Series No. 59. 6-11.

Palmore, James A., and Ariffin bin Marzuki. 1969. "Marriage Patterns and Cumulative Fertility in West Malaysia: 1966-67." Demography. 6 (4): 383-401.

Smith, Peter C. 1980. "Asian Marriage Patterns in Transition." Journal of Family History. 5 (1): 58-96.

Taj, Anju Malhotra. 1989. "Gender, Intergenerational Relations and Marriage Patterns in Indonesia." Ann Arbor, Michigan: Population Studies Center, University of Michigan. (Mimeographed). Paper presented at the 1989 annual meetings of the Population Association of America, Baltimore.

Williams, Lindy B. 1990. "Marriage and Decision-Making: Inter-Generational Dynamics in Indonesia." Journal of Comparative Family Studies. XXI (1): 55-66.

Xenos, Peter. 1990. "A New Look at Asia's Nuptiality Transition." Honolulu: East-West Population Institute. (Mimeographed). Paper presented at the Nihon University International Symposium on Family and Contemporary Japanese Culture: An International Perspective, Tokyo.

THE COEVOLUTION OF POPULATION AND ENVIRONMENT: TWO CASE STUDIES FROM PAKISTAN

East-West Center
East-West Population Institute
1777 East-West Road
Honolulu, Hawaii 96848

May 1991

THE COEVOLUTION OF POPULATION AND ENVIRONMENT: TWO CASE STUDIES FROM PAKISTAN.

By

Michael R. Dove
East-West Population Institute
Honolulu, Hawaii

Submitted to:

Ms. Ellen Starbird
Policy Development Division
Office of Population
Agency for International Development
Washington, D.C. 20523

This analysis was written with partial funding support from the Demographic Data Initiatives Project through a cooperative agreement (DPE-3046-A-00-8050-00) with the United States Agency for International Development and the East-West Center.

EXECUTIVE SUMMARY

I. OVERVIEW

(1) Two important evolutionary developments are underway in Pakistan, one consisting of the transfer of tree cover from public forests to private farms, and another consisting of the partial replacement of woodfuel by dungfuel in household hearths. The forest-farm transition is a coevolutionary development, because it is based on negative feedback from environment to population and the assumption by the population of some of the environment's regulatory functions and characteristics. The woodfuel-dungfuel transition is a non-coevolutionary development, because it is based on the absence of such feedback and the population's failure to assume these functions and characteristics.

(2) The analysis of these developments has broad relevance throughout the developing world, to all issues involving the development of human populations and the management of natural resources and the physical environment.

II. THEORETICAL CONCLUSIONS

(3) There are important differences between farmers and foresters in the way that they explain population-environment relations. Farmers explain them largely in terms of material factors, while foresters rely largely on cultural variables. The foresters' cultural explanations are empirically less valid than the farmers' material ones, not because foresters are less astute than farmers, but because government officers are ideologically less disposed than farmers to explain the behavior of the rural population in terms of resource scarcity. Such explanations are problematic for government because they inevitably lead to an interpretation of conflict between farmers and government in terms of competition for resources. The institutional desirability of avoiding such interpretations is responsible for governmental inattention to resource scarcity as an explanation of farmer behavior.

III. POLICY RECOMMENDATIONS

(4) A narrow policy focus on the rate of growth, size, or density of population is unproductive. These variables typically do not have critical values in and of themselves. Of more importance, they typically do not have values that are perceived as critical by the native population. It is more productive to seek critical values of the population/resource balance. The important research question here is not, what is the critical balance? But rather, what is the current direction of development with respect to this balance? What coevolutionary paths could shift the population and environment to a new balance? What are the constraints on such a shift, and how susceptible are these constraints to development

intervention? Of equal importance, how feasible is such intervention in social, economic and political terms? In particular, which interventions and developmental paths are in accord with and which are in conflict with the government agenda? The inter-disciplinary nature of these questions suggests that one policy imperative is close collaboration between the often disparate government agencies that are responsible for human population on the one hand and physical environment on the other.

(5) An important determinant of whether development intervention will succeed is whether or not it is in accord with the native population's perception of the population/resource balance. Another and related priority for research, therefore, is coevolutionary awareness. Are local populations aware of current evolutionary developments, and can this awareness be used to predict future developments? (E.g., is awareness of resource scarcity associated with receptivity to population management interventions?) How does the coevolutionary awareness of government planners and rural peoples compare? This study shows that farmers' awareness does not necessarily lag behind that of government officials. If the officials lag behind the farmers, on the other hand, why? Development studies must analyze not just the belief systems of rural peoples, but also those of government officials.

(6) To what extent can intervention exploit coevolutionary awareness in groups where it is already present, or raise it in groups where it is lacking? In order for population management campaigns to succeed, their urgency is best framed in terms congruent with native coevolutionary awareness. The symbols of population/resource pressure invoked in extension campaigns must be compatible with the indigenous logic of the relations between population and resources. Development inputs must be "translated" - in the broadest sense of the term - into local language and culture.

IV. BROADER IMPLICATIONS FOR DEVELOPMENT POLICY

(7) Coevolutionary development is characterized by a flow of information between environment and society. Where this flow is obstructed, development that is detrimental to the long-term interests of both society and environment takes place. The determinant variable here is information, which is highly susceptible to development intervention through education, research, and training. Such intervention is facilitated by the development agency's vantage point outside the system in question - by the agency's capacity to look at the system <u>as</u> a system. This is a reminder that one of the most valuable if often over-looked strengths of international development agencies is not their material resources but their analytic and conceptual resources, and that one of the most important aspects of the development process is the sharing not of money or technology, but of perspective.

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

FIGURES

TABLES

I. INTRODUCTION

There is dissatisfaction with past approaches to the study of the relationship between population and environment. The former dogma that over-population is responsible for environmental degradation in a direct and linear fashion is today questioned. This is the conclusion of, for example, Jodha (1985:256-7) in his study of the degradation of common property resources; Cline-Cole et al. (1990), Dewees (1989), Pitt (1986) and Westoby (1987:12-17) with respect to deforestation and the scarcity of fuelwood; Thompson et al. (1986:25-6,48-9) and Ives and Messerli (1989) regarding resource degradation in the Himalaya, and Blaikie (1985) and Blaikie and Brookfield (1987:chpt. 2) regarding land degradation in general. Recent studies have concluded that even population-driven consumption of resources like fuelwood cannot be blamed for deforestation (Agarwal 1986:36-37; Bajracharya 1983; Leach 1987: chpt.3; Moench 1987:32). The implications for the study of population and environment are two-fold: first, non-population-related factors - in particular the institutional and political economic context - must be taken into consideration in explaining environmental degradation; and second, the proper focus of study is not the impact of population on environment, but rather the mutual interaction between population and environment (Abernethy 1988:4).

1. The Coevolutionary Approach

The purpose of the current analysis is to apply these lessons to the development of a new approach to the study of population and environment. The principal theoretical underpinning of this analysis is the theory of coevolution of society and environment, as it has been developed by the resource economist Richard B. Norgaard (see References Cited).[1] Norgaard defines coevolution as "any feedback processes between two evolving systems", and "the reciprocal process of change" (1984a:528,529). It is specifically an "interactive rather than a parallel or analogous process" (1984b:161). A coevolutionary process is initiated when "at least one feedback is changed, which then initiates a reciprocal process of change" (1984b:161). With reference to human society and its physical environment, the process is initiated when society engages in some activity that modifies the environment, and this modification - this environmental response - provides cause for a subsequent response on the part of society (Norgaard 1984a:525). In a coevolutionary process, this subsequent response on society's part typically consists of the assumption of a regulatory function previously performed by the environment (Norgaard 1981:241; 1984a:529). This shift of regulatory or feedback functions from the ecosystem to the sociosystem is an important characteristic of the coevolutionary process (Norgaard 1984a:529;1984b:161). As a result of such shifts, the coevolving sociosystem and ecosystem increasingly come to resemble one another (Norgaard 1988:617). For example, agricultural coevolution between swidden cultivators and the tropical environment has increased complexity in an initially simple agricultural and increased simplicity in an initially

complex ecosystem (Norgaard 1981:239).

If the coevolutionary process benefits human society - like that between traditional swidden societies and their environments - Norgaard (1984a:529) calls it "coevolutionary development". "Coevolutionary feedback need not benefit man", according to Norgaard, so he uses the term "coevolution" alone in a "value free" sense (Norgaard 1984a:528,528). I will use the concept of coevolution will be used in a more value-laden sense, based on the apparently general value of feedback (meaning the flow of, and response to, accurate information) between ecosystem and sociosystem, to the continued welfare of both systems. I am in agreement with Norgaard's position that the lack of attention to feedback mechanisms hampers planning development planning. Norgaard (1984a:530) writes: "Neo-classical economics' neglect of feedback processes may account for many of the difficulties in western agricultural, resource and environmental politics today".

2. Outline of the Study

The first two sections of this study consists of the presentation of two case studies from Pakistan, one involving a transfer of tree cover from forests to farms, which is judged to be "coevolutionary", and the second involving a transition from woodfuel to dungfuel, which is judged to be "non-coevolutionary". An analysis of coevolutionary theory follows, focussing on the nature of the coevolutionary process - including the concept of coevolution, coevolutionary awareness, and coevolutionary direction - and the application of a coevolutionary perspective in development intervention. The study concludes with an evaluation of the use of coevolutionary theory to study population and environment, recommendations for development interventions based on this theory, and the broader implications of this theory for the development process on general.

The data for this study were gathered in stages during 1986-1988, under the auspices of the USAID-funded Forestry Planning and Development Project, in selected districts of Pakistan's Baluchistan, North-West Frontier, and Punjab provinces, with a sample ranging from 1,132 households in 118 villages to 13 households in 13 villages.[2] In addition to information on farmers' reaction to a proposed extension program for on-farm tree cultivation, the survey gathered a wide variety of background information on farm ecology and economy, the production and consumption of fuel, fodder, and timber, and ethno-scientific data on the farmers' perception and classification of the rural environment (see Dove in press a).[3] Data were also gathered on the perceptions and beliefs of government officials regarding these matters (Dove 1990, in press b).

II. CO-EVOLUTIONARY DEVELOPMENT IN PAKISTAN

1. Background

The climatic climax vegetation of most of Pakistan is tropical thorn forest, "an open low forest in which thorny usually hard-wooded species predominate", which merges into dry subtropical evergreen forests in the hilly regions to the north and western part of the country (Champion et al. 1965:111). The robustness of this vegetative cover is reflected in the varied animal life that it formerly sustained. As recently as the 17th century, Moghul court records and European travelers document the presence of Asian elephant, rhinoceros and lion on the Punjab plains (Bernier 1891:374-382; Rao 1957). Today these plains are nearly devoid of natural vegetation, and all three of the afore-mentioned animals have vanished from this part of the subcontinent. The contemporary, natural vegetation in most of Pakistan's arid lowlands ranges from a "scrub preclimax" at best (Champion et al. 1965:40) to rocky wastes at the worst. The forest cover of the country is so small that it affords Pakistan what is today one of the lowest annual rates of deforestation of any country in the world (less than one-tenth of one percent per annum of the forested area), simply by virtue of the fact that there is so little left to deforest (Repetto 1988:6-7).

The retreat of Pakistan's forest cover does not mean that there are no more trees. Trees do not occur in the places where foresters might look to find them, but they are present nonetheless, in culturally defined spaces. Trees are found in thick profusion in all graveyards and religious shrines, where they provide shade for the pious, and eternal blessings for the planter. Proscriptions against tree-felling in such places are strictly followed (cf. Gold 1989).[4] Trees are found within the enclosed courtyards of every rural home, for which they provide shade, fodder, and fruit. The greatest numbers of trees are found on the farmlands themselves, in clusters around water holes and tanks - where Moghul rulers decreed the planting of giant banyan (Ficus bengalensis) around wells and Persian wheels, where they shade the circling oxen that provide the motive force, and in hedgerows along field boundaries, where they provide protection against the wind and against livestock incursions, yield fuel and fodder, and offer the delicious satisfaction of legally stealing nutrients from the land of one's neighbor.

2. The Forest-Farm Transition

The transition from Pakistan's natural forest cover to the domesticated tree cover just described began millennia ago. The classic Vedic texts from the first and second millennium B.C. counsel the king to occupy the jangala, "open, dry lands", meaning open bush or savanna (Buhler 1886:227).[5] Savanna does not occur in the subcontinent except as a result of human activity (Champion et

al. 1965:38:27-28,38-40; Whyte 1968:167,173,174,188). The natural forest cover of ancient Pakistan was turned into open savanna by the early pastoral peoples of Pakistan, because this vegetative cover better suited their economy. Almost as soon as this transformation of the natural forests began, the creation of un-natural forests also began. The Vedic texts contain injunctions to plant and protect - not just trees or gardens - but forests. For example, the Kautiliya of Arthasastra suggests that forests should be planted whenever a new state is established (Kangle 1969:III,174; cf. Shiva 1989:59). This tradition of state forestry continued without a break to the creation by the colonial British administration of the Indian forest service in the mid-nineteenth century, which has succeeded with little change to the forest service of contemporary Pakistan. There also has been a folk counterpart to this tradition, especially in the frontier tribal areas where state control has been weakest, consisting of the management of village forests (variously called shamilat or hazara forests in Pakistan today).

Pakistan's state forests (and its village forests too) have largely gone the way of its natural forests, and the locus of management of tree resources is in the process of shifting again, this time to private farmlands. The loss in forest area is reflected in the decline of Pakistan's officially recognized "forest cover" to approximately four percent of the nation's land area. The increase in on-farm tree cover is not reflected in these statistics, which - as the term "forest cover" implies - are based on traditional measures of the amount of land under blocks of forest, not the total amount of land under trees.[6] Indirect evidence of the extent of the on-farm tree cover is provided by the fact that farms are providing 90 percent of Pakistan's fuelwood needs (Leach 1987:42), and by the fact that despite the near-total loss of its public forests, fuelwood prices in Pakistan have remained basically stable over the past two decades (Campbell in press; Leach 1987:54-56). Direct evidence of the extent of on-farm tree cultivation is provided by the Forestry Planning and Development Project surveys, in which almost one-half of the farmers reported that some or all of the trees on their farms were planted (Table 1).[7] The fact that this cultivation is a recent development is reflected in the relatively recent dates that farmers give for the commencement of tree-planting in their villages (Table 2).[8] The recency of the forest-farm shift in tree

TABLE #1 Sources of Existing On-Farm Trees

SOURCES		
All Natural	Natural & Planted	All Planted
50%	27%	22%
Percentage of Informants Citing		

TABLE #2 Perceptions of the Time Depth of Farm Forestry

Farmers' Answers to the Question: When Did Tree-Planting/Cultivation Begin?	Percentage of Responses:
(1) Not Relevant/No Tree-Planting Done	12.8%
(2) A Long Time Ago/The Time of the Ancestors	15.4%
(3) Do Not Know	20.5%
(4) X Number of Years Ago Mean: 25.4 years Standard Deviation: 24.5 years	53.8%

cover also is reflected in the fact that there is as yet no distinctive term for trees planted on farms. In order to distinguish timber, fuel and fodder species - all of which are new to cultivation - from fruit trees - which have long been planted on farms - farmers call the non-fruit trees are called junglot ke drukht "forest trees". The government's solution is to classify fruit trees as "non-trees": the forest laws include the formal disclaimer that "the expression 'tree' ... does not include ... any fruit tree" (GOP 1962:72).

On-farm tree cultivation takes a variety of forms. It ranges from not destroying naturally growing tree seedlings, to actively protecting them (Michie 1986:240) to planting seedlings. A common form is the complex inter-weaving of assorted trees and grasses in the ubiquitous (but unstudied) brush fences of Pakistan. Another example is the systematic use of nitrogen-fixing trees to restore agriculturally-taxed soil, while reaping side benefits of fuelwood and fodder, as in the kikar (Acacia nilotica) -based hurries of Pakistan's Sind Province (see Sheikh 1986). In some areas, there is actual mixed cropping of trees and food crops: an example, consisting of cropping of cropping rainfed pearl millet (Pennisetum americanum) under khejri (Prosopis cineraria) in the Rajasthan desert, has been described by Michie (1986).

The development of farm forestry at the same time that traditional forests are undergoing degradation is not accidental (see Figure 1): the Forestry Planning and Development Project surveys confirm that the loss of forests on local village or state lands is associated with farmers' decisions to cultivate trees on their lands (Table 3).[9] The association between deforestation and farm afforestation is not a simple response to diminishing forest

TABLE #3 Existence of Village Forests and Tree-Planting

% of Village Households That Have Planted Trees in Past:	VILLAGE HAS FOREST: No	VILLAGE HAS FOREST: Yes	n	X^2	P
	56.4%	43.6%	305	8.55	<.005

FIGURE 1 - THE FOREST-FARM TRANSITION

POPULATION	FEEDBACK	ENVIRONMENT
POPULATION/RESOURCE PRESSURE	---------->	FORESTS
FARM FORESTRY	<----------	DEFORESTATION
[Coevolutionary Impact]:		[Coevolutionary Impact]:
+ Regulatory Function		- Regulatory Function
- Complexity		- Complexity

lands, however, but to diminishing control of these lands. Resource scarcity involves both absolute scarcity and - from the farmers' viewpoint - restricted access. The diminishment of Pakistan's state forests has been accompanied by tightened government control over what remains. Public access to village or shamilat forests has been similarly restricted by their gradual privatization (Cernea 1985). The evolutionary response of farmers to this loss of control over tree resources has been to re-establish control by restocking the resource in a different context, to re-establish control in the only place where farmers can do so, on their own farms. This issue of resource control is reflected in the fact that the first question invariably asked by farmers, regarding the Forestry Planning and Development project's program of distributing free tree seedlings, was "To whom will the trees belong?" and "Will the Forest Department take over the land on which the trees are planted?"[10] The possibility of loss of control of lands on which trees are planted is raised by the Forest Department's practice, still on-going, of assuming on a contractual basis the management of village or hazara forests in Northern Pakistan.[11] While this is not supposed to affect village ownership of the forests, there are reported cases in which such forests have been kept by the forest department (which then classifies them as "resumed lands") on the grounds that they were really government land all along.

3. The Role of Population

Government officials and farmers perceive the causes of the forest-farm transition very differently.

A. Government Perceptions

The contemporary government of Pakistan adopts a cultural argument to explain the disappearance of forests. The Forest Department attributes over-exploitation of tree products and deforestation of forested areas to the "anti-tree" attitudes of the rural people (cf. Agarwal 1986:108). The Department attributes deforestation to culture-related problems of poor attitude, not to population-related problems of insufficient resources. The problem is perceived as one of a belief system that is unsuited to sustainable resource use, not an economic need that exceeds the resource base. Official disbelief in a material basis for deforestation is reflected in the government's attempt to remedy the problem by motivating and educating the public (with respect to the value of forests, etc.) as opposed to redressing a genuine imbalance between the resource demands of the public and the resource supply.[12]

The Forest Service tends to see the problem as too few trees, not too many people or too great demand; too little production, not too great consumption (as distinct, however, from destruction).[13] Most government efforts to restore tree cover or forest cover do not, accordingly, deal with the public's needs at all: they are tree-centered rather than people-centered. An example is the annual tree-planting campaign - traditionally the Forest Department's major extension activity - which consists of persuading the public to plant seedlings distributed by the government. The Forest Department sees its function chiefly as planting trees (or encouraging the public to plant trees), as creating forests. There is no recognition and often indeed an explicit denial of the fact that in much of Pakistan a reduction in land-use pressure alone will result in spontaneous, natural reforestation.[14] The Forest Service's emphasis is on the biological steps that promote reforestation, not the socio-economic conditions that suppress it.

B. Farmer Perceptions

Farmers attribute perceived deforestation equally to too little replanting (both by farmers and by the Forest Department) and too much cutting (Table 4). The reasons cited have nothing to do with rural culture or attitude, and everything to do with an imbalance between resource production and consumption.[15] Both explicitly and implicitly, the reasons cited associate deforestation with population/resource pressures.[16] Farmers also perceive the pressure of population on resources to be the major obstacle to afforestation on farms. Thus, the major perceived obstacles are lack of water, which refers to competition with food crops, the

difficulty of protection, which refers to competition for space with livestock, and the threat of deleterious impacts on food crops, which again refers to competition with food crops, for water, light, and soil nutrients (Table 5).[17]

TABLE #4 Perceived Determinants of Decrease in Tree Cover - Mostly in Forests.

DECREASED PRODUCTION - 57%					INCREASED USAGE - 43%		
Less Planting	Forest Dept. Fault	Farmer Lack of land	Farmer Lack of interest	Other	More Cutting	More Population	Selling to Markets
33%	9%	7%	4%	4%	35%	7%	2%
Percentage of Informants Citing							

TABLE #5 Perceived Constraints on Farm Forestry.

RESOURCE COMPETITION 73%			OTHER CONSTRAINTS 24%			NONE 3%
Lack of Water	Protection Problems	Threat of Crop Impact	Lack of Seedlings	Pests & Disease	Soil Problems	No Constraints
31%	21%	21%	14%	7%	3%	3%
Percentage of Informants Citing						

In areas with perceived increases in tree cover - mostly on farms - farmers attribute the increase to more planting, made possible by increased access to irrigation, increased awareness or interest, and market forces (Table 6).[18] It is noteworthy that while farmers identify increased usage of tree products as a major determinant of the loss of tree/forest cover, they do not attribute increases in tree/forest cover to decreased usage of tree products.

TABLE #6 Perceived Determinants of Increases in Tree Cover - Mostly on Farms.

INCREASED PRODUCTION - 97%						DECREASED USAGE -3%
More Irrigation	More Planting	More Interest	Market Potential	Decline of Commons	New Species	Less Cutting
31%	21%	21%	14%	7%	3%	3%
Percentage of Informants Citing						

That is, farmers do not identify diminished usage, or conservation, as a major cause of increased tree/forest cover; they attribute it solely to increased planting (Table 7).

TABLE #7 Changes in Tree-Planting and Tree-Use, and Changes in Tree/Forest Cover.

CHANGE IN TREE/FOREST COVER:	PERCEIVED DETERMINANTS: Tree-Planting Less	Tree-Planting More	Tree-Use Less	Tree-Use More
Decrease (Mostly in Forests)	52%			48%
Increase (Mostly on Farms)		97%	3%	

C. Determinants

generally better comprehend the coevolutionary linkages between population and environment than government officials. One of the principal reasons for this is the farmers' consistent adoption of a material perspective on the world, as opposed to the cultural perspective adopted by the government.[19] A material perspective focusses attention on issues of resource use and scarcity, a cultural approach does not. Resource scarcity is central to the feedback process between population and environment, so a focus on resource scarcity raises one's consciousness of this process. In the absence of this focus, the process is harder to perceive. There is an institutional basis for their adoption of a material versus cultural perspective on forest/tree resources. Farmers have no reason to disguise the fact that these resources are scarce and that this scarcity affects their behavior; but the government does. It is easier for foresters to defend state forests against tree-felling by farmers (e.g.) if the tree-felling is ascribed to a "bad attitude" rather than a lack of fuel for cooking. Similarly, it is easier to defend the preoccupation of the forest department with the state forests if the impression is created that they - and not private farms - are the source of most of the nation's fuelwood.[20]

This institutional explanation is supported by the exceptional cases in which forest officers do invoke material and population-related factors to explain deforestation. One case involves the Afghan refugee population, which foresters (as well as local farmers) note often out-number local residents in some parts of northwestern Pakistan. Foresters take great pains to describe how the refugees do not just cut down trees (for fuelwood) but even dig the tree's roots out of the soil. The foresters speak of such practices with regret but say that they are morally helpless to do anything in the face of the refugees' great <u>need</u>. The refugees' use and even misuse of resources is not attributed to culture, therefore, but to material need. A material explanation is

acceptable in this case, where it is not acceptable in the case of resource use by local farmers, because it is politically innocuous. It lays the blame for resource degradation on relations between Pakistan, Afghanistan, and the Soviet Union, not on competition between the forest service and local communities for scarce resources. This explanation obviates the need to even consider such competition, since it can be used to explain any resource degradation since 1979 (the year of the Soviet invasion of Afghanistan).

A second use of population-related factors by foresters to explain resource degradation involves traditional rights to gather forest products. These rights, encoded in the national forest laws since colonial times, allow local residents to gather forest products for subsistence uses, including fuel, fodder and the construction of houses, agricultural implements and coffins and grave markers (GOP 1962). These rights are inheritable under the law, and this, the foresters say, is the problem. The foresters accurately portray the way that the number of local residents and thus rights to use forest products mushroom with each additional generation[21], thereby exhibiting a sophisticated understanding of demographics. What is needed, the foresters say, is a "cap" on the inheritance and further spread of these rights to an even larger population. When the recognition of population/resource pressure is in the institutional interests of the forest service, therefore, it is readily recognized.

There is a colonial precedent for government interpretation of the material relations between population and environment in a manner favorable to itself. India's colonial forest service was established, and the first state forests were designated and protected, largely in response to government fears of social instability resulting from famines (Grove 1988). The advocates of state forest conservation attributed calamities like the 1838-1839 famine, in part, to climatic change (desiccation) brought about by the large-scale, market-oriented felling of India's forests during the first half of the nineteenth century. This argument eventually carried the day, enabling the state to justify assumption of control of natural resources for the good of the public, without accepting in principle the public's need to use those resources. Interjection of the mediating variable of climatic change sundered any direct material link between natural resource use and the welfare of India's rural population. This chimerical factor, like the contemporary chimerical factor of anti-tree attitudes, deflected attention from the real cause of resource degradation, famine and social instability, namely competition for resources from different sectors of society.

D. Development Application: The FP&D Project

This analysis of the coevolution of population and forests can be applied to specific development projects, such as the Forestry

Planning and Development Project. This project, jointly funded by the Government of Pakistan and the United States Agency for International Development (USAID), was designed to redress the ill effects of deforestation in Pakistan. Its field component, which consisted of providing farmers with extension advice and free seedlings for planting on their own lands, encountered problems as soon as it began. Instead of contacting small farmers and stimulating interest in small, subsistence-oriented plantings of indigenous multipurpose trees, as envisaged in the project design, many of the foresters initially contacted their traditional clientele, large landlords, whom they tried to interest in large market-oriented plantations of fast-growing exotics like Eucalyptus and Populus. These foresters dismissed the intended target group of small farmers as "non-progressive farmers" who could not be expected to be receptive to the benefits of farm forestry. While most forest officers believed that large farmers could be interested in planting large tree plantations for the market, few believed that common farmers could be interested in cultivating on-farm trees to meet household needs.[22]

The foresters' beliefs were contradicted on every point by the data gathered in the project's base-line studies. The studies demonstrated that the intended target of the project, the small farmers, were receptive to the project message and in need of its benefits (Table 8).[23] The foresters' difficulty in perceiving this receptivity is predictable from a coevolutionary analysis of the forest-farm transition. Since the shift of tree cover from forests to farms is prompted in part by a struggle for resource control between farmers and government, which the farmers construe as materially-based while the government does not, the government is likely to be less objective about the shift and the reason for it than the farmers. Hence, the foresters' dissociation of farm and forest - their disbelief in indigenous farm forestry efforts and interest, and their emphasis on the purported anti-tree attitude of the farmer - was predictable. Had this and related predictions project, resources could have been allocated to institutional development early on to try to ameliorate some of the problematic attitudes on the part of the Forest Department personnel.

TABLE #8 Interest in Farm Forestry: Reality and Perception.

Forester Conception	Study Finding
1. Small farmers are not "tree-minded".	1. Of the farmers interviewed, 87% reported having trees on their farms; 49% of them reported having planted some of these trees; and 66% of all farmers reported interest in planting trees under the FP&D project.

2. The main obstacle to tree-planting by most farmers is lack of interest.	2. The constraints on tree-planting most commonly reported by farmers were the threat of adverse effects on proximate food crops (reported by 43%), the lack of water (39%), and the difficulty of protection (38%).
3. Farmers will not plant trees unless provided with extensive government subsidies, including at a minimum labor and fencing materials.	3. The average farmer was excited at the prospect of getting free seedlings alone from the project. The only farmers who insisted on additional benefits were the wealthy and powerful ones (cf. Cernea 1985:276-277).
4. Only "progressive" farmers, with large holdings, are interested in planting trees.	4. Interest in planting trees was positively correlated with size of land-holding, but even among farmers with less than 2 ha, 45% reported interest in planting, as did 32% of those with no land-holdings at all.
5. Only the more educated, literate farmers are interested in planting trees.	5. Interest in planting trees was positively correlated with level of education, but even 56% of the uneducated reported interest in planting.
6. Farmers are only interested in large plantings of many 1000's of trees.	6. Of the farmers surveyed, 86% requested fewer than 1,000 seedlings, and 35% requested fewer than 100.
7. Farmers are only interested in planting market-oriented species such as Eucalyptus spp. and Populus spp..	7. Farmers expressed equal or greater interest in planting locally popular, multi-purpose indigenous species, especially Dalbergia sissoo, Acacia nilotica, and Zizyphus mauritania.
8. Farmers will only plant trees for market sale, not for household use - especially not for fuel use.	8. Of the farmers surveyed, 78% reported multiple desired uses for trees planted under the project. Fuel was the desired use reported by most farmers (91%), followed by construction (72%) and market sale (46%).
9. Farmers burn cow dung because they like to, not because they have to.	9. The principal reason reported for burning dung is to conserve wood (reflected in the fact that mixed burning of wood and dung is a function of shortages of wood not dung); and as a result of dung-burning, 1 in 5 farmers reports having to buy dung for use as fertilizer (Dove 1987:1,4; contra Dewees 1989:1165).

A coevolutionary perspective can also be applied to other development programs to explain their success or failure. Since the current coevolutionary trend in Pakistan consists of decreasing tree cover in forests and increasing tree cover on farms, any development intervention that seeks to increase forest cover or, whether inadvertently or not, decrease farm forest cover, is in conflict with the prevailing coevolutionary trend and is less likely to be successful on this account alone. One program that runs counter to the coevolutionary trend towards on-farm afforestation involves the government efforts - widely supported by international development organizations such as the World Bank, the United Nations Development Program, the World Food Program, and the development agencies of the Netherlands, Germany, and Switzerland - to reforest village commons. These efforts directly oppose the village-level forces that are making tree-growing more viable on private farmland than on common or public land. It is little wonder that they usually prove problematic (cf. Cernea 1985).

III. NON-COEVOLUTIONARY DEVELOPMENT IN PAKISTAN

Some of the same conditions that have led to the forest-farm transition have also led, in certain cases, to shortages of fuelwood. While a majority of households in the study sample report that their fuelwood supplies are "adequate", a greater percentage report that it is "difficult" to gather their fuelwood, and a significant percentage report having to purchase fuelwood periodically (Table 9). Of most importance, 82 percent of households in the sample report having to burn some dung for fuel. Thus, at the same time that the transfer of tree cover from forests to farms has been taking place, a second evolutionary development has been underway in many farm households, consisting of a partial shift from woodfuel to dungfuel (see Figure 2).

TABLE #9 Household Fuelwood Supplies: Adequacy, Difficulty Gathering, Purchasing.

% Of Households Reply That Reply:	Fuel Supply Inadequate	Difficult to Gather Fuelwood	Must Purchase Some Fuelwood
NO	59%	37%	78%
YES	41%	63%	32%

1. The Woodfuel-Dungfuel Transition

The primary response to woodfuel shortages in Pakistan has been to adjust consumption not of how much is consumed, but of what is consumed (cf. Leach 1987:36).[24] As woodfuels have become scarce in

FIGURE 2 - THE WOODFUEL-DUNGFUEL TRANSITION

POPULATION	FEEDBACK	ENVIRONMENT
DEVELOPMENT OF ALTERNATE FUELS & FERTILIZERS	<----------	DEFORESTATION
DUNG-BURNING	---------->	FARMLAND DEGRADATION
USE OF CHEMICAL FERTILIZER	---------->	FARMLAND DEGRADATION
	<--[no feedback]--	
[Coevolutionary Impact]:		[Coevolutionary Impact]:
- No response		- Regulatory Function
		- Complexity

rural Pakistan, an impressive variety of other sources of biomass - including grasses, rushes, crop residues, and stable waste - have come into use.[25] The most important of these is animal dung. Among farm households interviewed, 82 percent report using dung for fuel. Pakistan government officers, as mentioned earlier in this analysis, regard the use of dung for fuel as opposed to manure as a matter of "culture" or "tradition". They are joined in this view by many scientists. In a recent review of the fuelwood crisis, Dewees (1989:1165) wrote:

> In light of the strong religious and cultural significance of the use of cow dung in India, it can indeed be argued that even if woodfuels were more widely available as a result of tree planting interventions, households would continue to rely on the use of dung as a domestic fuel....There is only limited evidence which suggests that if woodfuels were more available, the use of animal dung for fuel would decline.

The data gathered in the baseline study suggest that, contra Dewees, the use of animal dung for fuel does vary inversely with woodfuel availability.[26]

Dung usually is not burned by itself: 92 percent of the households that report burning dung say that they burn it in a mixture with wood.[27] This mixing is methodologically serendipitous,

because it makes it possible to determine which element in the mixture is being conserved and which is being expended for the benefit of that conservation. Households with inadequate supplies of fuelwood are more likely to burn dung and wood together than households with adequate fuelwood supplies; in contrast to which households with in-adequate supplies of dung are not more likely to burn dung and wood together than households with adequate dung supplies (Table 10). The purpose of the mixed burning, therefore, is to conserve wood not dung. This conclusion is consistent with the explanations for mixed burning given by the farmers themselves: in addition to citing improved combustion of wet wood when fired with dung, and reduced smoking of dung when burned with wood, a significant number say that they mix the two fuels to conserve wood (Table 11). No farmers say that they mix the two to conserve dung.

TABLE #10 Adequacy of Fuelwood & Dung Supplies, and Mixed Burning of Wood & Dung.

Household Practices Mixed Burning:	Adequacy Household Fuelwood Supply: Inadequate	Adequate	n	X^2	P
	82% households	73% households	601	6.66	<.01

Household Practices Mixed Burning:	Adequacy of Household Dung Supply: Inadequate	Partial	Adequate	n	X^2	P
	91% house.	92% house.	93% house.	512	.42	<.75

TABLE #11 Reasons for Mixed Burning of Dung & Wood.

Reason for Mixing Dung and Wood	No. of Households Citing
Conserve Wood.....	..33% of all households
Improve Combustion.....	..48% of all households
Overall.....	.....58% these households
Of the dung.....	.....25% "
Of the wood.....	.....17% "

Further evidence of the relationship between woodfuel shortages and dung-burning is given in the proportion of the dung supply that is burned. The proportion that is burned, as opposed to being used as manure, varies widely around the mean of 60 percent (a figure that agrees well with the literature[28]); and this variation is directly associated with variation in household fuelwood supplies. Households that report their fuelwood supplies to be "inadequate" burn a significantly larger percentage of their dung than households reporting "inadequate" fuelwood supplies (Table 12). There is an even stronger correlation between the percentage burned and reported difficulty in gathering fuelwood

(Table 13).

TABLE #12 Adequacy of Fuelwood Supply & Percentage of Dung Burned

% of Households Burning More than Mean % (viz.,54%) of Dung Supply:	Household Fuelwood Supply: Inadequate	Adequate	n	X^2	P
	64.5%	51.5%	393	10.4	<.005

TABLE #13 Difficulty Gathering Fuelwood & Percentage of Dung Burned

% of Households Burning More than Mean % (viz.,55%) of Dung Supply:	Fuelwood Gathering: Not Difficult	Difficult	n	X^2	P
	34.3%	72.6%	363	51.9	<.001

The thesis that the object of mixed burning of wood and dung is conservation of wood at the expense of dung is in agreement with evidence that fuel resources are in general conserved at the expense of manure resources - which is evident from data on the proportion of dung used for fuel versus manure. The use of larger percentages of dung for fuel co-varies with shortages of dung for use as manure (Table 14). Also, those households with the least interest in using dung for manure burn, predictably, the largest percentage of their dung supply. Tenants typically have contracts for only one farming season and so they are averse to making the sort of long-term investment in soil fertility represented by the application of manure (cf. Barnard and Kristoferson 1985:132; Blaikie 1985:68).[29] As a result, tenants burn a significantly higher percentage of their dung than non-tenants (Table 15).

TABLE #14 Use of Dung for Fuel & Adequacy of Manure Supply

Dung Supply Adequate for Manure	Proportion of Dung Used for Fuel: 0-50 %	50-100 %	n	X^2	P
	68% households	52% households	277	6.3	<.025

TABLE #15 Tenurial Status & Percentage of Dung Burned

% of of Dung Supply Burned:	Landlords & Landlords-cum-Operators:	Owner-Operators:	Tenants & Tenants-cum-Operators:	n	X^2	P
	42.3%	48.0%	66.3%	375	11.9	<.005

The principal response to shortages of dung for use as manure is to use chemical fertilizer. The number of farmers in the study who report using chemical fertilizers (93 percent) is slightly higher than the number (88 percent) who report using manure (obviously most farmers are using both). There has been an explosion in the use of chemical fertilizers in Pakistan in the past several decades, and the increasing diversion of dung to fuel use is one of the principal contributing factors.[30] The (partial) replacement of manure by chemical fertilizers can no more be ascribed to "cultural preference" than the burning of dung instead of wood. This is evident from farmers' comparative evaluation of manure and chemical fertilizers. Farmers who use manure cite several advantages to its use, but few if any disadvantages (Table 16). In contrast, farmers who use chemical fertilizer report somewhat fewer advantages and many more disadvantages (Table 17).[31]

TABLE #16 Perceived Advantages & Disadvantages of Manure

Advantages of Dung as Fertilizer	No. of Households Citing
Improves Crop Growth/Yield...	...68% of all households
Improves Soil Fertility.....	...45% "
Long-Lasting Effect.....	...26% "
Good for Rice Nursery.....	...10% "
Reduces Pests.....	... 6% "
Disadvantages of Dung Fertilizer	**No. of Households Citing**
None.....	...90% of all households
Requires Water.....	... 4% "

TABLE #17 Perceived Advantages & Disadvantages of Chemical Fertilizers

Advantages of Chemical Fertilizer	No. of Households Citing
Improves Crop Growth/Yield...	...80% of all households
Quick-Acting/Speeds Growth...	...24% "
Improves Soil.....	....7% "
Disadvantages Chemical Fertilizer	**No. of Households Citing**
None.....	...43% of all households
High Cost.....	...23% "
Requires Water.....	...21% "
Increases Pests.....	...10% "
Degrades/Addicts Soil.....	...10% "
Short-Lasting.....	....5% "
Produces Unhealthy Food.....	....5% "

2. Perceptions of Fuel Supply & Management

A. Government vs. Farmer Perceptions

The Pakistan government under-estimates the magnitude of dung production: Campbell (in press) notes that 1980 official statistics put national dung production at 21 million tons per year, whereas an estimate based on actual rates of consumption put it at 112 million tons. In keeping with this denial of the magnitude of dung production, the government under-rates the importance of dung as a woodfuel substitute and the role of need rather than desire in this substitution. Most of the foresters participating in the Forestry Planning and Development Project believe that farmers burn dung out of desire and that the opportunity costs of not using dung for manure (costs that make dung burning more clearly a matter of resource allocation rather than cultural whim) are minimal. In their analyses of dung-burning (as in their analyses of deforestation), government officials de-emphasize the role of resource scarcity in motivating farmer behavior. As a result, government officials do not see the linkage between dung-burning and woodfuel scarcity, much less between dung-burning and population/resource pressure.

Pakistan's farmers do not use dung for fuel because they are ignorant of its value as manure.[32] On the contrary, one farmer interviewed in the Forestry Planning and Development Project study said that the benefits of dung were so great that if he could, he would feed it to his sons! Farmers also recognize that there is a shortage of dung for manure use. Among the farmers interviewed, 25 percent reported that their dung supply was inadequate for fuel use, but almost twice as many, 46 percent, reported that their supply was inadequate for manure use. That is, many of the farmers who perceive their dung supply as sufficient for fuel purposes perceive it as <u>in</u>-sufficient for manure purposes. This suggests that farmers do recognize the shortage of dung for manure that results from using dung for fuel.

Although farmers are aware of dung shortages, they are not completely aware of the causes of these shortages. Farmers attribute shortages of dung (for whatever purpose) mostly to inadequate supply (e.g., too few livestock), as opposed to excessive demand (Table 18).[33] Farmers have a better understanding

TABLE #18 Perceived Causes of Dung Shortages

Reason for Shortage of Dung	No. of Households Reporting
Few Livestock (Small dung supply).....	90% all households
Heavy Use for Fuel.....	15% "
Much Land (High demand for fertilizer)	10% "

of the consequences of these shortages, especially for agriculture. Farmers perceive the use of chemical fertilizers instead of manure as problematic: they believe that chemical fertilizers have fewer benefits than manure and more costs, as stated earlier. Farmers believe that the use of less manure is bad for the land: in a study in Northern Pakistan, 39 percent of farmers maintained that the use of less manure on fields is leading to soil degradation (Sardar 1986:139-140). There is evidence, therefore, that farmers perceive the risk entailed in the present pattern of resource management, and that they perceive it more clearly than government officials.

B. Determinants

A gender-based division of labor in the use of the household dung supply affects perceptions of its use.[34] Women are primarily responsible for gathering and processing dung. They are also primarily responsible for its immediate use: they use it for fuel, and they also usually apply it to the fields as manure (whereas men usually apply chemical fertilizers).[35] However, since the harvest (and agriculture in general) is largely men's work, it is men who assess the adequacy of the manure applications, not the women who control the dung supply. There may be feedback from men to women on the amount of dung allocated to agriculture, but it will be mitigated by the fact that women have their own priorities. Women's first priority in resource allocation is providing their families with cooked food. Women's first priority in dung allocation, therefore, is fuel-use (assuming that woodfuel is in short supply).[36] Since men are not involved in fuel use, they are unlikely - as the base-line studies show - to blame fuel use for shortages of manure. Given their limited role in the allocation of dung resources, men are more likely to place the blame on the production side than the consumption side. This is exactly what happens, with men attributing shortages of manure to shortages of livestock.

The only segment of Pakistani society that makes an explicit connection between the use of dung for fuel and its non-use for manure is tenant farmers. They openly discuss their strategy of maximizing the use of dung for fuel <u>because they are opposed to using it for manure</u>. The reason for their opposition is the long-term nature of the benefits of manure (as opposed to chemical fertilizers, which have only short-term benefits). Tenants are short-term users, interested in maximizing extraction; for the long-term welfare of the land and land-owner, in contrast, self-interest lies in maximizing sustainability. What is irrational from the long-term perspective is the basis of rationality from the short-term perspective: dung-burning is rational for tenants precisely because it is irrational for landowners. This reversal reflects the fact that the parties involved have divergent interests, which is ultimately to blame for the non-coevolutionary character of the woodfuel-dungfuel transition. (The analysis of the division of labor between women and men showed that a similar

discontinuity between the immediate use of and longer-term return on resources is responsible for the skewed allocation of dung resources within the farm household.) Tenants can perceive the basis of this divergence because they have nothing to gain by misperceiving it; they have nothing to gain by "mystification" of the conflict of interests inherent in the institution of tenancy. As is often the case, the most disadvantaged segment of society has the clearest view of its pattern of resource use.

The Pakistan government has one of the least clear views of resource use and the most to gain from this lack of clarity. The government regards the use of more chemical fertilizers and less manure not as a problem but as something approaching an official policy objective. The government's stance in fact resembles the tenants'. The difference is that while the tenants justify their stance in terms of their own self-interest (as opposed to their landlords' self-interest), the government justifies its stance in terms of the best interests of the farmer and disavows any self-interest. But the government is not disinterested. The Forest Service has a vested interest in perceiving dung burning as something other than a response to woodfuel shortages; and the Agricultural Department has a vested interest in seeing the use of chemical fertilizers as an absolute good. The Forest Service's interest in denying a material basis to the use of forest resources by rural communities has already been discussed; the Agriculture Department's interest in replacing manure with chemical fertilizers is the interest that any state institution has in integrating a local system of production into the national economy and polity: this lessens local autonomy, increases central control, and promotes extraction of surplus product (most obviously through purchase on the national market of an agricultural input that was formerly produced locally).[37] (To the extent that government promotion of chemical fertilizer contributes to the use of dung instead of wood as fuel, it shifts fuel pressure from state resources to private resources - at the cost of long-term stock depletion of the latter - providing the state with one more benefit.)

In short, at the same time that farmers are reasserting control over one resource, fuelwood, by developing on-farm sources; the government is asserting control over another, fertilizer, by developing off-farm sources. At the same time that farmers are responding to increasing government control of forests by relocating tree production onto their farms, the government is increasing its control elsewhere by relocating fertilizer production off of the farm. Government promotion of chemical fertilizers is not necessarily responsible for the use of dung for fuel (although it helps to make this possible): dung-burning is due more to shortages of wood than to surpluses of dung. Government involvement in this promotion is important because it blinds the government to the value of manure, to the costs of using dung for fuel instead of manure, and to the scarcity of woodfuel resources

that forces these costs on the farmer.

IV. ANALYSIS

1. The Nature of Coevolution

There are three distinctive concepts that are integral to, and also somewhat unique to, a coevolutionary perspective. These are the concept of coevolution itself, the concept of coevolutionary awareness, and the concept of coevolutionary direction.

A. Concept of Coevolution

Norgaard, as discussed at the beginning of this paper, maintains that one of the most important characteristics of coevolution is a shift of regulatory or feedback functions from the ecosystem to the sociosystem, resulting in decreasing complexity in the former but increasing complexity in the latter and in general heightening the similarity between the two systems. These criteria mark the forest-farm transition as coevolutionary and the fuelwood-dung transition as non-coevolutionary.

In the case of the forest-farm transition, some shift of regulatory mechanisms from ecosystem to sociosystem began to occur in ancient times, with the first establishment of state forests. A similar shift is seen with respect to village forests, even if only protection and no planting was involved. The most complete shift of regulatory mechanisms, however, occurs in the development of farm forestry, where the sociosystem assumes the most basic regulatory task of the forest, its reproduction (on the farm). Where the forests have completely disappeared, and the remaining tree cover is all cultivated, on farms, the responsibility for reproducing this cover (along with some of its sundry functions, including modification of climate - through shade - and production of biomass - for fuel, fodder, and timber, and indirectly for manure) has been entirely assumed by the sociosystem. Where population/resource pressure on the forests has overpowered their ability for self-regeneration, therefore, the responsibility for this has been shifted to the farming community. Where the forests involved are heavily-managed state forests (as opposed to more natural forests), this is not a case of society assuming a regulatory function from the ecosystem, but a case of farmers assuming a regulatory function from the state.[38] Thus, the evolutionary shift of tree cover from state forests to private farms is in part the outcome of contention between foresters and farmers over who will assume the function of the natural forest. Coevolutionary development involves not just relations between sociosystem and ecosystem, therefore, but also between peasant and state.

In the development of both state and village forests, the transfer of regulatory functions from environment to society involved some diminishment in the complexity of the ecosystem (e.g., a managed "chir pine" forest is not as complex as the natural forest), and some increase in complexity of the sociosystem, by virtue of the additional responsibility for forest management. Evidence of this complexity is provided by Pakistan's official forest laws: by the early part of this century, these laws took up almost 500 pages of single-spaced text, and included specifications on the species of trees whose lopping is permitted for fodder, the minimum size of tree that can be lopped, and the maximum proportion of the tree trunk that can be lopped (GOP 1962:66-67). There also is evidence of increased regulatory complexity attending the development of village forests, beginning with the creation of a distinct land category (shamilat), and extending to the development of complex laws governing rights to it (which typically were limited to village members, and sometimes just to village land owners), and the management of its resources (which often included sophisticated systems of annual closings, designed to maximize forest productivity by periodically reducing use-pressure). This assumption of regulatory responsibility increased the similarity of the sociosystem and ecosystem. As Thompson, Warburton and Hatley (1986:132) write, "The Villagers modify the forest and the forest modifies the villagers. As a result, the structure of this village forest often reflects the preferences and needs of the villagers (and vice versa)..."

The increased similarity and complexity that accompany a transfer of regulatory responsibilities is most striking in the case of farm forestry. A farm into which trees have been integrated is more complex not only in biological terms (with the addition of both tree species and the species for which trees provide habitats), but also in agronomic terms (in the likely exploitation of more parts of the farm, for more parts of the year, for more purposes), economic terms (with the need to manage tree-crop interactions and weigh short-term economic returns from crops against long-term economic as well as ecological returns from trees), jural terms (given that perennial trees confer certain land rights on the planter that annual crops do not), and even ideological terms (with the attribution of sacred characteristics to trees). Because of this added complexity, and also because of the manifest addition of the tree cover, the afforested farm resembles the forest - or what once was the forest - far more than the un-afforested farm.

The transition from woodfuel to dungfuel, does not exhibit the same characteristics of coevolutionary development as the forest-farm transition. The development of a farming system in which dung is burned involves decreased complexity, both through the cessation of nutrient recycling and, as a result of the partial replacement of livestock manure with chemical fertilizers, through the short-term addressing of a few specific aspects of soil

productivity as opposed to the long-term addressing of all of its aspects. Nor is there any evidence of any mechanisms having evolved to compensate for the lessened recycling of dung and other biomass (aside from the imperfect mechanism of chemical fertilizer use) or even to monitor the attendant consequences. Evidence of this last point is reflected in the fact that farmers do not directly associate their manure shortages with their burning of dung. Thus, the sociosystem exhibits less regulatory capability, not more.

The conclusion that the woodfuel-dungfuel transition is not coevolutionary does not mean that it will never be coevolutionary; it means that it is not developing in that direction at the moment. The lack of feedback between ecosystem and sociosystem, and the structural obstacles that are responsible for this, suggest that the woodfuel-dungfuel transition will not develop in a coevolutionary direction anytime soon. It is possible, of course, that the obstacles to feedback between ecosystem and sociosystem will eventually be removed, resulting in a reorientation of this development in a coevolutionary direction. Even with continued burning of dung, that is, greater feedback between ecosystem and sociosystem could make it possible for this development to take on a coevolutionary character. This is not inevitable, however: historical and cross-cultural evidence make it clear that long-term non-coevolutionary development, in the interest of neither environment nor society, often occurs. Their occurrences is in fact essential to the meaning of coevolution: if all development is coevolutionary, then the concept is tautologous.

B. Coevolutionary Awareness

In order for society to assume a regulatory function from the environment, it would appear to be necessary for society to understand this function and the reason for its assumption. In order for coevolutionary development to take place, therefore, it would appear to be necessary for society to be aware of what is taking place in its relations with its environment.[39] The principle of coevolution is indeed based on feedback, on a flow of information between population and environment, which forms the basis for continuing adjustment by one to the other. When this flow of information is curtailed, society's comprehension of the relationship is weakened, and the coevolutionary relationship is broken. The woodfuel-dungfuel transition is an example of this: accurate information on the consequences of dung-burning is not transmitted within the farm household (e.g., between the women who allocate dung supplies and the men who monitor soil fertility), nor between the farmers and the government. There is no feedback from the environment regarding the consequences of this use of resources to those who are shaping the use, and the consequence is dysfunctional development. Any constraint on the flow of information is, therefore, potentially inimical to coevolutionary development. The "mystification" by the foresters of farmer

patterns of resource use illustrates this point: this mystification contributes to the non-coevolutionary woodfuel-dungfuel transition, and it has inhibited (albeit not halted) the coevolutionary forest-farm transition.

Constraints on feedback are generally the result of differences of interest. Differences of interest that have been discussed in this study include one within the household between men and women, and one between the village and the state. The net impact of these differences is continued coevolutionary development in the case of the forest-farm transition, and continued non-coevolutionary development in the case of the woodfuel-dungfuel transition.

C. Coevolutionary Direction

In the coevolution of sociosystem and ecosystem, feedback processes typically operate so as to encourage further change in the same direction (Norgaard and Dixon 1986). In every case of coevolution, there is one particular direction that promotes the existing coevolutionary trajectory, that is "correct", and there are many other possible directions that do not promote that trajectory and are not correct. Incorrect directions are characterized by over-exploitative development, which takes systems to an evolutionary point from which only less advantageous coevolutionary paths are available, and which drives a wedge between the social and ecological systems so that they no longer respond to one another (Norgaard 1984b:168-169). A characteristic of such evolution is exploitation of stock resources (Norgaard 1984b), as in the case of dung-burning.[40]

Norgaard repeatedly emphasizes that the most important criteria for successful development intervention, from the standpoint of coevolutionary theory, is matching the direction of the intervention with the existing developmental direction (assuming that it is desirable, or countering it in the event that it is not). Thompson et al. (1986:chpt. 2) write in a similar vein of the importance of adjusting development interventions to the "directional spiral" of ongoing evolution. Leach (1987:74), in his study of household energy in South Asia, emphasizes the difficulty of planning unless we know the "natural" trend in biomass supply and demand. The present analysis suggests that development interventions that support on-farm afforestation and the replacement of dungfuel by woodfuel would respectively support and counter existing favorable and unfavorable developmental trends in Pakistan.

2. Application of Coevolutionary Theory

Norgaard (1984b:166) writes that the lack of an evolutionary perspective is responsible for development interventions replacing as opposed to building on indigenous systems of knowledge - often

with unexpected deleterious consequences. The essence of the coevolutionary approach, in contrast, is not to supplant but to build upon existing socio-economic developments (e.g., to help farmers to improve traditional farm forestry systems, not to impose completely new systems). This approach reflects greater humility regarding the powers of the development analyst (cf. Thompson et al. 86:101) and greater appreciation of the value of existing socio-economic processes.[41]

The coevolutionary approach builds on indigenous development processes by identifying and exploiting "points of leverage". Points of leverage do not exist everywhere in the development process; much of it lies beyond the reach of intervention (Thompson et al. 1986:112). As Thompson et al. say (1986:114), "Knowing where to hit it - that's what sustainable development is all about". Points of leverage identified in this study include, for example, the farmers' material obstacles to farm afforestation, and the foresters' institutional obstacles to working with small farmers. Successful intervention depends upon knowing not only where to hit, but what to hit with. The identification of appropriate projects is as important as the identification of points of leverage. One of the strengths of the coevolutionary approach is, by comparing the developmental "directions" of the socio-ecological reality and the planned intervention, to identify interventions with greater or lesser prospects for success. This strength was illustrated earlier in the comparison of the developmental direction of tree-planting campaigns and communal reforestation schemes with the direction of the forest-farm transition.

The object of "exploiting" a point of leverage is to accelerate (or decelerate) the evolutionary process. Thompson et al. write (1986:49-50), with reference to the possibility of identifying and utilizing a point of leverage in Himalayan resource use, "A feel for this historical momentum is crucial for anyone trying to <u>hasten</u> this turning point in the Himalayan region [emphasis added]." Norgaard and Dixon (1986:309-310) suggest that coevolutionary analysis can be used to accelerate the process by which well-designed projects distinguish themselves from poorly designed ones: "Natural selection [among development projects] can be <u>hastened</u> through monitoring, learning, and information dissemination systems [emphasis added]." In the earlier analysis of the forest-farm transition, steps were recommended by which problems could be predicted and the pace of this transition hastened.

There are two ways to hasten coevolutionary development. One way is to support the feedback between ecosystem and sociosystem. The other more radical way is, paradoxically, to <u>block</u> this feedback. The rate of evolution greatly speeds up when feedback processes are denied, halting the process of adjustment between society and environment and forcing society into a coevolutionary

leap forward (Norgaard 1988:614). With regard to Pakistan's forest-farm transition, for example, coevolution might be hastened by denying to the farmers any possible adjustment to deforestation other than the transfer of tree cover to the farms. This conclusion is supported by the base-line study finding that the development of farm forestry has been least rapid in areas where farmers still retain access to state forests. Where the intent is not to hasten a favorable development but to retard an unfavorable one, the prescription is not to deny but to promote feedback and adjustment. In the case of Pakistan's woodfuel-dungfuel transition, coevolutionary development could be hastened by increasing feedback to farmers (and policy-makers) on the ill-effects of dung-burning and facilitating alternate adjustments to woodfuel shortages. Research can be used to anticipate the ill-effects of evolutionary development, and then extension can be used to convince people of the reality of these effects and the need to react to them beforehand - thus accelerating the evolutionary process and saving time and resources.

A key decision in any intervention, obviously, is whether radical development is possible - which would call for denial of feedback - as opposed to more modest development - which would call for promotion of existing feedback. An error in ascertaining the potential for radical development is very risky, since a denial of feedback that does not result in a coevolutionary leap forward will very likely result in a non-coevolutionary "lurch" backwards.

V. CONCLUSIONS AND RECOMMENDATIONS

Two important evolutionary developments are underway in Pakistan, one consisting of the transfer of tree cover from public forests to private farms, and another consisting of the partial replacement of woodfuel by dungfuel in household hearths. The forest-farm transition represents a coevolutionary development, because it is based on negative feedback from environment to population and the assumption by the population of some of the environment's regulatory functions and characteristics. The woodfuel-dungfuel transition is a non-coevolutionary development, because it is based on the absence of such feedback and the population's failure to assume these functions and characteristics.

The results of the analysis of these developments have broad applicability throughout the developing world, to all issues involving the development of human populations and the management of natural resources and the physical environment.

1. Conclusions

The transfer of tree cover from forests to farms in Pakistan appears to be a response to the pressure of increasing population on finite (or shrinking) resource bases. Upon further analysis,

however, it proves to be a response not simply to population/ resource pressure, but to a contest between farmer and forester (e.g., peasant and state) for control of these resources. This contest did not develop, however, until the resources involved became scarce. Population pressure alone does not provide a complete explanation of these developments, therefore, but neither can it be disentangled from other explanations. The source of this confusion may be the overly reified concept of population pressure itself. A more useful concept to explain the relationship between Pakistani society and environment is not population pressure, but rather population pressure on resources. This concept is intuitively attractive, because the concept of resource scarcity embodies both population and environment. It also has the virtue of being the same concept that the farmers use to explain relations between population and environment.

There are important differences between farmers and foresters in the way that they explain population-environment relations. Farmers explain these relations largely in terms of material factors, while foresters rely largely on cultural variables. The foresters' cultural explanations are empirically less valid than the farmers' material ones, not because foresters are less astute than farmers, but because government officers are institutionally and ideologically less disposed than farmers to explain the behavior of the rural population in terms of resource scarcity. Such explanations are problematic for government because they inevitably lead to an interpretation of conflict between farmers and government in terms of competition for resources.[42] The institutional desirability of avoiding such interpretations is responsible for governmental inattention to resource scarcity as an explanation of farmer behavior.

Government inattention to resource scarcity is part of a broad-based lack of institutional attention to population management in Pakistan. At the end of a seminar at the East-West Population Institute in which population growth was described as an "invisible threat" to Pakistan, the Pakistani demographer Rukanuddin incidentally detailed a long list of institutional factors, within government and the broader society, that permit this threat to grow (Rukanuddin 1990). I suggest that population growth is the visible threat, and that the real invisible threat is the institutional context of this growth. As a recent editorial in a leading Pakistan newspaper says, "The key issue is the political will which is sadly missing" (quoted in Robey 1991).

2. Recommendations

The results of this study suggest that a narrow policy focus on the rate of growth, size, or density of population is unproductive. These variables typically do not have critical values in and of themselves. Of more importance, they typically do not have values that are perceived as critical by the native population. It is

more productive to seek critical values in the population/resource balance. The important research question here is not, what is the critical balance? But rather, what is the current direction of development with respect to this balance? What coevolutionary paths could shift the population and environment to a new balance? What are the constraints on such a shift, and how susceptible are these constraints to development intervention? Of equal importance, how feasible is such intervention in social, economic and political terms? In particular, which interventions and developmental paths are in accord with and which are in conflict with the government agenda? The inter-disciplinary nature of these questions suggests that one policy imperative is close collaboration between the often distinct government agencies (as in Pakistan) that are responsible for human population on the one hand and the physical environment on the other.

Another important determinant of whether development intervention will succeed is whether or not they are in accord with the native population's perception of the population/resource balance. Another and related priority for research, therefore, is coevolutionary awareness. Are local populations aware of current evolutionary developments, and can this awareness be used to predict future developments? (For example, will awareness of resource scarcity be associated with receptivity to population management interventions?) Also, how does the coevolutionary awareness of government planners and rural peoples compare? This study has shown that farmers' awareness does not necessarily lag behind that of government officials. If the officials lag behind the farmers, on the other hand, why is this so? These questions suggest that development studies must analyze not just the belief systems of rural peoples, but also the beliefs of government officials.

Finally, the question that is central to any development intervention, to what extent can development intervention exploit coevolutionary awareness in groups where it is already present, or raise it in groups where it is lacking? In order for population management campaigns to succeed, their urgency is best framed in terms congruent with native coevolutionary awareness. The symbols of population/resource pressure that are invoked in extension campaigns must be compatible with the indigenous logic of the relations between population and resources. For example, the symbol of "disappearing forests" is unlikely to be of much use in stimulating interest in the management of population/resource pressure if the forests are disappearing but their economic function is not (as in Pakistan, where this function is merely being shifted to private farms).[43] An image associated with non-coevolutionary development is needed here.[44] The lesson to draw from this is the need to "translate" - in the broadest sense of the word - development inputs into local language and culture.

3. Afterword

This discussion of "congruent symbols" is a salutary reminder of what development intervention is all about. One of the principal conclusions of this study is that coevolutionary development is characterized by a feedback or flow of information between environment and society, and that where this flow is obstructed, development that is detrimental to the long-term interests of both society and environment takes place. The determinant variable here is information, which is highly susceptible to development intervention through education, research, and training. Such intervention is facilitated by the development agency's vantage point outside the system in question[45] - by the agency's capacity to look at the system as a system. This is a reminder that one of the most valuable if often over-looked strengths of international development agencies is not their material resources but their analytic and conceptual resources, and that one of the most important aspects of the development process is the sharing not of money or technology, but of perspective.

The most important perspective derives from the view of development as a process. This view affords the development agency with a novel but highly productive perspective on development problems. There is a fundamental dichotomy in the way that development problems are perceived and the way that responses are framed. Is the question framed as "How do we deal with this problem?" or "Why is this problem occurring?"[46] The philosophical distinction here is profound, and it has an equally profound impact on the course of development. The first approach is instrumental, assumes that problems are idiosyncratic, ignores the development process, and guarantees recurrence of problems; the second approach is analytic, treats problems as having systemic significance, focusses on the development process per se, and offers some hope of resolving the problems behind the problems. This dichotomy can be seen in the way that problems with government counterparts are handled. Is the principal response to counterpart problems to deal with them piecemeal, or to inquire into their genesis? Blaikie (1985:84) offers an eloquent argument for doing the latter:

> The crucial difference between a social democratic view of the state and the one taken here, is that we recognise that bureaucracy itself is political in the course of exercising its executive powers, particularly in the realm of policy-making at the upper levels and in implementation at the lower levels. By extension, then...[development] practices left undone, legislation remaining unheeded, projects that only serve to keep research officers in salary and which never leave the experimental station (those things not done) are also, political acts and not just omissions, or non-events which do not need explanation.

To suggest that problems need explanation is to suggest that things need not be as they are. This is always a radical notion,

and never more so than when counterpart governments are involved. However much grief this notion visits upon the development agency, however, it will be dwarfed by the potential long-term developmental return.

ACKNOWLEDGEMENTS

This analysis was written during the tenure of a fellowship at the East-West Population Institute, partially supported by the "Demographic Initiatives Project", under agreement #DPE-3046-A-00-8050-00 with the U.S. Agency for International Development.

The field research upon which this analysis is based was supported by the "Forestry Planning and Development Project", jointly funded by the Government of Pakistan and the U.S. Agency for International Development, under the direction of the Office of the Inspector General of Forests in the Ministry of Food, Agriculture and Cooperatives, and under contract to the Winrock International Institute for Agricultural Development. The author was assisted in carrying out the farmer base-line study by Jamil Qureshi, Riaz Ahmad, Sarfraz Ahmad, Nisar Ahmed, Abul Hassan, Zafar Masood, Shamsul Qamar, Nadeem Shahzad, Gul M. Umrani, and Nazir Marvat. The author was assisted with comparative data on livestock dung production by Drs. Ashiq H. Cheema and M. Afzal of Pakistan's National Agricultural Research Council and Dr. G.B. Isani of the Sind Agricultural University.

The author is grateful to Yok-shiu Lee for assistance in framing the initial outline of the study, to John Wilson for helping to focus its institutional relevance, to Ellen Starbird for helping to identify the importance of household-level dynamics, and to Carol Carpenter, Jefferson Fox, Maynard Hufschmidt, and Robert Retherford for helpful written comments on an earlier drafts, which were presented in seminar at the East-West Center (jointly sponsored by the Population Institute and the Environment and Policy Institute) on 11 January 1991 and at USAID (sponsored by the Population Office) on 24 April 1991.

The author is grateful for excellent clerical, logistical, and institutional support to LeNora Wee, Joan Choi, Mary Welsh, and, especially, Loretta Koga.

None of the afore-mentioned organizations or persons necessarily agrees with the analysis and opinions presented in the paper, for which the author alone is responsible.

ENDNOTES

1. The most explicit early development of the coevolutionary concepts used by Norgaard is in the work of the ecologists Ehrlich and Raven (Odum 1971:273). Coevolutionary theory has equally strong roots in the social sciences. Norgaard (1984c:161) acknowledges theoretical antecedents in the works of the ecological anthropologists Steward (1977), Rappaport (1968), and Harris (1966). Two other social scientists whose works are cited by Norgaard and Dixon (1986:306) as making early contribution to coevolutionary thought are Boserup (1965) and Geertz (1963). Note that the concept of coevolution in the biological sciences involves genetic change, which is not part of the concept as used in the social sciences.

2. The study comprised five successive stages: (1st) group interviews focussing on gross village characteristics in 118 villages; (2nd) continued with interviews on basic household characteristics in 1,132 households in 63 villages; (3rd) in-depth interviews on farm ecology and economics in 589 households in 40 villages; (4th) in-depth interviews on village ecology with 40 groups of key informants and mullahs in 40 villages; and (5th) monitoring of daily activities for 18 months in 13 households of key informants.

3. This survey was supported by the "Forestry Planning and Development Project", jointly funded by the Government of Pakistan and U.S.AID, under the direction of the Office of the Inspector General of Forests, in the Ministry of Food, Agriculture and Cooperatives, under contract to the Winrock International Institute for Agricultural Development. The author was assisted in carrying out the survey by Jamil Qureshi, Riaz Ahmad, Sarfraz Ahmad, Nisar Ahmed, Abul Hassan, Zafar Masood, Shamsul Qamar, Nadeem Shahzad, Gul M. Umrani, and Nazir Marvat.

4. Indeed, the vegetation in such places is now studied by Pakistani foresters as the closest remaining approximation of the country's natural vegetation (Chaghtai et al. 1978, 1983, 1984).

5. This historical analysis, while applicable to much of Pakistan and, indeed, north-west India, applies especially to the "land between the five rivers" (the Jhelum, Chenab, Ravi, Sutlej and Indus), the ancient heartland or Aryavarta of Vedic culture and the contemporary site of the northern half of Pakistan's Punjab province (Tyler 1973:8).

6. The same orthodox definition of "forest cover" was used in a recent study that concluded that Sri Lanka was becoming deforested, a conclusion that was overturned when the definition was amended to include the tree cover on private gardens and plantations (Leach 1987:44-45).

7. The data in Table 1 refer to non-fruit or "forest" trees. The percentage of farmers that have planted trees would be much higher if fruit trees - the cultivation of which has a much longer history in Pakistan - were included in the analysis. In other parts of the country, farmer involvement in the cultivation of forest trees is higher. Rauf (1981:70/table 16) reported that 64.5 percent of villagers surveyed in the Hazara district of northern Pakistan reported past attempts to plant trees. Dewees (1989:1161) notes that all over the world, even without development interventions, rural people are responding on their own to increased fuelwood demands by planting trees.

8. The mean answer that tree-planting began about 25 years ago (or 1987-25 = 1962) can be compared with the age of the system of agroforestry observed by Michie (1986) in Rajasthan, namely 30 years (1982-30 = 1952).

9. Cf. Michie 1986:240.

10. Nor is the government completely guiltless of trying to establish some control over on-farm trees. The Punjab state government passed (but was unable to enforce) a law levying fines on landowners who do not maintain a minimum of three trees per acre on their farms (Bokhari 1989:58-59). The existence of some intent behind the law other than tree-planting is evident from the fact that the average farm in the Punjab has - whether by planting or natural growth - many more trees than were required by this law.

11. Cf. Dani (1983:72-3).

12. The colonial British government similarly explained undesirable land-use practices by some natives in cultural terms. Thus, colonial observers claimed that displacement of Hindu populations by Moslem ones inevitably resulted in the transformation of intensively cultivated "good" landscapes into overgrown, sparsely cultivated <u>jungli</u> "bad" ones (cf. Heyne quoted in Bartlett 1955:280-282). The colonial government explicitly favored the former type of landscape (which is consistent with the fact that intensive land-use systems are inherently easier for central governments to manage than extensive ones). The colonial government attributed the undesirable consequences of Moslem land-use to the Islamic system of agrarian taxation, which was said to penalize any long-term investment in soil fertility, because its limitations on the length of tenure discouraged long-term planning and the heaviness of its exactions encouraged periodic flight (Moreland 1929:205,207).

13. The reduction of development problems to production questions is a phenomenon not limited to Pakistan (see Altieri 1989:85).

14. The reality of the natural vegetative cover - that it returns if man lets it - and its corollary - that the key to successful afforestation is protection - directly conflict with the forest service's self-interests. Plant protection is socially and politically difficult, demands a long-term commitment, and emphasizes social rather than silvicultural expertise. In contrast, the forest service's preferred strategy for afforestation - planting tree seedlings - is straight-forward, requires only a short-term effort, and emphasizes the value of silvicultural training. In addition, raising the seedlings used in planting offers a variety of financial rewards for forestry officers.

15. This imbalance is indigenous in origin. While farmers made much of the impact of the Afghan refugees, none of them blamed the refugees for long-term changes in forest cover.

16. This is also clear in a survey of farmer perceptions of the causes of changes in vegetative cover, which was conducted in Northern Pakistan by Rauf:

Perceived Determinants of Changes in Ground Cover:
Hazara District, Northern Pakistan (Rauf 1981:63/table 15).

RESOURCE PRESSURE - 94%				OTHER - 6%
Increased Cultivation	Illegal Cutting	Growing Population	Land Reform	
44 %	40 %	9 %	1 %	6 %
Percentage of Informants Citing				

The major perceived cause of deforestation in the hills where Rauf worked, which was not found in the plains where the Forestry Planning and Development Project survey was conducted, is increased cultivation - meaning extension of cultivation to forested areas.

17. In the more heavily forested hills of northern Pakistan, Rauf found lack of need to be a greater obstacle to farm forestry than resource competition:

Farmers' Reasons for Failure to Cultivate Trees:
Hazara District, Northern Pakistan (Rauf 1981:72/table 17).

FAULT OF							
FARMER 71%					GOVERNMENT 27%		LAND 2%
No Need or Time	Have Natural Forests	No Knowledge	Compete with Grass	No Care	Lack of Cooper. & Seed	No Land Demarcation	Too Hilly
34.9%	11.9%	9.2%	9.2%	5.5%	18.4%	9.2%	1.8%
Percentage of Informants Citing							

18. The importance of irrigation in promoting increased on-farm tree cultivation is reflected in a positive association at the village level between irrigation and a (perceived) increase in tree/forest cover.

Association Between Irrigation & Perceived Increase in Forest Cover

PERCEIVED VILLAGE TREND IN FOREST COVER:	VILLAGE SOURCE OF WATER FOR CULTIVATION	
	Rainfed	Part/Whole Irrigated
Decreasing	15.5	9.5
Increasing	3.5	12.5

For n=41 villages, X^2_c=4.81, P<.05.

19. Another reason for the greater success of the farmers in perceiving the coevolutionary process is their ability to adopt a multi-sectoral perspective, to think about the environment beyond the narrow confines of their farms and also to consider some of the implications for their farms of changes in that broader world. Government officials show less ability to do this (e.g., to relate farmer exploitation of forests to farmer exploitation of farms). The government draws administrative boundaries that officials cannot cross, but which farmers - as exemplified in the old pattern of grazing farm livestock in the forests during the day and then staking them in the fields at night - traditionally have.

20. Leach (1987:39) attributes the official conclusion - that any fuelwood consumption in excess of the official figures on state forest production must therefore have been stolen from the state forest - to the existence of better data on energy use than on energy resources. He fails to see that such blindness to on-farm production of fuelwood supports - and therefore may be generated by - the continued focus of government resources on production in state forests versus private farms.

21. "Depletion of forests in the hills is often associated with excessive grazing, fuelwood and timber collection rights that were initially admitted at the time of settlement. The greatest curse about them is that, they have been growing indefinitely with increase in human and livestock population and have now reached a stage that it is no longer possible for the coniferous forests to satisfy them without impairing the quality of the stand and risking environmental stability" (Bokhari 1989:16).

22. Government perceptions of on-farm tree production are biased accordingly. Based on official production data, U.S.A.I.D. estimated that less than 6 million tons of fuelwood were harvested in 1980 (mostly from state lands), whereas consumption-based data indicated that purchases of fuelwood (excluding fuelwood that did not enter the market) alone amounted to almost 147 million tons

that year (Campbell in press). The difference, by a factor of 25 to 1, is attributed to under-counting of on-farm fuelwood production (ibid). This production is completely excluded from consideration in the 1980 "Pakistan Census of Agriculture", which includes data on-farm fruit trees and orchards, but not non-fruit trees (GOP 1983). Cf. Fairfax and Fortmann (1990:266) on the denial of on-farm tree cultivation by foresters.

23. The foresters' beliefs to the contrary were decisively invalidated. Although the foresters were correct that there is a general correlation between wealth and interest in agroforestry, the strength of this correlation was not so great as to invalidate the intended project focus on the small farmer.

24. Surprisingly little variation has been found between the rates of fuel consumption in the most resource-poor and resource-rich households (Burney and Akhtar 1990; Campbell in press:table 3; Leach 1987:1920).

25. This "biomass fuel transition" has precluded the "energy transition" to petroleum-based fuels that many development experts predicted in response to the growing scarcity of biomass fuels (Leach 1987:chpt.2; cf. Smith 1987). Among the households in the study sample, 10 percent use kerosene (not necessarily to the exclusion of other fuels) in cooking and 4 percent use bottled gas, and the reason most commonly cited for these uses is the shortage of wood. These figures agree well with Campbell's (in press:table 4) calculation that commercial fuels supply only 10 percent of the energy used in rural households in Pakistan.

26. The idea (as in Dewees 1989) that dung is the culturally preferred fuel is given credence by the observation that the use of dung fuel rises as household income rises (e.g., Campbell in press:17). It does not necessarily follow that dung is the culturally most desired fuel, however, only that it is not the culturally least desired fuel. (In fuelwood-poor parts of Bangladesh, the fuel preference of the wealthiest rural households is in fact dung [Briscoe 1979].) There are many types of fuel - crop refuse and stable waste among them - that are by any objective measure inferior to dung. Ignorance of how bad the biomass fuel situation actually is in South Asia leads outside observers to assume that dung use by a moderately well-off household must be due to cultural rather than economic valuations. With valued qualities as both fuel and manure, dung is a valued economic good. It is bought and sold for use as both fuel and manure (although primarily the latter), and its ownership is explicitly addressed in every contract between landlord and tenant (Carpenter in press).

27. The mixed use of woodfuel and dungfuel is not officially recognized by the government, whose 1980 Population Census (e.g.) categorizes households according to whether their cooking fuel is wood or dung (GOP 1984:12, Annexure D).

28. Campbell (in press) reports that 64 percent of the dung is Pakistan is used for fuel and just 36 percent for manure.

29. Tenants' use of manure for fuel is also stimulated by a relatively greater lack of other fuels. Tenants typically lack rights to (e.g.) fell trees on their landlord's land.

30. A related factor is the increase in tenant farming: the short-term time horizons of tenancy match the short-term impact of chemical fertilizers, and the fuelwood scarcity associated with tenancy (which typically provides only limited rights to trees and tree products) necessitates the use of dung for fuel as opposed to manure. Other important factors are the heavy subsidization of fertilizer prices by the government, and the widespread adoption of high-yielding varieties of wheat and other crops requiring chemical fertilizers (see Kurin 1983).

31. The many perceived disadvantages of chemical fertilizers, coupled with an indigenous system of knowledge that views chemical fertilizers as appropriate for some agronomic situations and manure as appropriate for others (see Kurin 1983), has ensured that the use of dung for manure has persisted in spite of the availability of subsidized chemical fertilizers.

32. The use of dung for manure dates back thousands of years in South Asia, as attested to in classical Sanskrit texts such as the Rigveda and Atharvaveda (Macdonell and Keith 1912/1958,I:99).

33. While farmers do not link the shortage of manure to dung-burning, they do link dung-burning to the shortage of woodfuel. Farmers recognize that fuelwood is a scarce commodity, and they further recognize - unlike the government - that it is this scarcity that obliges them to use dung for fuel.

34. Cf. Blaikie (1985:82): "Although land-use decisions are made by the household, these may well not be made equally by all members of it, and this may be significant in the perception of conservation and any government sponsored conservation programme. So, a prior starting point should be the politics within the household itself."

35. Women also do the actual labor in "leaping" mud walls with fresh, protective layers of dung. The "unclean" connotations of dung, in Islamic Pakistan, may be partly responsible for the customary allocation of work with dung to women, who are to some extent regarded as unclean simply because of their gender.

36. The fuel-use priority is supported by a difference between cooking and agriculture in the immediacy of feedback on resource-use. If dung supplies are inadequate for use for fuel, this will be apparent during use. If dung supplies are inadequate for use

for manure, this will not be apparent until after the subsequent harvest or several subsequent harvests.

37. Cf. Blaikie (1985:152), on his study of the political economy of soil erosion: "The approach to soil erosion and conservation taken here...emphasises relations of surplus extraction as a cause of erosion, and a conflict model of the state, where policies are selectively formulated and implemented (or allowed to languish) according to the interests, balance of power, and tactics of competing classes and groups within the institutions of state."

38. I am indebted to R. Carpenter for this observation.

39. As Norgaard says (1984b:165,165n; 1989:49), reality and the perception of reality coevolve together. Knowledge of the natural environment cannot be independent of the use of that environment (Norgaard 1987:118).

40. Merrey's (1983:732-3) demonstration of a lack of "functional fit" in the use of water resources by the farmers in Pakistan's Punjab plain is another example of a non-coevolutionary relationship between sociosystem and ecosystem.

41. Whereas deterministic, mechanistic models tend to promote confidence regarding the ability to comprehend and successfully intervene in the development process, the indeterministic coevolutionary model tends to promote doubt (Norgaard and Dixon 1986:310).

42. The explanation of peasant behavior in terms of resource scarcity is generally problematic for governments because it has an inherently populist flavor about it, inevitably linking problems to the material deprivation of the poor. Government institutions responsible for this deprivation (in whole or part) are inherently ill-disposed to acknowledge this linkage.

43. The argument must not be removed from its proper context. Blaikie (1985:99) "Although people have been conserving soil or limiting children for a long time, an explicit and out-of-context definition of a single element in people's lives (conservation, small families) will tend to be distrusted and misunderstood."

44. One such image could be the "humoral temperature" of Pakistan's farmlands, which is being raised as a result of too much animal dung being burned for fuel and not enough returned to the land as manure (cf. Kurin 1983).

45. The participants in coevolutionary development are likely to be aware of this development; they are not likely to be aware <u>of</u> this awareness, however.

46. Is the problem treated as a black box, or as a potential key to the box? See Blaikie (1985:73).

REFERENCES CITED

Abernethy, Virginia
1988 Editorial: The Road Taken. Population and Environment 10,1:3-4.

Agarwal, Bina
1986 Cold Hearths and Barren Slopes: The Woodfuel Crisis in the Third World. Riverdale (MD.):Riverdale Co. for Institute of Economic Growth.

Altieri, Miguel A.
1989 Rethinking the Role of U.S. Developmental Assistance in Third World Agriculture. Agriculture and Human Values 6,3:85-91.

Bajracharya, D
1983 Deforestation in the Food/Fuel Context: Historical and Political Perspectives from Nepal. Journal of Mountain Research and Development 3:227-240.

Barnard, Geofrrey and Lars Kristoferson
1985 Agricultural Resideues as Fuel in the Third World. IIED Energy Information Programme, Technical Report No.4. London: Earthscan.

Bartlett, H.H.
1956 Fire, Primitive Agriculture, and Grazing in the Tropics. In Man's Role in Changing the Face of the Earth, William L. Thomas ed., pp.692-720. Chicago: University of Chicago Press.

Bernier, Francois
1891 Travels in the Mogul Empire: AD 1656-1668. Archibald Constable tr. Delhi: S. Chand

Blaikie, Piers
1985 The Political Economy of Soil Erosion in Developing Countries. London: Longman.

Blaikie, Piers and Harold Brookfield (eds.)
1987 Land Dregradation and Society. London: Methuen.

Bokhari, A.S.
1989 Pakistan: A Review and Analysis of Forest Policy and Legislation. Consuiltant's Report. Islamabad: World Bank.

Boserup, Ester
1965 The Conditions of Agricultural Growth. Chicago: Aldine.

Briscoe, John
1979 Energy Use and Social Structure in a Bangladesh Village. Population and Development Review 5,4: 615-641.

Buhler, G. (tr.)
1886/1964 The Laws of Manu. Delhi: Oxford University Press/Motilal Banarsidass.

Burney, Nadeem A. and Naeem Akhtar
1990 Fuel Demand Elasticities in Pakistan: An Analysis of Households' Expenditure on Fuels Using Micro Data. The Pakistan Development Review 29,2:155-174.

Campbell, Tim
in press Socio-Economic Aspects of Household Fuel Use in Pakistan. In The Sociology of Natural Resources in Pakistan and Adjoining Countries: Case Studies in Applied Social Science, Michael R. Dove and Carol Carpenter eds. Lahore: Vanguard Press/Mashal Foundation.

Carpenter, Carol
in press Women and Natural Resources in South Asia. Society and Natural Resources.

Cernea, Michael M.
1985 Alternative Units of Social Organization Sustaining Afforestation Strategies. in Putting People First: Sociological Variables in Rural Development, Michael M. Cernea, pp. 267-293. New York: Oxford University Press for The World Bank.

Chaghtai, S.M.; H. Shah; and M.A. Akhtar
1978 Phytosociological Study of the Graveyards of Peshawar District, NWFP, Pakistan. Pakistan Journal of Botany 10:17-30.

Chaghtai, S.M.; Noor Ahmad Rana; and Habibur Rahman Khattak
1983 Phytosociology of the Muslim Graveyards of Kohat Division, NWFP, Pakistan. Pakistan Journal of Botany 15,2: 99-108.

Chaghtai, S.M.; Abdus Sadiq; and S. Zahir Shah
1984 Vegetation Around the Shrine of Ghalib Gul Baba in Khwarra-Nilab Valley, NWFP, Pakistan. The Pakistan Journal of Forestry 34,3: 1454-150.

Champion, Harry G; S.K. Seth; and G.M. Khattak
1965 Forest Types of Pakistan. Peshawar: Pakistan Forest Institute.

Cline-Cole, R.A.; H.A.C. Main; and J.E. Nichol
1990 On Fuelwood Consumption, Population Dynamics and Deforestation in Africa. World Development 18,4:513-527.

Dani, Anis Ahmad
1988 Peripheral Societies in a Nation-State: A Comparative Analysis of Mediating Structures in Development Processes. Ph.D. dissertation, University of Pennsylvania.

Dewees, Peter A.
1989 The Woodfuel Crisis Reconsidered: Observations on the Dynamics of Abundance and Scarcity. World Development 17,8:1159-1172.

Dove, Michael R.
1987 Prospects for Wood-Dung Fuel Replacement Through Farm Forestry Development: The Punjab, NWFP, Baluchistan. Forestry Planning & Development Reports #6, Islamabad.

1990 The Anthropology of Development vs. the Application of Anthropology to Development: Mediating the Forester-Farmer Relationship in Pakistan. Practicing Anthropology 13,2:21-28.

In press a The 'Humor' of Shade: The Peasant Epistemology of Tree Shade in Pakistan. Human Ecology.

In press b Foresters' Beliefs about Farmers: An Agenda for Social Science Research in Social Forestry. Agroforestry Systems.

Fairfax, Sally K. and Louise Fortmann
1990 American Forestry Professionalism in the Third World: Some Preliminary Observations. Population and Environment 11,4:259-272.

Geertz, Clifford
1963 Agricultural Involution: The Processes of Ecological Change in Indonesia. Association of Asian Studies Monographs and Papers, no.11. Berkeley: University of California Press.

Gold, Ann G. and Bhoju Ram Gujar
1989 Of Gods, Trees and Boundaries: Divine Conservation in Rajasthan. Asian Folklore Studies 48:211-229.

Government of Pakistan (GOP)
1962 The West Pakistan Forest Manual, Vol.I. Peshawar: GS&P Dept.

1983 Pakistan Census of Agriculture 1980. Lahore: Agricultural Census Organization, Statistics Division.

1984 1981 District Census Reports. Islamabad: Population Census Organization, Statistics Division.

Grove, Richard H.
1988 Conservation and Colonialism: The Evolution of Environmental Attitudes and Conservation Policies on St. Helena, Mauritius and in Western India 1660-1854. In Changing Tropical Forests: Historical Perspectives on Today's Challenges in Asia, Australasia and Oceania John Dargavel, Kay Dixon and Noel Semple eds., pp.19-45. Canberra: Centre for Resource and Environmental Studies.

Harris, Marvin
1966 The Cultural Ecology of India's Sacred Cattle. Current

Anthropology 7:51-59.

Ives, Jack D. and Bruno Messerli
1989 The Himalayan Dilemma: Reconciling Development and Conservation. London: Routledge for the United Nations University.

Jodha, N.S.
1985 Population Growth and the Decline of Common Property Resources in Rajasthan, India. Population and Development Review 11,2: 247-264.

Kangle, R.P.
1969/1988 The Kautilya Arthasastra. 3 Vols. Delhi: Motilal Banarsidass.

Kurin, Richard
1983 Indigenous Agronomics and Agricultural Development in the Indus Basin. Human Organization 42,4:283-294.

Leach, Gerald
1987 Household Energy in South Asia. London: Elsevier Applied Science.

Macdonell, Arthur Anthony and Arthur Berriedale Keith
1912/1958 Vedic Index of Names and Subjects, 2 vols. Delhi: Motilal Banarsidass.

Merrey, Douglas J.
1983 Irrigation, Poverty and Social Change in a Village of Pakistani Punjab: An Historical and Cultural Ecological Analysis. Ph.D. dissertation, University of Pennsylvania.

Michie, B.H.
1986 Indigenous Technology and farming Systems Research: Agroforestry in the Indian Desert. In Jones, J.R. and B.J. Wallace (eds.) Social Sciences and Farming Systems Research. Westview Press, Boulder, pp.221-244.

Moench, Marcus
1987 Forest Degradation and Biomass Utilization in an Himalayan Foothills Village. East-West Environment and Policy Institute Working Paper, No.87-10.

Moreland, W.H.
1988 The Agrarian System of Moslem India: A Historical Essay with Appendices. Delhi: Kanti Publications.

Norgaard, Richard B.
1981 Sociosystem and Ecosystem Coevolution in the Amazon. Journal of Environmental Economics and Management 8:238-254.

1984a Coevolutionary Agricultural Development. Economic Development and Culture Change 32,3:525-546.

1984b Coevolutionary Development Potential. Land Economics 60,2:160-173.

1987 Economics as Mechanics and the Demise of Biological Diversity. Ecological Modelling 38:107-121.

1988 Sustainable Development: A Co-Evolutionary View. Futures (December):606-620.

1989 The Case for Methdological Pluralism. Ecological Economics 1:37-57.

Norgaard, Richard B. and John A. Dixon
1986 Project Design and Evaluation Using Economics and Coevolutionary Criteria. Policy Sciences 19:297-317.

Odum, Eugene
1971 Fundamentals of Ecology, 3rd ed. Philadelphia: Saunders College Publishing.

Pitt, David C.
1986 Crisis, Pseudocrisis, or Supercrisis? Poverty, Women, and Young People in the Himalaya: A Survey of Recent Developments. Mountain Research and development 6,2:119-131.

Rao, S.
1957 History of Our Knowledge of the Indian Fauna through the Ages. Journal of the Bombay Natural History Society 54,2:251-280.

Rappaport, Roy A.
1968 Pigs for the Ancestors: Ritual in the Ecology of a New Guinea People. New Haven: Yale University Press.

Rauf, Mohammad A.
1981 Forestry Development in Pakistan: A Study of Human Perspectives. Peshawar: Pakistan Forest Institute.

Repetto, Robert
1988 The Forest for the Trees? Government Policies and the Misuse of Forest Resources. Wasington (D.C.): World Resources Institute.

Robey, Bryant (ed.)
1991 Pakistan's Population Growth: The Need for Action. Asia-Pacific Population and Policy 17.

Rukanuddin, Abdul Razzaque
1990 Recent Population Growth in Pakistan. Seminar, East-West Population Institute, Honolulu.

Sardar, Mohammad Rafique
1986 Mountain Farmers' Perceptions of Soil Erosion and Response to Soil Conservation. Ph.D. dissertation, S.U.N.Y. Syracuse.

Sheikh, Mahmood Iqbal
1986 A Case Study on Hurries - Acacia nilotica Block Plantations for Wood Production in Pakistan. Peshawar: Pakistan Forest Institute.

Shiva, Vandana
1989 Staying Alive: Women, Ecology and Development. London: Zed Books.

Smith, Kirk R.
1987 The Biofuel Transition. Pacific and Asian Journal of Energy 1,1:13-32.

Steward, Julian H.
1977 Evolution and Ecology: Essays on Social Transformation. Jane C. Steward and Robert F. Murphy eds. Urbana: University of Illinois Press.

Thompson, M.; M. Warburton; and T. Hatley
1986 Uncertainty on a Himalayan Scale: An Institutional Theory of Environmental Perception and a Strategic Framework for the Sustainable Development of the Himalaya. London: Ethnographica.

Tyler, Stephen A.
1973 India: An Anthropoloigcal Perspective. Prospect Heights: Waveland Press.

Westoby, Jack C.
1987 Forestry and Underdevelopment Revisited. Forestry for Development Lecture Series. University of California's Department of Forestry and Resource Management, Institute of International Studies, and Center for South and Southeast Asia Studies.

Whyte, Robert Orr
1968 Grasslands of the Monsoon. London: Faber and Faber.

THE TRANSITION FROM NATIVE FOREST LATEXES TO HEVEA IN KALIMANTAN: LESSONS REGARDING PEASANT INDEPENDENCE AND STATE INTEREST.

East-West Center
East-West Population Institute
1777 East-West Road
Honolulu, Hawaii 96848

May 1991

THE TRANSITION FROM NATIVE FOREST LATEXES TO *HEVEA* IN KALIMANTAN: LESSONS REGARDING PEASANT INDEPENDENCE AND STATE INTEREST.[1]

Presented in:
The panel on "Non-Timber Forest Products in the Pacific Basin",
for the XVII Pacific Science Congress, Honolulu, 30 May 1991.

By

Michael R. Dove
East-West Population Institute
Honolulu, Hawaii

Submitted to:

Ms. Ellen Starbird
Policy Development Division
Office of Population
Agency for International Development
Washington, D.C. 20523

This analysis was written with partial funding support from the Demographic Data Initiatives Project through a cooperative agreement (DPE-3046-A-00-8050-00) with the United States Agency for International Development and the East-West Center.

TABLE OF CONTENTS

I. INTRODUCTION

1. Background

With growing interest in developing non-timber forest products, an outstanding historic example of such development - carried out without the support of government, and to some extent in spite of its opposition - merits attention. This example involves the transition among the inhabitants of Indonesia (and also Malaysia) early this century, from gathering native forest rubbers to tapping Para rubber (Hevea brasiliensis).[2]

A key distinction between tapping Para rubber and gathering forest rubbers is that the former falls within the realm of "agriculture" while the latter does not. The development of one from the other involved a transition, therefore, from without agriculture to within, from nature to culture.[3] The magnitude of this transition reflects the involvement of not just society and nature, but society, nature and the state. The transition to Para rubber cultivation was a key point in the development of this peasantry's orientation towards the state. A historical analysis of this transition will contribute to more informed planning of the development of non-timber forest products and to improved understanding of contemporary peasant-state relations

2. Outline of Paper

Following a brief description of the research locale and focus, this analysis begins with the history of the Southeast Asian trade in forest products, the development of the rubber trade in particular, and then the introduction of Para rubber. This is

followed by a brief analysis of the similarities and differences between gathering forest rubbers and tapping Para rubber, especially with respect to swidden agriculture. Then the political-economic context of these developments is analyzed, focussing on state involvement in the forest rubber trade and the impact that this had on the adoption of Para rubber. The final section of the paper compares the political-economy of Para rubber development in Southeast Asia with its development in South America.

3. Research Locale

The data upon which this analysis is based were gathered during several periods of research in West and South Kalimantan, carried out between the years 1974 and 1984. The most detailed data were gathered during an extended stay with the Kantu', an Ibanic-speaking tribe of West Kalimantan (Figure #1).[4] They grow dry rice (as well as some swamp rice), maize, cassava, and a wide variety of non-rice cultigens in swiddens cut from both primary and secondary forest. In addition to cultivating annual food crops in their swiddens, the Kantu' cultivate several types of perennial, cash crops in the fallowed swidden land. These include a variety of trees yielding edible fruits and oils; the pepper plant (Piper nigrum); and, especially, the Para rubber tree. Para rubber is today the Kantu's primary source of cash or tradeable commodities, used to obtain the basic trade goods of salt, tobacco, clothing, and kerosene.

The Kantu' are far from unique in their rubber holdings. Rubber is one of Indonesia's major resources: it is a major source of household income for over eight million people, the country's third largest generator of foreign exchange after oil and timber (Effendi 1985:108), and it makes Indonesia the world's second-largest rubber producer. Some of this rubber is produced on large plantations or estates, which employ modern agricultural technology, heavy capital investment, and a wage labor force. But the bulk of Indonesia's rubber, 84 percent at the most recent count (Booth 1988:201; Effendi 1985:108), is produced in tiny gardens of a hectare or so, with century-old technology, by so-called "smallholders"[5] like the Kantu' - ordinary farmers who produce rubber with household labor to meet part, typically not the major part, of their household's income requirements. Perhaps most remarkable of all, this 84 percent market share is the product of more than three-quarters of a century of direct competition between the smallholders and the estates. Estates held a commanding share of Indonesia's rubber production during the industry's early years in the second decade of this century, and they have steadily lost ground to the smallholders ever since.[6] The historical success of rubber smallholders is due, in part, to the fact that Para rubber filled the same niche in the peasant or tribal economy previously filled by native forest latexes.

II. HISTORY

1. Forest Rubbers

Trade in non-timber forest products has a long history in the region (and has retained considerable economic importance to the present day [Dunn 1975; Peluso 1983]). Evidence of the export of forest products from the western islands of Indonesia to China dates from the 5th century (Wolters 1967); Middle Eastern trade with the Malay Peninsula dates from 850 A.D.; and European trade with Indonesia's spice islands dates from the fifteenth century (de Beer and McDermott 1989:16). The antiquity and ubiquity of this trade is suggested by the importance of the goods that it supplied - in return for forest products - to people who otherwise lacked them, principally salt and iron (Lian 1988:18).

A major category of forest products throughout this history has been natural gums, resins (intra-regional trade in which may date back to Neolithic times [Dunn 1975:120-137]), and rubbers.[7] Rubber-gathering was formerly a central part of the tribal economy in Kalimantan. The contemporary Kantu' say that their ancestors first explored and settled their present territory in the Empanang river valley, not in search of fresh swidden territory, as our image of swidden cultivators would suggest, but in search of jangkang (Palaquium leiocarpum) and kubal (perhaps Ficus elastica).[8] These are two of a wide variety of indigenous, latex-producing trees and vines.[9] They were (and are) used traditionally, within the local economy, for caulking and sealing purposes (e.g., of canoes [cf. Jessup and Vayda 1988:16]). It was not desire for this use, however, but for trade, that prompted the ancestors of the Kantu' to migrate to the Empanang valley in search

of it.

There are few data available on the history of the regional trade in forest rubbers. Large-scale trade with Europe dates from the 1840's and the discovery that "gutta-percha" - a generic name for latex from a number of different plants, but especially from Palaquium spp. (Burkill 1962,II:1651) - could be used for insulating marine telegraph cables, among other purposes (Lindblad 1988:14).[10] A second boom in the European trade occurred during the first decade of this century, following the discovery that fire-resistant plates and tiles could be made from "jelutong", again a generic term for latex from a number of different plants, but especially from Dyera spp. (Burkill 1962 I:889; Lindblad 1988:18). This boom was short-lived[11], and by World War I interest in rubbers was shifting from exploitation of native forest sources to cultivation of the introduced Hevea (while among forest products, attention was shifting from rubbers to rattans) (Cramb 188:109; Lindblad 1988:102).[12]

2. Para Rubber

Large-scale international trade in Para rubber dates from development of the vulcanization process for clothing in 1839 and development of the pneumatic tire for automobiles in 1888 (Purseglove 1968:147). The trade was initially supplied by the tapping of naturally grown trees in the Amazon basin.[13] The rubber trees of Kalimantan and the rest of Southeast Asia are descended from seedlings that the British gathered in Brazil in 1876 and

planted in Ceylon in 1876 and Singapore in 1877 (Purseglove 1968:149).[14] The first seedlings from the Singapore trees arrived in Sarawak in 1882 (Tremeer 1964:52). By 1908, the Sarawak government was distributing rubber seedlings to natives in the interior (Cramb 1988:111; Tremeer 1964:52). On the Dutch side of the border, in West Kalimantan (which today ranks third among Indonesian provinces in terms of rubber acreage [Effendi 1985:108]), the introduction of the rubber tree occurred at about the same time, in 1909 (Uljee 1925:74 cited in King 1988:237). The Kantu', for whom communication was (and remains) easier across the border to Sarawak than to the distant Kalimantan coast, say that they obtained their first rubber seedlings from Iban tribesmen in the Saribas drainage of Sarawak and from a Catholic mission downriver on the Kapuas, in the late 1920's. A majority of Kantu' households had planted some rubber by World War II, although households with mature rubber were then still in the minority.

III. NATIVE RUBBERS VS. PARA RUBBER

The historic exploitation of indigenous latex-producing trees and vines resembled in many respects the subsequently introduced system of rubber cultivation.[15] The technology used to obtain the latex of most jelutong and some gutta-percha was much like that used to exploit rubber: tapping by means of v-shaped incisions in the bark (Burkill 1962 I:892).[16] The exploitation of the forest rubbers could be carried out at short notice, in response to market fluctuation, with minimal capital investment or risk-taking; as is

also the case with rubber (which is unique in this respect among export crops [Drake 1982:294-295]).[17] The labor requirements of both systems are relatively low (Cramb 1988:112). These similarities facilitated the adoption of rubber by the Kantu' and other groups; but this adoption would not have occurred with the speed and magnitude it did if there were not also significant differences.

One major difference between Para rubber and the native rubbers involves complementarity with swidden cultivation. The central act of the swidden cycle, clearing the forest, clearly differentiates between the two. Whereas the native rubbers are at risk whenever the natural forest is cleared, it is cleared forest in which Para rubber is planted: the rubber seedlings are planted in newly cleared swiddens. As the habitat of the native rubbers is destroyed, therefore, the "habitat" of Para rubber is created. As more and more of Kalimantan's primary forest cover has been cleared, a shift of dependence from the native rubbers to Para rubber became inevitable. This shift was also promoted by the changes in the patterns of agriculture and settlement that have occurred over the past century.[18] As a result of demographic and political constraints, both swidden cycles and settlement patterns have become more sedentary, which favors Para rubber. Whereas the supply of natural rubbers within easy access of any given settlement eventually will become exhausted, the productivity of a rubber grove is potentially open-ended (if naturally grown saplings are allowed to succeed the older generations of trees);

it is terminated only by migration away from the area. While sedentariness is inimical to the continued exploitation of natural forest rubbers, therefore, it is essential to the exploitation of Para rubber.

A second important difference between Para rubber and the native rubbers involves recognition of ownership. Individual ownership of latex-producing forest trees was recognized under traditional tribal adat. The first person to tap a tree was judged to be its owner.[19] These traditional jural principles were not respected by the outside world, however. Even today, valued and individually claimed forest trees are cut down with impunity by outsiders.[20] Recognition of proprietary rights by the non-tribal world is generally reserved for planted trees.[21] Indeed, the planting of commercially valued perennials like rubber or coffee is recognized under both national and tribal law as establishing rights not just to the trees but to the land under them (Weinstock and Vergara 1987:318-9). The proprietary implications of planting Para rubber were not lost on the tribesmen of Kalimantan, who still sometimes plant rubber largely for its tenurial benefits. This benefit of Para rubber acquired disproportionate importance because of the particular political-economic conditions prevailing in Indonesia at the beginning of this century.

IV. THE POLITICAL ECONOMY OF RUBBER PRODUCTION IN SOUTHEAST ASIA

1. Government Involvement and Tribal Response

In both colonial and post-colonial Indonesia, whenever a natural

resource has experienced a commercial boom and attracted the attention of government and industry, they have taken steps to restrict exploitation by traditional smallholders, always out of ostensible concern for either their welfare or the welfare of the resource in question. There was an international boom in jelutong (from Dyera spp.) in the first decade of this century, as mentioned previously: by 1908 the colonial government in parts of Kalimantan was requiring a license to tap the trees; in 1910 the government awarded all tapping rights to foreign concessionaires[22]; and in 1913 the government imposed export levies on the native tappers (Potter 1988:131-133). The government justified these measures in terms of the need to avoid over-exploitation of the latex-yielding trees (Potter 1988:131), or the need to protect the smallholders against middlemen (Lindblad 1988:19). But the resultant abuse of native rights in pursuit of European profit was so glaring that the Dutch legal scholar, van Vollenhoven, used it as a textbook case of the colonial government's abuse of its right to "wastelands" (Potter 1988:134). Another observer was driven to comparing the right of the Dayak to tap jelutong to the right of the Javanese to cultivate land (CAPD 1982:5519).

This active state effort to control production of the native forest rubbers set the stage for the shift to Para rubber. My thesis is that the shift to Para rubber was at least in part a response to the state effort at control. The shift to Para rubber was not a shift from a subsistence economy to a mixed or market-oriented economy, as some observers have suggested, because the

tribesmen were already participating in the market through gathering the native rubbers. Rather, it was a shift, or the beginning of a shift, from a tribal political-economic formation to a peasant formation. Wolf (1966:25) writes that "Ecotypes based on swidden can support a peasantry only under exceptional circumstances or where swiddens become "anchored" to a nonswidden crop." For many of the swidden cultivators of Kalimantan, this anchor was rubber. But adoption of rubber provided these tribesmen with more than the means to produce a "fund of rent" for the state, Wolf's (1966) defining characteristic of peasant economic formations. Replacement of native rubbers with Para rubber was part of a move from a limited involvement in the world economy, with limited vulnerability, and power, to greater involvement with greater vulnerability and greater power. It was a move from limited engagement to greater engagement. It represented not submission to the state, but an aggressive re-orientation towards the state.

2. Cultural Evidence

The central role of Para rubber production in this political-economic transformation is reflected in ritual. Omen-taking was traditionally practiced both when gathering native rubbers and producing Para rubber, but with a difference: omen-taking in native rubber production focussed on the hazards of traveling to gather the rubbers, whereas omen-taking in Para rubber production focussed on the hazards of trading the product (Sandin

1980:107,112,113,115,122). The focus in the first case was on the physical dangers of the tribal world, and the focus in the second case was (and is) on the more "fiscal" dangers of the outside world. This shift from "physical" to "fiscal" hazards aptly sums up some of the consequences of a transition from a tribal to a peasant political-economic formation.

The anxieties attendant upon this transition were also reflected in an extraordinary event that took place in pre-war Borneo. A panic swept Kalimantan and Sarawak in the 1930's and 1940's, based on a rumor that the spirit of the rubber was "eating" the spirit of the swidden rice (cf. Freeman 1970:268, Geddes 1954:97). This panic obviously reflects native anxiety about the impact of involvement in Para rubber on the traditional cultivation of swidden rice. But it also reflects a more generalized anxiety about the impact of the new political-economy on tribal society. It can be interpreted as a cultural caution against over-involvement in rubber production - a caution that most tribesmen took to heart. Just as most Dayak tribesmen moderated their involvement in gathering the native forest rubbers - during the periodic booms, it was coastal Malays and Bandjars who did most of the gathering, not the interior tribesmen (Potter 1988:132-3; cf. Hudson 1967:66) - so did they moderate their involvement in production of Para rubber. As Hudson writes (1967:311) "But most villagers feel that the rubber market is a chancy thing. World demand varies and prices fluctuate. No one of them wants to be totally dependent on factors over which they have no control.

Thus...rubber cultivation will continue in the foreseeable future as an activity ancillary to swidden farming." The fact that they maintained rubber production as an "ancillary" activity proved to be the particular strength of their system of smallholder production.

3. Government Evidence

Political-economic tensions over the tribesmen's shift from the native forest rubbers to Para rubber were also manifested in government policy, albeit with different intentions. Where the tribesmen were concerned with minimizing their vulnerability to the outside world, the state was concerned to maximize it. The most notorious example of this occurred under the International Rubber Regulation Agreement, enacted by the Netherlands, Great Britain, France, India and Siam in 1934 and eventually extended to 1944 (Barlow 1978:62-67; Boeke 1953:124-125,248; Thee 1977:26). The agreement was in theory designed to stabilize rubber prices by limiting production. In practice, in Indonesia and elsewhere, the agreement was used in an attempt to limit production by smallholders for the benefit of estates, through the imposition of export levies ranging up to 83 percent on the smallholders rubber (Dillon 1985:116). This was frankly acknowledged by some of the participants, as the following statement by the chairman of the British North Borneo Company indicates:

> 'One of the primary objects of the Rubber Control Scheme was to protect European capital in plantation companies

in Malaya, Borneo, and the Netherlands East Indies from competition arising from the production of rubber by the natives at a fraction of the cost involved on European-owned estates' (McFadyean 1936, cited in Barlow 1978:72).

V. THE POLITICAL ECONOMY OF RUBBER PRODUCTION IN SOUTH AMERICA

The development of Para smallholder rubber production in Southeast Asia followed a very different path from that taken in its homeland in South America. The fact that Para rubber is regarded as a forest product in South America but an export "crop" in Southeast Asia, in particular, offers a new perspective on its development in both regions.

Para rubber grows wild in the tropical forests of South America, at maximum densities of 1-2 trees per hectare. The native tappers or seringueiros clear winding paths or "avenues" several kilometers in length through the forest to perhaps 100-200 trees, which they tap every day in season (Barlow 1978:17). The tappers work under the authority of traders or patrons, who have rights to forest sections based on tax-paying and force (Murphy 1960:18). Indian tappers working on state land, and continuing some involvement in subsistence food-cropping, are somewhat better off than peasant tappers on privately owned land who are dependent upon their trader even for food; although even for the Indians, involvement in tapping has come at the expense of their own social system (Murphy 1960:143,153,177). Whereas Para rubber has empowered many of its smallholder adopters in Southeast Asia,

therefore, its impact has been quite the reverse in South America (Padoch 1988:131). This difference is reflected in the recent international attention focussed on the plight of the South American tappers (and the killing of a well-known activist) and efforts to "empower" them: the lot of the Southeast Asian smallholder, while often lacking in many respects, is still so different from that of the seringueiros that a similar movement in Southeast Asia is both absent at present and unlikely in the foreseeable future.

This difference may be due chiefly to one fact: Para rubber had to be planted in Southeast Asia, but not South America. By planting or not - and thus by involving or not issues of nature versus culture and public domain versus private - the potential for involvement of the state and state-supported economic elites, versus the potential for development of the smallholder - is completely different. The structural role of Para rubber in South America is analogous to that of the native forest rubbers in Southeast Asia; and what happened to the native rubbers in Southeast Asia - in terms of local people losing control to outside forces - is what happened to Para rubber in South America.

VI. CONCLUSIONS

Many of those interested in the development of non-timber forest products regard this as basically a technical and economic challenge. There is much discussion of the economic values of these products and much analysis of the costs and benefits of

returns from various products compared with those from other uses of the forest (e.g., by logger or shifting cultivator). In fact the importance of political-economic factors may make such fine cost-accounting irrelevant - if not harmful since it draws attention away from the real issues. The analysis presented here shows that the most important issue may be not the size or efficiency of the return but rather who receives it (and who might like to receive it instead).

The development of non-timber forest products is not firstly a technological and economic challenge, therefore; it is first and foremost a political challenge, involving mediation of relations between forest peoples and the state. This is attested to by the very different outcomes of Para rubber development in Southeast Asia and South America. The tree, the plant, is identical, but the two histories are completely dissimilar. This illustrates once again the ability of political-economic factors to overpower biological factors in tropical forest development.

ENDNOTES

1. This analysis was written during the tenure of a fellowship at the East-West Population Institute, with partial funding support from the Demographic Data Initiatives Project through a cooperative agreement (DPE-3046-A-00-8050-00) with the United States Agency for International Development and the East-West Center. The field research upon which the analysis is based was supported by the National Science Foundation (Grant #GS-42605). None of the aforementioned organizations necessarily agrees with the analysis and opinions presented in the paper, however, for which the author alone is responsible.

2. Note that Padoch (1980:478), in contrast, maintains that among some Iban at least "The traditional 'Jungle produce' - damar, camphor, gutta-percha and rattan - has been replaced by the cutting and working into posts and shingles of Borneo ironwood or 'belian' (Eusideroxylon zwageri)".

3. Compare the development of rubber cultivation from outside of agriculture to the development of tree crops from within agriculture (see Eder 1981 on Philippine orchards).

4. I carried out research among the Kantu' for two years. The subgroup that I studied, the Melaban Kantu', live along a western, secondary tributary of the Kapuas river, which is two weeks' travel by river from the coast of Kalimantan (at Pontianak), and two days's travel by foot from the international border with Sarawak (at Lubok Antu). I gathered additional data during six years of subsequent work on Java, with periodic field trips to most of Indonesia's principal islands.

5. A rubber "smallholder" is defined in the literature as someone with less than 25 hectares (Barlow and Muharminto 1982:86). In practice, most smallholdings are much closer to the Kantu' average of approximately four hectares.

6. See Booth (1988:201) and Effendi (1985:108).

7. Gums, resins and latexes are all "exudates", viscous liquid compounds that are produced naturally by forest plants and emerge from injured tissues; latexes, as distinct from the other two products, are suspensions of salty, hydrocarbons and other organic compounds in waters (de Beer and McDermott 1989:37,38).

8. Richards (1981:106) also writes that gutta expeditions usually preceded migration. Lian (1988:118) writes more generally that the gathering of forest products was the historical genesis of the Iban custom of berjalai "expedition".

199

9. Latex-producing plants in Indonesia include, in addition to the introduced Para rubber, five other introduced trees, two native trees, two climbers, five lianas, and one climbing shrub (Anonymous 1935, cited in CAPD [1982:3525]).

10. It seems unlikely that the earlier-mentioned migration of the Kantu' to the Empanang valley is attributable to this boom in the European trade in the 1840s; because just four decades later, at the height of Kantu' settlement of the valley, they already numbered more than thirty longhouses (Dove 1985:11). This suggests that the trade that prompted the Kantu' migration, therefore, must have been the more ancient trade within the region.

11. A Modest resurgence in interest in "jelutong" began in 1922, with the discovery that it could be used in chewing gum (Burkill 1962 I:891).

12. The two most important native latexes - "gutta percha" from Palaquium spp., and "jelutong" from Dyera costulata - are still traded, albeit not in volumes approaching historic levels (de Beer and McDermott 1989:40).

13. The center of production was around the city and state of Para, from which the vernacular term for Hevea brasiliensis comes.

14. The effort to plant rubber in Asia was initiated "in order to maintain the world's supply, which was in danger of extinction", due to overly intensive and destructive exploitation in South America (Purseglove 1968:148).

15. Another traditional technology that resembled and thus may have facilitated the adoption of Para rubber was the cultivation of a wide variety of trees bearing fruit, oil and other valued (and in some cases marketed) commodities (cf. Cramb 1988:112). The perennial character of these crops may suggest, however, that this technology did not itself develop until the sedentarization of Borneo's tribal peoples, and their adoption of rubber, was relatively well advanced.

16. Some sources of gutta-percha, however, had to be felled to obtain their latex (Burkill 1962 II:1651); and even those trees that could be exploited by tapping quickly succumbed to pests or disease. On the other hand, this was also to some extent true of Para rubber until an improved tapping technology was developed, as a result of painstaking research in Southeast Asia. Traditional methods of tapping, employing the hatchet in South America and the cutlass in Southeast Asia, were harmful to the tree (Barlow 1978:21-22; Purseglove 1968:161-164).

17. Lindblad (1988:115) erroneously concludes that Para rubber production responds more slowly to market conditions than the production of gutta-percha, because of the time-lag from rubber-

planting to maturity. In the short-term, however, the response mechanism for Para rubber is not planting but resumption of tapping, which consumes only 2-4 days - which is far shorter than the time required to find and exploit a stand of gutta-yielding trees in the forest.

18. The causal direction here is actually two-way: that is, the adoption of rubber to some extent promoted - just as it was promoted by - the intensification of swidden agriculture. Possession of producing rubber gardens provided an incentive for a more sedentary pattern of settlement, for example.

19. Cf. Lian (1988:118) on a similar law among the Kenyah. This law obviously only applied to tree species whose latex was extracted by tapping, as opposed to felling.

20. Note this report of the destruction of jelutong trees, among others, from the Indonesian daily newspaper Suara Pembangunan (cited, in translation, in Down to Earth 1990:10): "A logging company identified only as PT SBK with a concession in Kotawaringin Timur district, Central Kalimantan is suspected of cutting down thousands of tengkawang [Isoptera spp. and Shorea spp.], pantung [Dyera spp.] and maja [Terminalia spp.?] trees which had provided local people with a source of income. The company has ignored the protests of the Riam Batang villagers, who used to make a reasonable living from the products - nuts and resins - from these trees".

21. In fact, the Kantu' say that their ancestors also planted some of the native rubber trees, in particular Palaquium spp., the major source of gutta-percha (cf. Wijk [1941] cited in CAPD [1982:1344] on planting of Dyera lowii & Dyera borneenis). Presumably such trees - especially if planted in proximity to a house or to some other easily recognized property - were less vulnerable than naturally grown trees in the middle of the forest.

22. Even Charles Brooke, otherwise known for his hostility to European plantation interests, gave Europeans a jelutong-processing monopoly in Sarawak (Reece 1988:28-29).

REFERENCES CITED

Barlow, Colin

1978 The Natural Rubber Industry: Its Development, Technology, and Economy in Malaysia. Kuala Lumpur: Oxford University Press.

Barlow, Colin and Muharminto

1982 The Rubber Smallholder Economy. Bulletin of Indonesian Economic Studies XVIII(2):86-119.

de Beer, Jenne H. and Melanie J. McDermott

1989 The Economic Value of Non-timber Forest Products in Southeast Asia: With Emphasis on Indonesia, Malaysia and Thailand. Amsterdam: Netherlands Committee for IUCN.

Boeke, J.H.

1953 Economics and Economic Policy of Dual Societies: As Exemplified by Indonesia. New York: Institute of Pacific Relations.

Booth, Anne

1988 Agricultural Development in Indonesia. Asian Studies Association of Australia, Southeast Asia Publications Series No. 16. Sydney: Allen and Unwin.

Burkill, I.H.

1962 A Dictionary of the Economic Products of the Malay Peninsula. Kuala Lumpur: Ministry of Agriculture and Cooperation.

Centre for Agricultural Publishing and Documentation (CAPD)

1982 Indonesian Forestry Abstracts: Dutch Literature until about 1960. Wageningen.

Cramb, R.A.

1988 The Commercialization of Iban Agriculture. In Development in Sarawak: Historical and Contemporary Perspectives, R.A. Cramb and R.H.W. Reece eds., pp. 105-134. Monash Paper on Southeast Asia No. 17, Center of Southeast Asian Studies, Monash University.

Dillon, H.S.

1985 Development of Rubber Smallholders in North Sumatra. In Smallholder Rubber Production and Policies: Proceedings of an International Workshop held at the University of Adelaide, pp.116-126. Canberra: ACIAR.

Dove, Michael R.

1985 Swidden Agriculture in Indonesia: The Subsistence Strategies of the Kalimantan Kantu'. Berlin: Mouton.

Down to Earth

1990 'Loggers Destroy Local Forest Product Supplies', No.7 (March):10.

Drake, Richard Allen

1982 The Material Provisioning of Mualang Society in Hinterland Kalimantan Barat, Indonesia. Ph.D. dissertation, Michigan State University.

Dunn, F.L.

1975 Rain-Forest Collectors and Traders: A Study of Resource Utilization in Modern and Ancient Malaya. Monographs of the Malaysian Branch of the Royal Asiatic Society, No.5.

Eder, James F.

1981 From Grain Crops to Tree Crops in the Cuyunon Swidden System.

In Adaptive Strategies and Change in Philippine Swidden-Based Societies, Harold Olofson ed., pp.91-104. Laguna: Forest Research Institute.

Effendi, Suryatna

1985 Improvement of Smallholder Rubber Farming Productivity in Indonesia. In ACIAR, pp.108-115.

Freeman, J.D.

1970 Report on the Iban. London: The Athlone Press.

Geddes, W.R.

1954 The Land Dayaks of Sarawak. Colonial Research Study No. 14. London: H.M.S.O.

Hudson, Alfred B.

1967 Padju Epat: The Ethnography and Social Structure of a Ma'anyan Dajak Group in Southeastern Borneo. Ph.D. dissertation, Cornell University.

Jessup, Timothy C. and Andrew P. Vayda

1988 Dayaks and Forests of Interior Borneo. Expedition 30(1):5-17.

King, Victor T.

1988 Social Rank and Social Change among the Maloh. In The Real and Imagined Role of Culture in Development, Michael R. Dove ed., pp.219-253. Honolulu: University of Hawaii Press.

Lian, Francis J.

1988 The Economics and Ecology of the Production of the Tropical,Rainforest Resources by Tribal Groups of Sarawak, Borneo. In Dargavel et al. pp.113-125.

Lindblad, J. Thomas

1988 Between Dayak and Dutch: The Economic History of Southeast Kalimantan, 1880-1942, Verhandelingen No.134. Dordrecht: Foris Publications.

Murphy, Robert F.

1960/1978 Headhunter's Heritage: Social and Economic Change Among the Mundurucu Indians. New York:Octagon Books (reprint).

Padoch, Christine

1980 The Environmental and demographic Effects of Alternative Cash-Producing Activities among Shifting Cultivators in Sarawak. In Tropical Ecology and Development, J.I. Furtado ed., pp.475-481. Kuala Lumpur: International Society of Tropical Ecology.

1988 People of the Floodplain and Forest. In People of the Tropical Rain Forest, Julie Sloan Denslow and Christine Padoch eds., pp.127-141. Berkeley: University of California Press.

Peluso, Nancy P.

1983 Markets and Merchants: The Forest Product Trade of East Kalimantan in Historical Perspective. M.Sc. thesis, Cornell University.

Potter, Lesley

1988 Indigenes and Colonisers: Dutch Forest Policy in South and East Borneo (Kalimantan), 1900 to 1950. In Dargavel et al. pp.127-149.

Purseglove, J.W.

1968 Tropical Crops: Dicotyledons. Harlow (U.K.): Longman.

Reece, R.H.W.

1988 Economic Development Under the Brookes. In Cramb and Reece,

pp.21-34.

Richards, Anthony

1981 An Iban-English Dictionary. Oxford: Clarendon Press.

Sandin, Benedict

1980 Iban Adat and Augury. Penang: Universiti Sains Malaysia.

Thee, Kian-Wie

1977 Plantation Agriculture and Export Growth: An Economic History of East Sumatra, 1863-1942. Jakarta: LEKNAS-LIPI.

Tremeer, R.E.

1964 The Early History of Rubber Planting in Sarawak, 1880-1910. Sarawak Gazzette 90:50-52.

Weinstock, Joseph A. and Napoleon T. Vergara

1987 Land or Plants: Agricultural Tenure in Agroforestry Systems. Economic Botany 41,2:312-322.

Wolf, Eric R.

1966 Peasants. Englewood Cliffs: New Jersey.

Wolters, O.

1967 Early Indonesian Commerce. Ithaca: Cornell University Press.

COMPLETENESS OF CONTRACEPTIVE USE DATA IN THE 1987 THAILAND DEMOGRAPHIC AND HEALTH SURVEY

East-West Center
East-West Population Institute
1777 East-West Road
Honolulu, Hawaii 96848

May 1991

-207-

COMPLETENESS OF CONTRACEPTIVE USE DATA IN THE 1987 THAILAND DEMOGRAPHIC AND HEALTH SURVEY

Minja Kim Choe
Research Associate
East-West Population Institute
East-West Center, Honolulu

Kua Wongboonsin
Deputy Director and Associate Professor
Institute of Population Studies
Chulalongkorn University, Bangkok

and

Varachai Thongthai
Deputy director and Assistant Professor
Institute for Population and Social Research
Mahidol University, Bangkok

May 1991

Acknowledgements

The study reported here used data from the 1987 Thailand Demographic and Health Survey (TDHS) and the 1987 Determinants and Consequences of Contraceptive Use Pattern in Thailand (CUPS). The 1987 TDHS was funded by the United States Agency for International Development (AID) and was conducted jointly by the Institute of Population Studies, Chulalongkorn University and the Institute for Resource Development, Columbia, Maryland. The CUPS was supported by a grant from the Special Programme of Research, Development, and Research Training in Human Reproduction, World Health Organization and was conducted by the Institute for Population and Social Research, Mahidol University.

Most of the analysis for this report was carried out at the East-West Population Institute, East-West Center in Honolulu with funding support provided by the Demographic Data Initiatives Project through a Cooperative Agreement (DPE-3046-A-8050-00) between the Agency for International Development and the East- West Center. These funds included Research Fellowships at EWPI for Kua Wongboonsin, April 1 to May 22, 1991 and Varachai Thongthai, March 25 to May 10, 1991.

Introduction

Demographic surveys such as World Fertility Survey, Contraceptive Prevalence Survey, and Demographic and Health Surveys typically include women's past history of contraceptive use. Unlike the follow up surveys of new acceptors of contraceptive methods, these data sets provide information on women's attitude and behavior about the use of contraceptives for a cross section of the population. For this reason, many efforts have been made recently to study women's contraceptive use behavior using these data sets (for a comprehensive review, see Jejeebhoy, 1991). At the same time, some problems and limitations on the use such data sets have been identified and discussed (Pebley et al., 1986; Goldman et al, 1991).

A desirable data collecting scheme for estimation of contraceptive use dynamics would be a prospective study that follows a representative sample of contraceptive users for a period of time, collecting information on their use continuation, switching, stopping, failure, together with reasons for these behavior and basic background characteristics. However, such schemes require resources that are rarely affordable and therefore are rarely carried out except for a few places (Matlab Extension project in Bangladesh is one such example). Most commonly used method of collecting data on contraceptive resort to cross sectional surveys which gather information on contraceptive

behavior retrospectively. Completeness and accuracy of a retrospective survey data require good questionnaire design and ability of respondents to provide accurate recall of events and dates of events. A recent review of different methods of collecting data on contraceptive use retrospectively concluded that one method of questioning proposed by J. Laing (1985) -- through a month-by-month calendar spanning a set period prior to the interview provided superior estimates of contraceptive use dynamics in comparison to other methods of data collection (United Nations, 1991, Chapter II). In this paper, we examine the completeness of contraceptive use data in one of recent surveys conducted in Thailand, the 1987 Thailand Demographic and Health Survey (TDHS). Our analysis is focused on the completeness of the data for their use in estimating contraceptive use prevalence at times prior to the date of survey, and in estimating contraceptive use continuation rates and failure rates in the recent past.

Sources of errors in retrospective surveys

The possible sources of errors on contraceptive use information in a retrospective surveys can be classified into two categories: those due to survey design and those due to respondent errors. Survey design may be such that (1) only partial information on contraceptive use are collected, (2) the information collected is not

representative of all use episodes, or (3) it does not facilitate accurate collection and recording of information.

Respondent errors may result in (4) incomplete recording of use episodes, (5) inaccurate recording of dates, (6) misreporting of pregnancies resulting from contraceptive failures as planned pregnancies, and (7) unrecorded pregnancies resulting from contraceptive failures ending in fetal losses. The extent of respondent errors on contraceptive use in the past may depend on the time of events and nature of contraceptive use episodes. Events that took place long time before the survey may be subject to higher rates of omissions and erroneous information. The contraceptive use episodes of short durations and of methods that are temporary in nature such as periodic abstinences, barrier methods (condoms, diaphragms, spermicides, etc) and oral contraceptives are more likely to be underreported and/or reported with erroneous dates and durations.

Contraceptive use data in TDHS

The 1987 TDHS employed a questionnaire in which the Demographic and Health Survey (DHS) model A questionnaire was extended with additional questions on recent contraceptive practice. The standard set of questions in the DHS model A on use of contraceptives depend on whether a woman was using a contraceptive method at the time of survey. For women who were using a method, the current

method and its duration of use, previous method used in the open birth interval, date of beginning of the use, and duration of use were ascertained. For women not currently using a method, information on type of method, date of beginning of use, and duration of use were obtained only for the last method used in the open birth interval. In addition, information on use were collected for the interval preceding each birth during last five years from all women. The information on types of use were collected for up to two methods for each interval but the information on duration of use and reason for discontinuation were collected only for the last method used in each interval. For these episodes, the dates of beginning and ending of the duration of use were not collected.

The TDHS conducted in 1987, in an effort to obtain more complete contraceptive use history data, also collected information on the first method used in the open birth interval including the type of method and the starting date of use if it is different from any of the methods already specified (current or the previous method). For this method the duration of use and reason for discontinuation were also collected if the woman was using a contraceptive method at the time of survey. Thus, the survey collected at most three contraceptive use episodes from women who were using some kind of contraceptives at the time of survey, and two from women who were not using contraceptives at the time of survey.

Assuming that the information in the TDHS on recent contraceptive use is reasonably complete and accurate, Laing and Wongboonsin used it to estimate ontraceptive use continuation and failure rates in Thailand (1991). They had to make some assumptions about the duration of use, starting date or ending date of the duration of use, and reason for discontinuation for some of the use episodes.

The examination on the completeness and accuracy of contraceptive use data reported here is made indirectly by comparing information in the TDHS data with those from another survey data collected at about same time in Thailand using a contraceptive use calendar method. The Contraceptive Use Pattern Survey (CUPS) conducted in 1987 collected information on contraceptive use during five years period preceding the survey using the monthly contraceptive use status calendar to ascertain contraceptive use status for each month from January 1982 to the month of survey.

Contraceptive use status calendar in CUPS

The data collected in the CUPS contraceptive use status calendar and the procedures used in collecting information are summarized below. Interviewers were instructed to review the pregnancy history, and for each pregnancy that started in January 1982 or later, enter information on months of termination of pregnancy, results of pregnancy (live birth or fetal loss), and duration of gestations in

the calendar. For the months between gestations, women were asked about contraceptive uses. For the months of uses codes for contraceptive methods were entered, and for the months of non-use, reasons for not using were entered. Postpartum amenorrheic periods were also ascertained and were combined with use or non-use codes as appropriate. If a woman was using more than one contraceptive method at any time, only the most efficient method was coded. Codes for the first month of gestation indicate whether the pregnancy was the result of a contraceptive failure (and if so, what method) or not. Hence, the information available in the monthly basis are contraceptive method in use, reason for not using contraceptives, conception, gestation, pregnancy outcome, and postpartum amenorrhea.

The interviewers were recent college graduates who could speak local dialect fluently. They were trained and supervised by researchers of the Institute for Population and Social Research, Mahidol University. More information on interviewer training and field work are described elsewhere (Leoprapai and Thongthai, 1989). The calendar portion of the questionnaire did not pose special problems for interviewers. During first few days of interview when many inquiries are made about the questionnaire from the interviewers, the inquiries about the calendar were not much different from inquiries about other parts of the questionnaire.

Comparison of TDHS and CUPS data

Both TDHS and CUPS data consist of nationally representative sample of ever married women aged 15-49. Table 1 shows the age distributions of the women included in two surveys and mean parities for women in 5-year age groups. The tables shows that two data sets are quite comparable in terms of age distribution and cumulative fertility. Proportions of women in the age ranges 20-24, 25-29, and 30-34 are slightly higher in the CUPS data and women in the age range ranges 40-44 and 45-49 are slightly higher in the TDHS data. The cumulative fertility in two data sets are very close in each age group. Because age distribution of women in TDHS data are slightly older than CUPS, the average cumulative fertility is slightly higher for TDHS data.

Table 2 shows percent of currently married women aged 15-44 who were using contraceptives at the time of survey in the two sets of data. The contraceptive prevalence is slightly higher in the CUPS data due to higher prevalence among older women and higher prevalence of sterilizations. The prevalence of pills, IUDs, and injectables and very similar in two surveys. The prevalence of other contraceptive methods including condoms, rhythm methods, and withdrawal is slightly higher in the CUPS survey. We conclude that the amples in two data sets are reasonably comparable to each other for analyzing trends in contraceptive use and their dynamics.

Trend in use prevalence

From CUPS data, contraceptive use prevalence in the past can be computed directly from use status calendar. From the TDHS data, we estimate the contraceptive use prevalence in the past first by creating a simulated contraceptive use status calendar. Simulation of use calendar is based on the information directly available from the questionnaire in TDHS and the following assumptions about starting and ending dates of contraceptive use and reasons for discontinuations.

Assumption 1. For women who were not using a contraceptive method at the time of survey and had more than one use episode in the open birth interval, we have information on the starting date of use for the first method but no information on the duration of use and reason for stopping. We assume that the first use episode ended just prior to the last episode, and the reason for stopping is to switch to different method.

Assumption 2. For contraceptive use episodes in closed intervals, only limited information is available. For the last episode, we have information on the method used, duration of use, and reason for stopping, but no information on starting and ending dates of use. We assume that the ending date is 9 months prior to the birth of next child if the reason for stopping is contraceptive failure, and 17

months prior to the date of last birth if the reason for stopping is other than contraceptive failure.

The assumptions 1 and 2 listed above were used also by Laing and Wongboonsin in their work estimating contraceptive use effectiveness and continuation rates (Laing and Wongboonsin, 1991).

Assumption 3 If a woman experienced more than one contraceptive use episode in a closed birth interval, we only have the type of method available. We assume that women experienced maximum of two contraceptive use episodes in any closed interval and that if there were two episodes, the first episode started in the month following the termination of pregnancy and ended in the month preceding the beginning of the next use episode.

The assumptions we make will tend to over-estimate the contraceptive use prevalence to some extent. But the extent of over-estimation is not believed to be large because the number of use episodes subject to these conditions are believed to be small.

Estimated contraceptive use prevalence rates based on TDHS and CUPS data are shown in Figure 1 for all methods for the period included in the contraceptive use status calendar: January 1982 to May 1987. Figures 2 through 6 show prevalence of specific methods: sterilizations, IUD, pills, injections, and other less effective methods. The contraceptive use prevalence from The Third Contraceptive Prevalence Survey provide additional estimate for May 1984

(midpoint of the survey dates) which are also indicated on Figures 1 through 6.

The over all contraceptive use prevalence rate estimated from the TDHS data are lower than that estimated from the CUPS data at all times. The difference is relatively small at the time of survey and for about one year period preceding the survey, estimates from CUPS data showing about 6 percentage points higher than the TDHS data based estimates. The difference widens considerably during the period 12-24 months preceding the survey. By twenty-four months prior to survey, the difference widens to 12 percentage points and remained at about same level to the beginning of the calendar. For some methods such as sterilizations and IUD, the differences in the prevalence are small and more or less constant throughout the calendar period. The differences are larger and for pills, injectables, and other less effective methods.

The estimated prevalence of pills are most problematic. The difference in estimated prevalence from two sources of data becomes larger as we go further back in time from the date of survey. Both data sets provide about same level of prevalence of pills at the time of survey at about 20 percent among currently married women. One year prior to survey, the difference in prevalence estimated from two data sources is 3.6 percent (19 percent relative difference), and two years prior to survey, the difference is 5.3 percent (28 percent relative difference). Three years prior to survey

the difference is 6 percent (relative difference 29 percent). For the time three years prior to the survey we have another estimate of pill prevalence from the Third Contraceptive Prevalence Survey which shows 19.8 percent, the level very close to the estimate from the CUPS data. We can conclude tentatively that prevalence of pills in the past from the CUPS calendar data are quite accurate but the estimate from the TDHS data are too low.

Although our assumptions on the starting and ending dates of contracpetive use episodes are likely to exaggerate the use prevalence in the past slightly, the use prevalence from TDHS data seem to be lower than actual, the underestimation being more serious for the time as we go further back in time from the survey data. Methods such as pills and barrier methods seem to have more severe underreporting problems than other methods such as sterilizations and IUDs. It is reasonable to suspect that these temporary methods are often used for a very short period of time and are likely to be underreported in the usual retrospective method of collecting contraceptive use data such as "last method used" and "the first method used in the interval." The month-to-month probing employed in the calendar approach such as that used in the CUPS seem to be more accurate in estimating the past prevalence by facilitating more complete reporting of use episodes.

Number of contraceptive use episodes

As discussed earlier, the TDHS data collected up to two contraceptive use episodes in each closed birth intervals. In an effort to see whether this limitation of two methods per closed birth interval would affect the completeness and accuracy of contraceptive use data, we tabulated the number of contraceptive use episodes in closed birth intervals included in the 5-year status calendar. Table 4 shows that the number of women who experienced 3 or more use episodes are substantial although not very large. By limiting the number of use episodes in closed birth intervals at two, we may miss about 7 percent of use episodes.

Table 5 shows the distribution of women by number of use episodes in the open interval in CUPS data. By limiting use episodes to two or three depending on the current use states results in about 5 percent undercount of use episodes. By adding question on the first method used in the closed interval, about 17 percent of the use episodes and be added to what would have resulted if the DHS model A questionnaire were used.

Staring and ending dates of use episodes

To analyze the contraceptive use history data in TDHS, we had to make assumptions about missing information on starting and ending dates of use episodes in the closed

birth interval. One of the assumtions made was that the first method used in a closed interval (for women who used more than one method in a closed interval) began right after the birth initiating the interval. To see if this assumption is reasonable we tabulated the distribution of number of months between birth and adoption of contraceptives in Table 6. It shows that although most women begin to use contraceptive soon after giving birth, on the average there is a few month gap (mean is 4.7 months).

Another assumption we made on the missing dates is that for the women who stopped using contraceptives for reasons other than contraceptive failure, the mean waiting time until conception was 8 months. Table 7 shows the distribution of interval (in months) between ending date of contraceptive use and next birth for those who stopped using contraceptives for reasons other than contraceptive failures. The mean interval is 16.5 months, indicating that our assumption (mean interval of 17 months) is quite reasonable.

We also made an assumption that for women who used more than one contraceptive method, there was no gap between the end of one method and the begginning of the next method. Table 8 shows the distribution of inter-episode intervals within a closed interval included in the use status calendar of CUPS. It shows that nearly all women who switch contraceptive methods within a closed interval do so without any inter-episode intervals of non-use.

Pregnancy wastages

One source of error in estimated contraceptive failure rate is under-reporting of contraceptive failures that resulted in fetal loss. In TDHS data, where the data on the use of contraceptives were obtained in reference to live birth, the extent of such errors may be substantial. Table 9 shows that pregnancies that resulted from contraceptive failures are much more likely to end as fetal loss compared to planned pregnancies in CUPS data. Because TDHS data uses live births as reference points to obtain contraceptive use history and CUPS uses pregnancies as reference points, it is more likely that use episodes that resulted in failure and fetal loss are underreported in TDHS.

Implications

The design of TDHS is definitely an improvement over model A core DHS for obtaining the contraceptive use history data. In estimating the contraceptive prevalence in the past, the missing episodes due to questionnaire design and the exaggerated use durations resulting from assumptions made on the missing dates of beginning and ending of use episodes are likely to cancel each other. These assumptions, however, are likely to affect use failure rates and continuation rates. Estimated use failure rates would be

too low because of (1) underreporting of use episodes that end in failure and (2) exaggerated use durations. For the same reason, estimated use continuation rates would be too high.

The poor performance of the TDHS data in estimating past prevalence must be due to reasons other than the study design that directly affects the collection of complete contraceptive use histories. The likely explanation is that the collection of contraceptive use information may by more complete if pregnancies rather than the live births are used as references. We do not know whether TDHS type approach, if combined with pregnancy histories, rather than live birth histories will provide more complete reporting of contraceptive use information in the past. The calendar approach used in the CUPS data seems to facilitate women to report past contraceptive use much more completely than the TDHS approach.

Conclusion

The Thai Demographic and Health Survey is definitely an improvement over the standard DHS model A questionnaire for collecting accurate contraceptive use history. The TDHS design is still unsatisfactory to obtainging accurate level of contraceptive use in the past, especially for the methods used for short durations. The calendar method of collecting contraceptive use data facilitate more accurate and complete

reporting of use episodes. The information collected in the calendar would be more useful if we have information on length of use at the beginning of the calendar for the users (Wongboonsin, Thongthai, and Choe, 1991). The CUPS experience document that the calendar approach is not excessively difficult or expensive. For these reasons, the collection of contraceptive use data through a calendar approach is recommended.

References

Chayovan, Napaporn, P. Kamnuansilpa, and J. Knodel. 1988. Thailand Dempgraphic and Health Survey 1987. Bangkok: Institute of Population Studies, Chulalongkorn University.

Goldman, Noreen, L. Morenzo, C. F. Westoff, and B. Vaughn. 1991. "Estimates of Contraceptive Failure and Discontinuation Based on Two Methods of Contraceptive Data Collection in Peru." Pp. 171-183 in United Nations (Department of International Economic and Social Statistics), Measuring the Dynamics of Contraceptive Use. New York: United Nations.

Jejeebhoy, Shireen. 1991. "Measuring Contraceptive Use-Failure and Continuation: An Overview of New Approaches," pp.21-51 in United Nations (Department of International Economic and Social Statistics), Measuring the Dynamics of Contraceptive Use. New York: United Nations.

Laing, John. 1985. Continuation and Effectiveness of Contraceptive Practice: A Cross-Sectional Approach," Studies in Family Planning 16(3).

Laing, John and K. Wongboonsin. 1991. Findings on Contraceptive Use-Effectiveness from the 1987 Thailand Demptraphic and Health Survey. Papers of the East-West Poplation Institute. Forthcoming.

Leoprapati, Boonlert and V. Thongthai. 1989. Contraceptive Practice of Thai Women 1987. Salaya, Thailand: Institute for Population and Social Research, Mahidol University.

Pebley Anne R., N. Goldman, and M. K. Choe. 1986. "Evaluation of Contraceptive History Data in the Republic of Korea," Studies in Family Planning 17(1).

United Nations (Department of International Economic and Social Statistics). 1991. Measuring the Dynamics of Contraceptive Use. New York: United Nations.

Wongboosin, Kua, V. Thongthai, and M. C. Choe. 1991. "Contraceptive Use Failure and Continuation Based on Two Methods of Contraceptive Data Collection in

Thailand." Unpulished manuscript. Honolulu: East-West Center.

Table 1. Percent distribution of ever married women and mean parity by age group from CUPS and TDHS data, 1987

Age group	Percent distribution		Mean parity	
	CUPS	TDHS	CUPS	TDHS
15-19	4.1	5.0	0.7	0.5
20-24	17.0	14.8	1.2	1.2
25-29	22.3	19.3	1.9	1.8
30-34	21.6	19.6	2.5	2.5
35-39	16.9	16.4	3.3	3.3
40-44	10.7	12.9	5.0	5.2
45-49	7.4	11.9	5.0	5.2
Total	100.0	100.0	2.6	2.8
No. of women	6,835	6,775		

Sources: Leoprapai and Thongthai, 1989: Tables 3.1 and 3.3; Chayovan, Kamnuansilpa, and Knodel, 1988: Tables 1.2 and 3.5

Table 2. Percent of currently married women aged 15-44 who are using Contraceptives by women's age group and by method from CUPS and TDHS

		Percent using	
		CUPS	TDHS
Age group:	15-19	51.5	43.0
	20-24	59.9	56.8
	25-29	69.4	69.1
	30-34	76.0	75.0
	35-39	79.2	73.3
	40-44	73.2	69.4
Method:	Sterilizations	29.2	27.9
	Pills	19.9	20.0
	IUD	6.2	7.2
	Injectables	10.9	9.2
	Condoms	1.9	1.2
	Rhythm	0.9	1.0
	Withdrawal	1.2	0.9
	Others	0.5	0.1
Total		70.5	67.5

Sources: Leoprapai and Thongthai, 1989: Tables 5.1 and 6.1; Chayovan, Kamnuansilpa, and Knodel, 1988: Tables 4.5, 4.6, and 4.7.

Table 3. Contraceptive prevalence in May 1984 among currently married women from the Third Contraceptive Prevalence Survey (CPS3), CUPS, and TDHS

Method	Percnet using		
	CPS3[a]	CUPS	TDHS
Sterilizations	27.9	25.7	24.2
IUD	4.9	5.3	4.0
Pills	19.8	20.6	14.6
Injectables	7.6	7.5	5.3
Others	4.4	3.4	2.0
Total	64.6	62.6	50.1

Sources: a. Leoparapai and Thongthai, 1989: Table 5.1; Chayovan, Kamnuansilpa, and Knodel, 1988: Table 4.7.

Table 4. Of women who had at least two live births during the 5-year period preceding the survey, distribution of number of contraceptives used in the last closed birth interval, CUPS data

Number of contraceptives used	Number of women
0	529
1	303
2	83
3	18
4	6
5 or more	3

Table 5. Of women who had last birth during the 5-year period preceding the surveym distribution of number of contraceptives used in the open birth interval, CUPS data

Number of contraceptives used	Number of women
0	714
1	1,522
2	1,083
3	184
4	32
5 or more	17

Table 6. Of women whose last closed interval was within the 5 years period preceding the survey and who used a contraceptives in the last birth interval, distribution of interval between the birth of next to last child and the beginning of contraceptive use (in months), CUPS data

Months between end of use and conception	Number of women
0	92
1-3	139
4-6	71
7-9	33
10-12	39
13-15	25
16+	17
Total	426

Table 7. Of women whose last closed interval was within the 5 years period preceding the survey and who used a contraceptives in the last birth interval, distribution of interval between the end of contraceptive use and the birth of last child (in months), CUPS data

Months between end of use and conception	Number of women
Uner 7	2
7	7
8	85
9	72
10	46
11	44
12	26
13	15
14	20
15-17	38
18-20	15
21-23	8
24+	36

Table 8. Of women whose last closed interval was within the 5 years period preceding the survey and who used at least two contraceptive methods, distribution of interval between the end of a contraceptive use and the beginning of the next contraeptive use (in months), CUPS data

Months between end of use and conception	Number of women
0	137
1	1
2	1
3	1
4	0
5+	4

Table 9. Of pregnancies that ended during the 5-year period preceding the survey, proportion of pregnancies ending in live births and fetal loss by whether the pregnany was planned or not, CUPS 1987 data

Planned status	Number of Pregnancies	Percentage of ending in	
		Live births	Fetal loss
Planned	1,881	93.3	6.7
Contraceptive failure	143	77.5	22.5
Total	2,024	92.1	7.9

Figure 1. Percent using any contraceptive methods among ever-married women aged 15-44 according to TDHS and CUPS data, 1982-1987

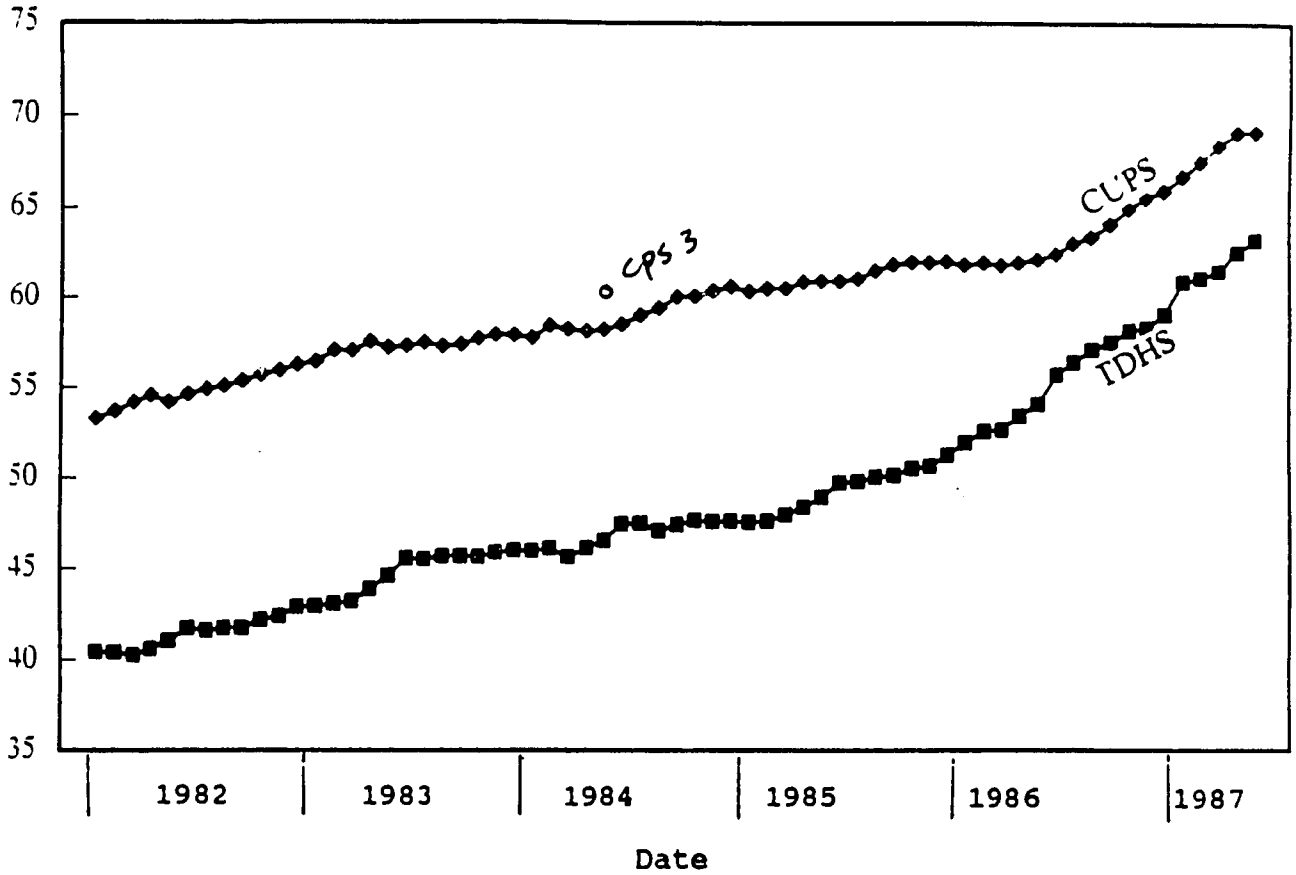


Figure 2. Percent using sterilization among ever-married women aged 15-44 according to TDHS and CUPS data, 1982-1987

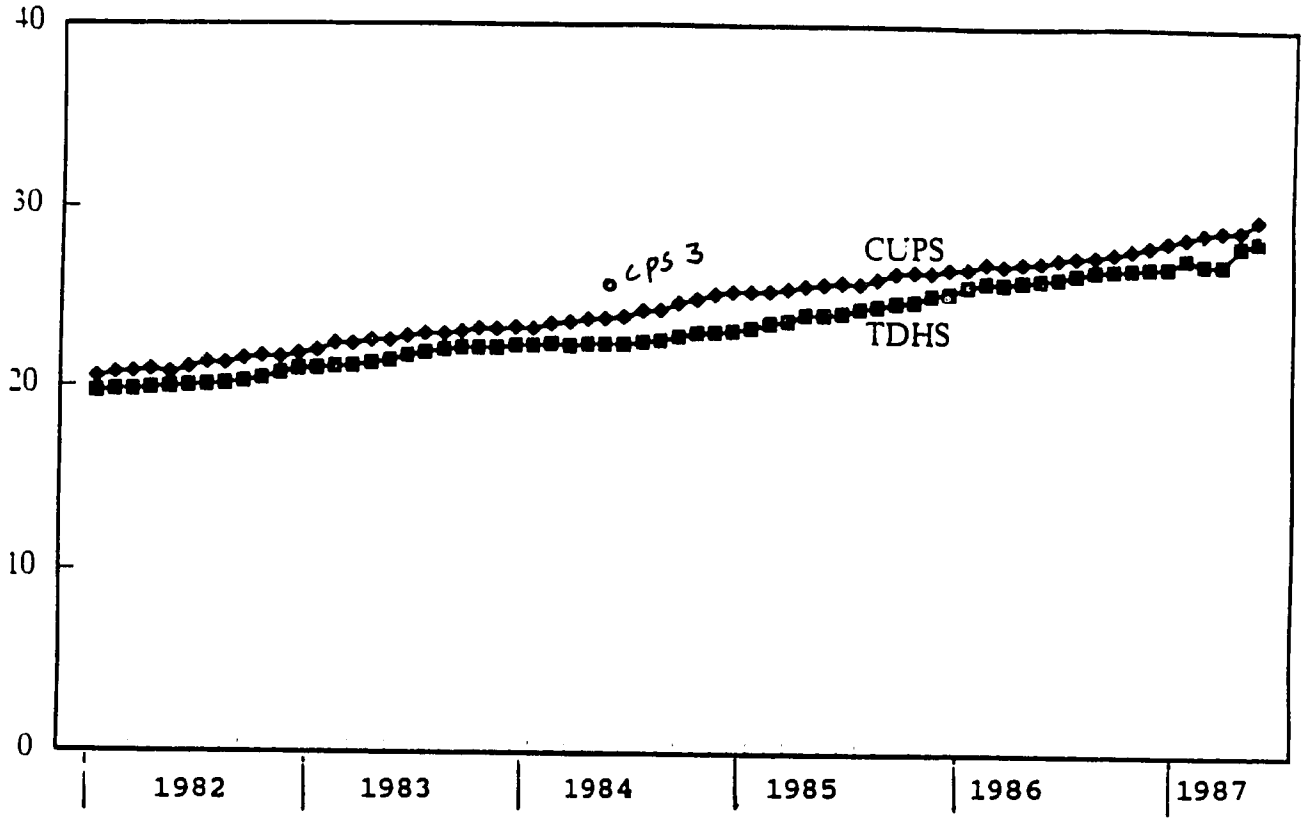


Figure 3. Percent using IUD among ever-married women aged 15-44 according to TDHS and CUPS data, 1982-1987

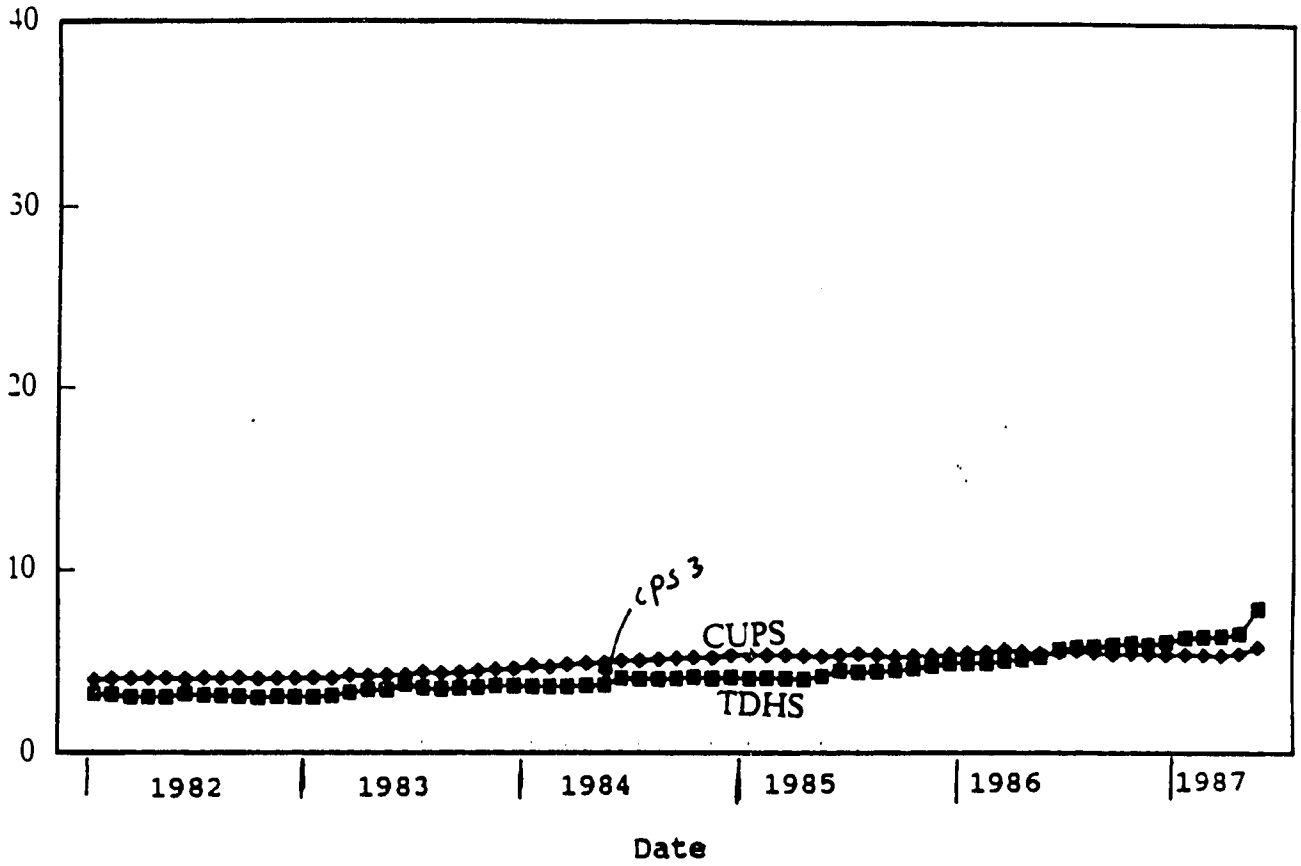


Figure 4. Percent using pills among ever-married women aged 15-44 according to TDHS and CUPS data, 1982-1987

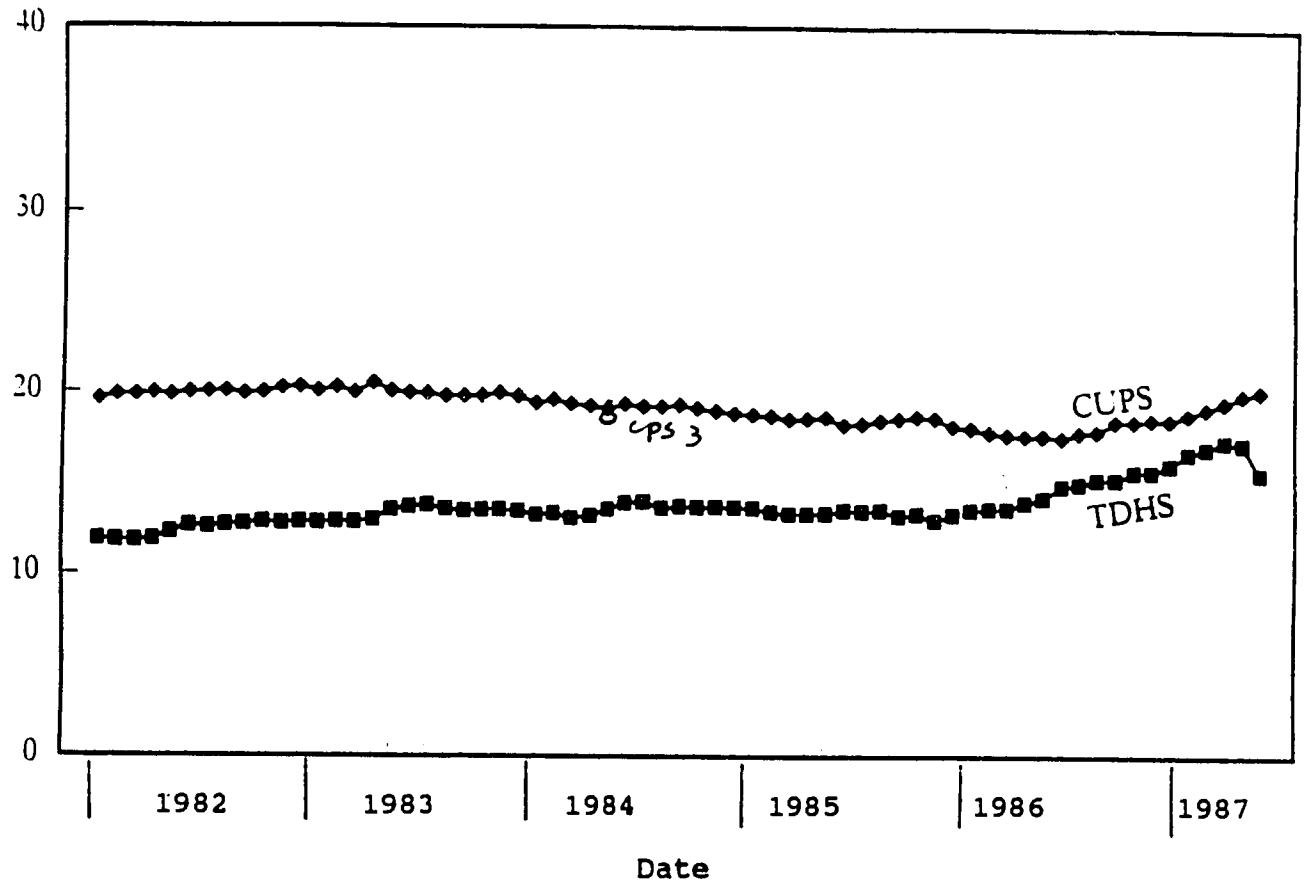


Figure 5. Percent using injectables among ever-married women aged 15-44 according to TDHS and CUPS data, 1982-1987

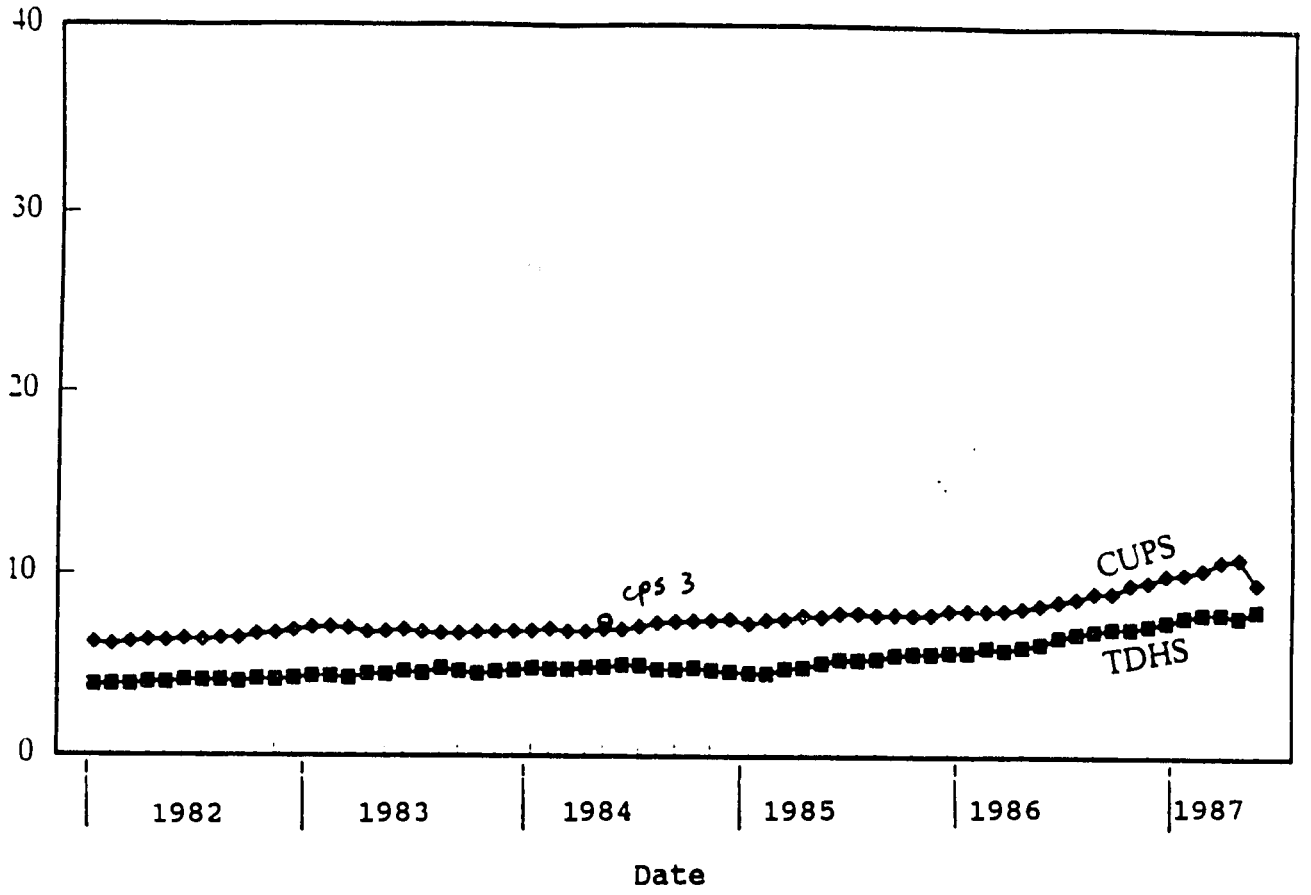
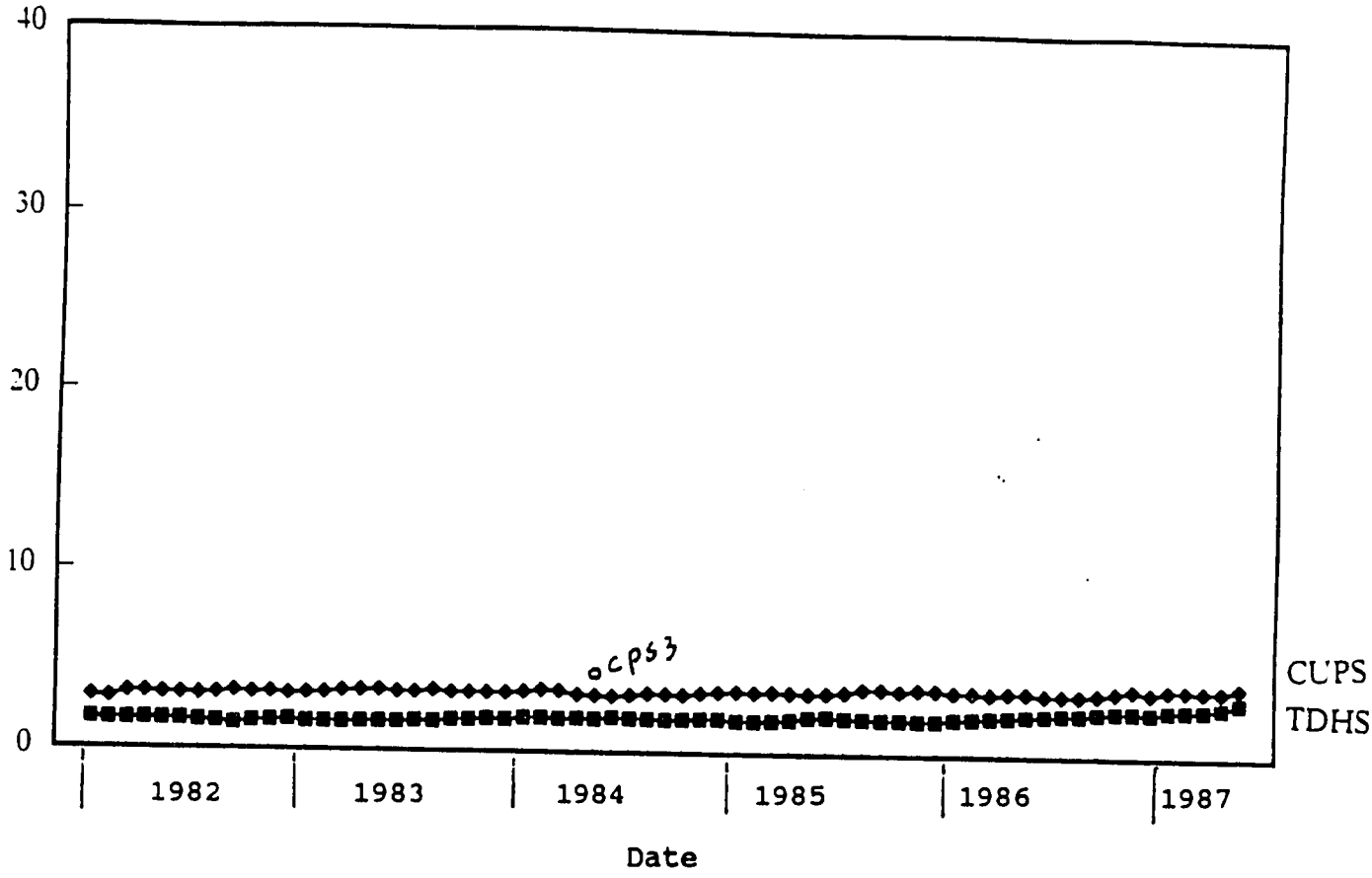


Figure 6. Percent using less effective methods among ever-married women aged 15-44 according to TDHS and CUPS data, 1982-1987



CHILD CARE IN THAILAND: DETERMINANTS AND HEALTH CONSEQUENCES FOR PRESCHOOL-AGED CHILDREN

East-West Center
East-West Population Institute
1777 East-West Road
Honolulu, Hawaii 96848

May 1991

CHILD CARE IN THAILAND: DETERMINANTS AND HEALTH CONSEQUENCES FOR PRESCHOOL-AGED CHILDREN

Kua Wongboonsin
Institute of Population Studies
Chulalongkorn University
Bangkok, Thailand

Karen Oppenheim Mason
Population Institute
East-West Center
Honolulu, Hawaii

Minja Kim Choe
Population Institute
East-West Center
Honolulu, Hawaii

Draft: 20 May 1991

Paper prepared for the U.S. Agency for International Development under Cooperative Agreement No. DPE-3046-A-00-8050-00 with the East-West Center. A shorter version of this paper will be presented at the annual meeting of the American Sociological Association, Cincinnati, OH, August 23-27, 1991.

ABSTRACT

Data from a probability sample of children of mothers of reproductive age residing in metropolitan Bangkok, Thailand, in 1990 are used to explore the determinants and health consequences of alternative child care arrangements for preschool-aged children. Non-maternal child care arrangements have become more common over time in Bangkok, a change that is attributable to some combination of declining fertility, rising educational attainment of women, and increased female labor force participation rates. Despite the trend over time, the predominant arrangement for children in the first three years of life remains care by the mother. Among older preschool-aged children (ages 3-5), however, attendance at kindergartens and other early schools is as common as is care by the mother. Child care arrangements vary systematically not only by child's age, but also by the mother's employment and socio-economic status, with employed, higher status women generally providing less care themselves than their non-employed or lower status counterparts. There is no evidence that the type of child care currently being used contributes to children's acute illnesses, although the lack of a relationship may reflect the nature of the measures used.

INTRODUCTION

Although economic development promises an improved life for many in the Third World, it often creates new challenges as well. One of these new challenges in the urban areas of developing countries is how young children are cared for. Modernization and economic growth seem likely to alter traditional child care arrangements for at least three reasons. The first is a loss of older brothers and sisters from domestic work as family size becomes smaller and school attendance more important, something that undermines the use of older siblings as baby sitters. The second is the absorption of married women into wage work as the modern economic sector grows (a trend evident in many parts of Asia and Latin America). This may create new pressures for non-maternal child care. The third reason is the reduced availability of grandmothers and other adult females for child care as extended family living becomes less common and modern-sector employment in the older generation grows. Whether the combined impact of these demographic, educational, family and labor force trends has brought about new forms of child care in most Third World countries is not yet known. There is reason to think, however, that child care change is likely to occur in the near future and may have already done so, especially in rapidly developing urban areas like Bangkok's. Studies that assess changes in child care patterns, their causes and consequences, are thus much needed.

The current paper studies changing child care arrangements in urban Thailand, analyzing a 1990 survey of women with children living in the greater Bangkok metropolitan area. In this survey, women were asked to report both their current child care arrangements for children under age six, and, for all children, what these arrangements were between birth and age three. By restricting analysis of the retrospective questions to life-long Bangkok residents, we can determine whether child care arrangements for young preschool-aged children have changed over time. Through multivariate analysis, we can also explore the possible causes of such change,

including reduced fertility and rising labor force participation of mothers. The current child care question allows us to explore differentials in child care according to a wider range of variables than is available retrospectively. This question can also be used to explore possible health consequences of alternative child care arrangements, in particular, consequences for short-term (acute) illness.

BACKGROUND

Although Thailand is still a predominantly rural, developing country, during the past two decades it has changed profoundly in the areas likely to affect child care. Especially noteworthy are the rapid decline of fertility to a level that is within 1.5 children of the long-term replacement level (Knodel et al. 1987:5); changes in living arrangements that have made extended-family households less common (Limanonda 1990); rising educational levels for both girls and boys, so that primary schooling is now close to universal and secondary schooling increasingly common, especially in urban areas (Knodel et al. 1987:38-39; Kiranandana et al. 1989); and rising labor force participation rates among women, including married women (Hanenberg and Wongboonsin 1991). This last trend is especially noteworthy given traditionally high labor force participation rates among Thai women. For example, between 1985 and 1988, the percentage of Bangkok women aged 25-29 in the labor force rose from 68.3 to 77.0 (National Statistical Office 1985, 1988b). Thus, at the very ages when women are most likely to have young children, the vast majority are also working for pay.

Consistent with the trends noted above, which suggest a decreasing reliance on the mother or other close relatives for child care during the preschool-aged years, are trends in Bangkok in the availability of nurseries and day care centers (for children under age three) and kindergartens (for children ages three through five).[1] The number of kindergartens rose fairly steadily during the 1980s, going from 641 in 1982 (with a total

enrollment of 81,422 children) to 764 in 1989 (with an enrollment of 97,966 children; see Planning Division 1983, 1990).[2] The number of nursery schools rose until 1989, but dropped in the succeeding two years (Child and Youth Welfare Division 1991).[3] In 1982, there were 389 nurseries and day care centers with a total enrollment of 16,935, and in 1989, there were 510, with enrollments totalling 21,457. By 1991, however, the number had dropped to 465 with total enrollments of 18,500. To be sure, at any given time, the percentage of children enrolled in either type of setting has been small. For example, in 1987, there were 20,819 children under three in Bangkok enrolled in nurseries and day care centers out of an estimated total of 386,980 children that age (National Statistical Office 1988a). Thus, declining fertility and the other trends noted above have hardly resulted in the wholesale care of children by non-familial institutions. Nevertheless, from these aggregate statistics it would appear that there probably has been some growth of non-familial child care in Bangkok during recent decades.

If we are correct in speculating that trends in fertility, education, women's employment, and household composition have increased the use of non-familial child care arrangements, then we should not only be able to explain trends in child care by changes in fertility, educational attainment, female labor force participation rates, and household composition, but should also observe differentials in child care according to these variables at any given point in time. Our expectations for differentials, based on studies in the United States (Mason and Duberstein 1991) as well as our knowledge of Thailand, are as follows. Maternal care or care by relatives should be less common when the mother has few children or the child is a first born, either because the costs of non-maternal care will be lower when the woman has only one or two preschool-aged children to care for, thereby making paid care more affordable or relatives more willing to help out, or because the child will have no older siblings available to provide part-time care. We also expect non-maternal child care to be used

more heavily when the mother is well educated, because schooling is likely to be highly valued by well-educated mothers, who may consequently place their children in an educational setting such as a kindergarten at a relatively young age. Mothers who value education for their children are also unlikely to assign child care responsibilities to older siblings, and may therefore favor care by a nursery or kindergarten.

The relationship between women's employment and the type of child care they use is likely to depend on the kind of work they perform. Generally, we would expect non-employed women to provide their own child care more often than employed women do, but an exception to this rule may occur for women who are self-employed or work in a family business. Because of the relative flexibility offered by self or family employment, women who are self or family-employed may be able to combine working with caring for their children. Thus, it is women who work as employees for non-related employers who in principle should be least likely to provide all child care themselves.

Also pertinent to the type of child care used by women is the availability to them of surrogate caregivers. For example, women who have adult female relatives residing with them should have a greater opportunity to arrange non-maternal child care than women who have no surrogates in the household. (The same principle should hold for the availability of relatives nearby, but the Bangkok dataset has information on household members only.) In addition, women's earnings or total family income should affect their use of non-familial child care. In Bangkok, as elsewhere, most nursery schools and kindergartens are privately run and hence charge a fee to their users. Having servants in the home who provide child care also involves a cash outlay. The family's ability to pay for child care should thus affect their likelihood of using non-familial arrangements.

The child's age should also affect care arrangements. Thai mothers have a strong preference for caring for their children themselves, especially when the child is young, and are generally suspicious of the care

provided by strangers (Richter et al. 1991). The supply of nurseries and day care centers is also low relative to the number of young children. For these reasons, we expect maternal care to be especially common for the youngest children, with non-maternal care increasing among older preschoolers. Age differentials in type of child care tend to be strong in developed countries such as the United States (Mason and Duberstein 1991), and there is little reason to expect this to differ substantially in Bangkok.

An additional influence on child care use in urban Thailand may be women's attitudes towards the use of non-familial child care arrangements as indicated by their geographical background (with rural-reared women likely to be less positive about non-familial child care than are urban-reared women), and their religion (with Muslim women less positive about non-familial care than are Buddhist women). The idea of having non-family members care for preschool-aged children is relatively new in Thailand and is clearly a phenomenon restricted to the larger urban areas, especially Bangkok. Thus, women who grew up outside of Bangkok may be less willing to consider the use of non-familial child care than are women who grew up in the city. Muslims in Thailand tend to be less supportive of non-familial roles for women than Thai Buddhists are. This may affect child care arrangements indirectly by influencing women's employment patterns; it may also affect them directly insofar as it tends to promote self or family employment for women precisely so they can combine work with child care.

The main health consequence of alternative child care arrangements that has been studied in developed countries is the incidence of acute, communicable diseases, in particular, upper respiratory tract infections. Studies in the United States (e.g., Presser 1988) have shown that preschool-aged children in group care or other care outside their own home are more prone to such infections than are children cared for at home, a differential attributed to the greater exposure to disease in a group setting. Differentials in more serious conditions or in the use of preventive health measures such as childhood immunizations are less

evident, or have not been studied. In the current study, we will explore the relationship between current child care arrangements and the child's recent experience with acute illness.

DATA AND METHODS

The 1990 Bangkok survey is based on a probability sample of ever-married women of reproductive age (15-52) who had borne at least one child and were residing in a sample household in 1990. In order to draw the sample, Bangkok-area households from the 1987 Thai Demographic and Health Survey (TDHS) were revisited and any woman who was either an original TDHS respondent with at least one child, or who was aged 15-49, married at least once, and had at least one child, was included in the sample. Because of the turn-over in Bangkok's population, only 677 of the 1,154 women interviewed in the study were original TDHS respondents; the remaining 477 women were new residents at an original TDHS address or in a few cases were newly eligible for the study. The analysis that follows is based on a file consisting of the children of the sampled women. It should be noted that in addition to there being multiple respondents per household, there are multiple children per respondent.[4] This means that the tests of significance reported herein should be treated as rough guidelines only.

Data on child care arrangements were collected as part of a battery of questions that asked about each of the respondent's children. Early in this battery, the respondent was asked: "During the last 4 weeks, what was (child's name) usually doing or how was s/he usually cared for during most of the hours that you (worked/participated in your activities/used child care)?" Responses were recorded in 12 categories that included the respondent, the child's other parent or step-parent, a sibling 15 or older, a sibling under 15, some other relative of the child, a non-relative, a day care center, a nursery, a school, the child takes care of him or herself, the child is old enough or does not need care from others, and other arrangements. A follow-up question asked whether the care occurred

primarily in the child's home or elsewhere. Because the use of relatives and non-relatives is fairly uncommon, we have grouped all relatives together and have included day care centers and nurseries together with non-related individual caregivers (nannies, amahs, etc). Schools, including the kindergartens that are intended for children aged 3-5, are treated separately. Thus, current child care arrangements are classified as mother versus relative versus non-relative versus school. Analysis of this variable is restricted to the 421 children who were aged 0-5 at the time of the interview and did not have missing data on the variables used in the analysis.

Later in the interview about each of their children, women were asked: "What was the (first) child care arrangement you used during the child's first year of life and where did that care take place? I mean, while s/he was less than a year old." Again, women's responses were recorded in a number of categories, in this instance including whether the care occurred primarily in the child's home or elsewhere. Then, still later in the interview, respondents were asked whether the care arrangement used during the child's first year of life was subsequently changed prior to age three, and if so, what any new arrangements in the second and third years of life were. In the analysis that follows, we focus on the child care arrangement used during the child's third year of life. It should be noted, however, that 95 percent of the 2,059 children in the sample were reported as having the same primary care arrangement in all of the first three years of life.

We begin by focusing on the retrospective child care question in order to address the issue of change over time. Because of high rates of migration into Bangkok, it is important to restrict analysis of this question to the children of women who are life-long Bangkok residents (N=824). Otherwise, differences across cohorts of children in how they are cared for during the first three years of life may reflect differential in-migration from the countryside, rather than genuine changes within Bangkok. The analysis of the retrospective question also examines possible determi-

nants or correlates of alternative child care arrangements measured as of the appropriate time period. These include the child's number of siblings and birth order, the mother's religion and education, whether she worked and the type of occupation she held in the period before marrying and between marrying and having her first child, and her husband's education.[5] In order to ascertain whether changes in past use can be attributed to changes in education, female employment or fertility, we first estimate a simple model in which child care arrangements are solely a function of the child's birth cohort, then add to this model measures of education, female employment, and fertility. If the addition of these variables causes cohort differences to disappear, then it suggests that these changes underlie the changing child care patterns.

In the analysis of current child care arrangements, we first explore differentials for the variables discussed earlier, then estimate a multivariate model in order to ascertain which factors directly influence child care arrangements. In this latter analysis, child care arrangements are trichotomized as mother care versus care by other relatives versus non-relative care.[6] A final analysis relates current child care arrangements to children's recent illnesses, controlling for other variables that might directly influence their health. In this last analysis, as well as in portions of the earlier ones, the causal ordering between predictor and outcome variables is sometimes more ambiguous than we would like. Where possible, we take this into account in interpreting the results.

RESULTS

Although child care arrangements during the child's first three years of life were recorded in some detail, almost three-quarters of the children of life-long Bangkok residents were cared for by their mother during this period, with another fifth receiving care from other relatives, and less than 10 percent, care from non-relatives (see the top line of Table 1, below). For this reason, we initially focus on only three types of care,

maternal care vs care by relatives vs care by non-relatives. In the multivariate analysis, we restrict our attention to the maternal/non-maternal dichotomy because of a lack of variation in the use of non-relatives across most socio-demographic groups.

Table 1 shows simple percentage distributions across the three major types of care according to the variables discussed earlier. The first such variable is the child's year of birth or birth cohort. Between the 1960s and the end of the 1980s, there was a clear downward trend in reliance on the mother's care, with a concomitant rise in the use of relatives. The use of non-relatives also rose during the 1970s and early 1980s but has since declined. To be sure, even among children born during the second half of the 1980s, care by the mother was the choice for the majority. The percentage receiving such care in the late 1980s (69%), however, was markedly smaller than the percentage receiving maternal care in the early 1960s (81%). Thus, just as we would expect on the basis of trends in fertility, education, female employment, and household composition, care of young children by mothers has indeed declined in the Bangkok area since the early 1960s.

[Table 1 about here]

Most of the remaining variables shown in Table 1 have the expected relationship with early child care arrangements, although in some cases the relationships are weak. The larger the number of siblings, the more likely is the mother to care for her child herself, a pattern that also holds for the child's birth order. The first of these makes sense in terms of the elevated costs of non-maternal child care when more children are involved. That birth order is positively related to maternal care makes less sense, insofar as birth order measures the availability of older siblings (i.e., relatives) for child care, rather than the mother herself. Because birth order and sibset size are positively correlated, a multivariate analysis is required to see whether it is sheer numbers of children or the position of

the particular child in his or her sibset that is most important in determining the type of care she or he receives.

One of the largest differentials in Table 1 is according to the mother's educational level. Especially striking are the results for university-trained women. These women use non-relative care as often as care by relatives and more often than they use maternal care. Women's pre- and post-marital occupations show a similar disjuncture between the elite ranks of professionals, administrators, and clerical workers and all other women. For post-marital occupation, especially, the women most likely to rely on maternal care are the ones who are not working, while the ones least likely to use maternal care are the professionals, administrators and clerical workers. Husband's education also is related to the type of child care that is used, although less strongly than is the wife's.

With regard to religion, the children of Muslim mothers are somewhat more likely to be cared for by their mothers than are the children of Thai Buddhist mothers. This difference may reflect religious differences in attitudes about child care or a greater propensity for Thai Buddhist women to work outside the home. Again, multivariate analysis is required if we are to learn which of these explains the religious differential.

In order to explore the cohort trend revealed in Table 1, we have estimated a series of logistic response models in which the logit for type of child care (mother versus other) is regressed onto birth cohort and a series of control variables. The coefficients from these models, estimated using maximum likelihood, are shown in Table 2. The first pair of coefficients is for a trichotomization of birth cohort and shows the same time trend as was seen in the percentages displayed in Table 1. The log odds of relying on the mother's care are greatest for children born before 1971, and are next highest among those born between 1971 and 1980. The difference between the pre-1971 cohort and the post-1980 cohort would be statistical significant at conventional levels were all of the assumptions of the test met.

[Table 2 about here]

The second pair of coefficients in Table 2 shows the estimated effects of birth cohort on the log odds of using maternal care after the child's number of siblings has been held constant. The coefficients no longer show a time trend and are very close to zero. This is also true for the third pair of coefficients, which were estimated net of the mother's education. Thus, holding constant either the child's family size or the mother's education is sufficient to explain away the time trend in the use of maternal care. We are thus unable to attribute the declining reliance on maternal care solely to the fertility decline or to the secular trend in education (or in mother's employment and occupation, as the final pair of coefficients in Table 1 suggests). Rather, it is some combination of these changes that appears to lie behind the declining use of maternal care.

In Table 3, we show the full multivariate model predicting the log odds of maternal child care. This model includes all of the variables shown in Table 1 with the exception of the mother's premarital occupation, which was dropped because of its collinearity with her post-marital occupation. As would be expected on the basis of the results shown in Table 2, child's birth cohort no longer predicts the use of maternal care once the other variables in the model are controlled. Number of siblings does, however: the more siblings there are, the more likely that the mother cares for the child. Net of sibset size, the child's birth order no longer predicts whether maternal care is used. Apparently, the original tendency for higher order children to be cared for by their mothers reflected their larger sibsets rather than their birth order per se.

[Table 3 about here]

All three of the socio-economic measures included in the model strongly predict the use of maternal child care, although in a slightly different form than before the controls were introduced. In general, a higher level of maternal education predicts a lower log odds of maternal child care, although there is a possible non-monotonicity involving the

lowest levels of education. Likewise, employed women are consistently less likely to provide maternal child care than are non-employed women, and the higher is the employed woman's occupation, the lower is her odds of providing maternal care. (Again, there is a possible non-monotonicity at lower occupational levels.) Husband's education is also negatively related to the use of maternal child care, although again, the use of such care is slightly lower at the lowest educational level than at the next lowest level. All three of these relationships thus suggest that greater economic resources, a stronger commitment to children's education, and the mother's involvement in work outside the home reduce the odds of relying solely on maternal care for young preschool-aged children.

The final variable in Table 3 is religion, which no longer has a relationship to the use of maternal child care. Apparently, the tendency for Muslim women to use maternal care more frequently than Buddhist women was a reflection of their lower socio-economic status and higher fertility (correlations not shown) rather than a reflection of distinct attitudes.

In sum, this analysis of the child care arrangements used by mothers when their children were under the age of three suggests several things. Although care by the mother remains the predominant arrangement for this age group, its prevalence has declined significantly since the 1960s, a change that statistically can be explained either by declining fertility, by rising levels of female education, or by rising female labor force participation rates. Regardless of cohort, there is a clear tendency for mothers to care for their children themselves when they have relatively large numbers of them, when their own or their husband's schooling is poor, and when they are not in the labor force or, if employed, work at relatively low status occupations. Religion and the child's birth order have no relationship to the use of maternal child care net of the fertility and socio-economic measures.

Turning now to current child care arrangements, Table 4 demonstrates that the age of the child makes an important difference for the method of

child care that parents choose. Although the predominant arrangement for children under three is care by the mother, for children between the ages of three and five, the use of kindergartens is as common as is maternal care. Other arrangements involving relatives or non-relatives are rare. For comparison, we also show the arrangements used for school aged children. Almost all children aged 6-12 are reported as being in school, an indication of the universality of primary schooling in Bangkok. Tabulations not shown here also indicate that the care arrangements for children 6-12 do not vary across socio-demographic groups. Our focus on preschool-aged children is thus justified.

[Table 4 about here]

Table 5 presents additional predictors of current child care arrangements, many of them similar to the predictors considered earlier. As the top two lines of the table indicate, whether the mother is employed makes a large difference for how children are cared for. Less than one-third of working mothers provide all child care themselves, as opposed to close to three-quarters of the non-working mothers, and the reliance on other relatives and schools is comparably higher among working mothers. Among women who work, whom they work for, how much they earn, and the occupation at which they work all are related to their child care arrangements. Self or family-employed women are far more likely than employees to care for their children themselves, presumably because it is easier for them to combine their work with child care. Women's earnings are also strongly related to child care arrangements, with high earning women rarely providing all child care themselves and instead relying on schools, relatives and non-relatives. The same is true for women employed in professional, administrative and clerical occupations.

[Table 5 about here]

In addition to the employment characteristics of working women, women's schooling and household income are both strongly related to child care arrangements. The higher the woman's schooling, the less likely she

is to provide all child care herself and the more likely she is to rely on relatives, non-relatives and schools. Household income has a similar relationship to child care arrangements, with high income families relying primarily on non-maternal arrangements and low income families, primarily on maternal care. Education, employment, occupation, earnings, for whom women work, and family income are all strongly inter-correlated (see Table 6). The zero-order relationships displayed in Table 5 consequently leave unclear which of these variables directly affects women's child care arrangements. For example, whether education is related to child care arrangements only because it affects women's employment and incomes, or instead for some other reason such as its influence on their values or attitudes, is unclear from Table 5. To clarify which of these variables directly affects women's child care arrangements requires a multivariate analysis.

[Table 6 about here]

The last three variables in Table 5 concern non-economic aspects of women's lives.[7] The first is a measure of whether women have child care help readily available in the form of another ever-married woman of reproductive age who lives in the same household. (Unfortunately, there are no measures of whether a woman has relatives living nearby, a pattern more common in Thailand than is the sharing of a dwelling.) Although the difference is not very large, there is a greater tendency for women to rely on care by relatives when there is another woman living in the household than when there is not. This suggests that having surrogate caregivers available encourages non-maternal child care.

The last two variables in Table 5 refer to the woman's background, first, to whether she grew up in a rural or urban area, and second, to her religion. Women from rural areas are more likely than urban-reared women to provide all child care themselves and are less likely to send their older preschoolers to kindergartens or other early schools. Whether this reflects the lower socio-economic status of rural-reared women or instead

different values or attitudes about non-familial child care cannot be ascertained without a multivariate analysis, but the correlations in Table 6 make clear that rural-reared women have less schooling, lower earnings, and lower status occupations than women reared in Bangkok or other cities.

Finally, a woman's religion also makes a difference for her child care arrangements. Buddhist women are less likely than Muslim women to care for their children themselves, and are more likely to rely on schools. Again, whether this is a matter of values and attitudes or instead a reflection of socio-economic differences between Muslim and Buddhist women remains to be seen.

The multivariate model of women's child care use, estimated as a multinomial logistic response model with three possible outcomes, is shown in Table 7. Each coefficient in this table shows the log odds of belonging to the first rather than the second named category of the dependent variable associated with a one unit increment in the predictor variable. Where the predictor is part of a dummy variable classification, the coefficient gives a contrast between the category represented by the predictor variable and the excluded category. Thus, for example, the coefficient of -1.11 shown in the first column, second row of the table says that the log odds of using mother care rather than non-familial care is 1.11 units less for employees than for women who do not work (the excluded category).

[Table 7 about here]

One of the strongest relationships in Table 7 is between child's age (scored in months) and type of child care. Older children are considerably more likely than younger preschoolers to be in school or other forms of non-familial care, and are also more likely to be cared for by relatives than by their mothers. Mother's employment also continues to have a strong relationship to type of child care. Employed women, especially those who work as employees for non-related individuals or firms, are less likely than non-employed women to provide all child care themselves. They are

also more likely to rely on relatives than on non-familial care when compared to the non-employed women. Both of these closely parallel the zero-order relationships shown in Table 5. Also little changed after controlling for other variables is the relationship between employed women's earnings and the type of child care they use. Compared to lower earning women, high earning women are much more likely to use non-familial care than to provide all child care themselves; they are also more likely to use relatives than to provide all care themselves. The last tendency was not apparent in the zero-order case and suggests that the greatest importance of women's earnings may not for their ability to purchase market child care, but rather for whether they feel they can afford to remain out of the labor force once a child is born. For, as microeconomic theory predicts, the higher a woman's earnings, the less likely she is to provide all child care herself.

In Table 7, women's education also continues to predict the type of child care they use. The nature of the relationship, however, is somewhat different than was seen in the zero-order case. What the figures in Table 7 indicate is that very poorly educated women are markedly less likely than better educated women to use non-familial child care. While the direction of this relationship is not surprising, the point in the educational continuum where the largest difference in child care use occurs is surprising. In Table 5, it was university-educated women who were especially likely to use non-familial child care, as one might expect on the basis of their high earnings and propensity to work as employees in non-familial enterprises. After controlling for employment, earnings, and income, however, it is the very poorly educated who are especially unlikely to use non-familial care, rather than the very highly educated who are especially likely to use it. This may indicate that even moderates amounts of education are sufficient to erode traditional ideals about child care.

Once women's employment, earnings, and education are held constant, total household income no longer has any relationship with type of child

care used. Apparently, its original association with the use of non-maternal and non-familial care was entirely caused by its correlation with women's employment and earnings. Financial ability to purchase market forms of child care does not appear to have much impact on the actual forms of care being used in urban Thailand.

If the availability of money to pay for non-market care is irrelevant to the actual form of child care used, the availability of child care substitutes for the mother is not. Even after controls for other variables have been introduced, the presence of another ever-married woman of reproductive age in the mother's household continues to have a positive relationship to the use of relatives for child care, albeit a fairly weak relationship. Admittedly, we cannot ascertain whether women choose to double up with relatives in order to obtain help with child care, or whether instead the availability of relatives is fortuitous. In either case, however, there appears to be an association between extended family living and child care by relatives.

Whether the child's mother grew up in an urban or rural area no longer has a relationship to type of child care once economic and employment variables are controlled. Apparently, the greater propensity of rural-reared women to provide their own child care resulted from their lower socio-economic status. Contrary to the results in our analysis of past child care use, however, religion continues to have a significant relationship to type of child care, even after controls for education, employment and earnings are introduced. Non-Buddhists (most of whom are Muslims) are more likely than Buddhists to provide child care themselves in preference to seeking care from outside the family; they are also slightly more likely to provide child care themselves in preference to seeking care from relatives. We are unable to explain why a religious effect persists in the case of current child care arrangements but not in the case of past child care use. Its persistence in the present analysis, however, suggests that

Thai Muslims may value maternal care of preschool-aged children more highly than Thai Buddhists do.

In sum, the analysis of current child care arrangements refines the picture provided by the analysis of past child care arrangements of how and why women's socio-economic and employment status affect their child care arrangements. Although the current analysis, like the past one, suggests a tendency for higher status families to rely more often than lower status families on relatives and non-familial institutions for child care, the current analysis suggests that the ability to pay for non-familial care may play a relatively minor role in this relationship. Household income has no relationship to type of child care used, and the mother's earnings predict the use of non-maternal care, especially care by relatives, rather than the use of non-familial (market) care. More important for a family's child care choices, it would appear, are the mother's economic incentives to work, as indexed by her earnings, and her qualifications to work in the type of jobs where simultaneous care of children is difficult or impossible (namely, as an employee of an unrelated employer).

The current analysis also suggests that women's education may be less important for shaping their attitudes about children's schooling than it is for shaping their attitudes about the familial care of children. For, in the current analysis, it is the uneducated who are most inclined to rely on familial child care, rather than it being the highly educated who are most inclined to rely on educational forms of child care such a kindergartens. Traditional values about family care of children may also underlie the tendency of Muslim women to provide child care themselves more often than Buddhist women do.

Let us turn now to children's illnesses as a possible outcome of type of child care. The Bangkok survey asked women whether any of their preschool-aged children had experienced an illness during the past week or during the past month.[8] Although the nature of the illness was not specified, by removing all children reported as being chronically ill from the

analysis, we can assume that a majority of the illnesses reported in response to these questions were acute, infectuous diseases of the type that might be spread through contact with other children in a group setting. In order to see whether attendance at kindergartens or other forms of non-relative care contributes to illnesses of this type, we estimate the log odds of having been ill during the past week or month as a function of the type of child care used during the past four weeks, plus control variables that might independently affect child health and morbidity (child's age, family income, the mother's earnings, and her education). The results for type of child care, with and without the controls, are shown in Table 8.

[Table 8 about here]

The simple relationship between type of child care and the incidence of illness is not what one would expect on the basis of past research on this topic in the United States. Children attending kindergartens and other schools are **not** the most likely to have suffered a recent illness. Rather, it is children being cared for by the mother who are most likely to have been ill, with those attending kindergarten or school significantly less likely to have been ill. Because it is only children over the age of two who attend kindergartens or other early schools, this could reflect an increased resistence to common infectious diseases among children as they age. In the bottom half of Table 8, however, where child's age and socio-economic variables are held constant, the tendency is still for children in the mother's care to suffer recent illnesses, particularly when illnesses in the past month are considered (none of the contrasts for illnesses in the past week are significant, indeed, the entire equation fails to achieve significance). The results shown in the bottom half of the table thus provide little evidence that school attendance increases the risks of contracting infectious diseases.[9]

There are two possible explanations for the seemingly higher incidence of illness among children being cared for by their mothers than among other

children. First, especially in the case of illnesses within the past month, it may be that illness is determining the type of child care, rather than child care influencing illness. In other words, children who became sick within the past month may have been removed from kindergarten or school because of their illness. The exclusion of chronically ill children from the analysis, and the apparent stability of child care arrangements reported in the retrospective questions on child care, both augur against this explanation. Nevertheless, it remains a possibility. The second possibility is that mothers are more likely to notice or report an illness when they provide children's care themselves.

CONCLUSIONS

This analysis of child care arrangements in the Bangkok metropolitan area suggests that change in how young children are cared for is indeed a feature of the modernization processes that many rapidly developing countries in Asia are undergoing. Although care by the mother continues to be the predominant arrangement for children under the age of three, the use of kindergartens and other early schools to care for children ages three through five has become very common in Bangkok; care of younger children by relatives has also increased. In Bangkok, the growth of non-maternal care arrangements appears to reflect some combination of demographic and economic changes, and may involve family changes as well. As fertility has fallen, the costs of having either relatives or non-relatives care for children have presumably dropped. And as women's modern-sector employment has become more common, the ability of mothers to provide full-time care for young children has declined. Both of these appear to explain why fewer mothers today than 20 years ago care for their children themselves during the child's early years of life.

One issue that the current analysis has been unable to explore very fully is the interplay between residential and child care decisions. Our analysis showed that the presence of another adult woman in the household

was associated with a somewhat higher probability of using care by relatives, but we were unable to ascertain whether the household's composition was determined by women's child care needs or was simply a fortuitous circumstance that made relative care possible. Even less clear in our analysis was the role of relatives living near but not in the child's household, a pattern common in Thailand. The tradition of couples locating near the wife's parents in Thailand has a pragmatic basis, at least in part. By living close by, both the older and younger generations can offer assistance to each other. In contemporary Bangkok, where the extra-domestic employment of wives is common and a growing proportion of women have good educations and demanding modern-sector jobs, the decision to locate near kin may be based on a desire to rely on relatives for child care. Alternatively, the decision may be based on other considerations, but may offer the opportunity for such care. The issue of how couples decide both about child care arrangements and about residential location is in need of further study.

Also worthy of further study is the question of how alternative forms of child care affect children's health and development. The current analysis found no evidence that children in group care were more prone to short-term illnesses than children being cared for by their mothers or other relatives, but the analysis was unable to focus on the specific types of illnesses most likely to infect children in group care, such as upper respiratory-tract infections; it was also unable to identify cases where illness had led to a temporary or permanent change in child care arrangements. Also unavailable in the current study were measures of child development and psychological well-being, factors that may be affected by child care arrangements, although in complex ways (Clarke-Stewart 1991). It seems likely that the changes in child care arrangements currently occurring in Bangkok have both advantages and disadvantages from the point of view of children's development and well-being. For example, insofar as care by older siblings is fast disappearing, and children are instead being

cared for by adults, their welfare may be increasing. On the other hand, some of the potential liabilities associated with group care may also be on the rise. Certainly, studies that attempt to assess a wider range of consequences for children of new forms of child care are much needed.

FOOTNOTES

1. In Thailand, unlike the United States, a kindergarten is an educationally-oriented school for children as young as three and up to the usual school entry age of six. In Bangkok, as in the U.S., there also are nursery schools, preschools, and day care centers which are primarily oriented to children under the age of three. We refer to the latter as nurseries or day care centers in order to avoid confusion with the kindergartens and other early schools that are oriented to children ages 3-5.

2. These figures do not include seven public kindergartens, which enrolled a total of approximately 800 children per year during the 1980s.

3. We do not fully understand the cause of the drop-off in the number of nurseries and day care centers. Because of declining fertility, the estimated numbers of children under age three is currently declining in Bangkok, but available population estimates do not suggest a decline of the magnitude experienced by day care centers during the past few years. Rising land values in Bangkok may lie behind this trend, although the evidence for this is incomplete.

4. In the subsample of women who are life-long Bangkok residents, 453 out of 583 total households contain more than one respondent or child, with these 453 households contributing a total of 694 children to the subsample (N=824). Thus, multiple children per household are very common in this subsample. In the alternative subsample consisting of children currently aged 0-5, only 66 households out of a total of 351 have multiple children in the sample, with these 66 households contributing a total of 136 children to the subsample (N=421). Thus, problems with the estimates caused by clustered sampling and the non-independence of observations are greater for the first subsample than for the second.

5. Other potentially relevant variables, such as the mother's earnings, the family's total income and the household's composition, were ascertained

only for the time of the interview and hence cannot be included in the analysis of past child care use.

6. An alternative treatment of the dependent variable, in which kindergartens and other early schools were treated as a separate category while relatives and non-relatives were combined, produced similar results to those found with the trichotomy shown in the paper. We prefer the latter, however, because it makes more sense from an economic standpoint: non-relative care is basically care provided by the market, whereas care by relatives and the mother are both forms of non-market, familial care.

7. Omitted from Table 5 are the child's birth order and number of siblings. In analyses not shown here, neither of these variables had an interpretable or significant relationship to type of child care, both in the zero-order case and when other variables were controlled. They were consequently dropped from the analysis.

8. The exact question wordings were: "In the past week, was (child's name) sick?" and "In the past month, was (child's name) sick? (any illness that required medical attention)?"

9. Parallel analyses relating whether the child was cared for at home versus away to the incidence of illness in the past week and month were also performed and showed similar results to the analyses reported here. Specifically, before controls were introduced, children cared for away from home were significantly less likely to have an illness than children cared for at home. After controlling for child's age, type of child care, and the socio-economic measures, the difference was no longer statistically significant but was still in the same direction.

REFERENCES

Child and Youth Welfare Division. 1991. Personal communication to Kua Wongboonsin. Bangkok: Ministry of Interior, Department of Public Welfare.

Clarke-Stewart, Alison. 1990. "Consequences of child care for children's development." Irvine, CA: University of California-Irvine, paper prepared for the National Symposium on Child Care in the 1990s: Trends and Consequences, University of Nebraska, Lincoln, NE, June 19-20, 1991.

Hanenberg, Robert and Kua Wongboonsin. 1991. "Labor force shortages in Thailand and surpluses in neighboring countries: Recent trends and implications for the future." Pp. 155-189 in Population and Labour Force of the Southeast Asian Region. Bangkok: Chulalongkorn University, Institute of Population Studies, Publication No. 181/34.

Kiranandana, Thienchay, Kua Wongboonsin and Suchada Kiranandana. 1989. "Population and development in Thailand: With special reference to health/nutrition, education and old-age." Pp. 291-415 in Frameworks for Population and Development Integration, Volume II: Bangladesh, Nepal, Philippines, Thailand. Bangkok: Economic and Social Commission for Asia and the Pacific, Asian Population Studies Series No. 93.

Knodel, John, Aphichat Chamratrithirong, and Nibhon Debavalya. 1987. Thailand's Reproductive Revolution. Madison, WI: University of Wisconsin Press.

Limanonda, Bhassorn. 1990. "Thai family: A review of past evidences." Bangkok: Chulalongkorn University, Institute of Population Studies, paper presented at the Nihon University International Symposium on Family and the Contemporary Japanese Culture: An International Perspective, Tokyo, Japan, October 20-24, 1990.

Mason, Karen Oppenheim and Laura Duberstein. 1991. "Consequences of child care for parents' well-being." Honolulu, HI: East-West Population Institute, paper prepared for the National Symposium on Child Care in the 1990s: Trends and Consequences, University of Nebraska, Lincoln, NE, June 19-20, 1991.

National Statistical Office (Thailand). 1985. Report of the Labour Force Survey (Round 1) 1985. Bangkok: National Statistical Office.

National Statistical Office (Thailand). 1988a. The Children and Youth Survey 1987. Bangkok: National Statistical Office.

National Statistical Office (Thailand). 1988b. Report of the Labour Force Survey (Round 1) 1988. Bangkok: National Statistical Office.

Planning Division. 1983. Summary of Education Statistics. Bangkok: Ministry of Education, Office of the Permanent Secretary.

Planning Division. 1990. Summary of Education Statistics. Bangkok: Ministry of Education, Office of the Permanent Secretary.

Presser, Harriet B. 1988. "Place of child care and medicated respiratory illness among young American children." Journal of Marriage and the Family 50(November):995-1005.

Richter, Kerry, Chai Podhisita, Aphichat Chamratrithirong, and Kusol Soonthorndhada. 1991. "Child care in urban Thailand: A qualitative study of emerging issues." Nakhon Pathom, Thailand: Mahidol University, Institute for Population and Social Research, paper presented at the annual meeting to the Population Association of America, Washington, D.C., March 21-23, 1991.

Table 1: Main child care arrangement when child was age 2, by parents' background and early marital characteristics: Life-long Bangkok residents.

Predictor	Mother	Relative	Non-relative	Base N
Total sample	74.4%	18.8%	6.8%	824
Child's birth year				
Before 1965	80.8	16.9	3.1	65
1966-1970	80.4	17.6	2.0	102
1971-1975	77.0	17.4	5.6	161
1976-1980	72.9	18.7	8.4	203
1981-1985	71.3	19.0	9.7	216
1986-1989	68.8	24.7	6.5	77
Number of Siblings				
None	60.6	31.5	7.9	127
One	67.7	19.1	13.2	235
Two	75.5	19.8	4.7	212
Three+	86.8	11.2	2.0	250
Birth order				
First	68.2	23.8	8.0	362
Second	73.5	17.6	8.8	238
Third+	85.3	12.1	2.7	224
Education				
University	21.9	39.7	38.4	73
Grades 8-12	62.6	27.5	9.9	171
Grades 5-7	85.4	13.5	1.0	96
Grades 1-4	84.2	13.8	2.0	392
None	84.8	13.0	2.2	92
Premarital Occupation				
Prof/clerk	27.0	47.0	26.1	115
Sales	77.9	18.6	3.6	140
Craft/agri	81.6	15.7	2.8	212
Serv/trans	89.2	10.8	0.0	65
No work	82.9	12.1	5.1	292

Table 1,
cont.

Predictor	Mother	Relative	Non-relative	Base N
Postmarital Occupation				
Prof/clerk	13.9%	56.5%	29.6%	108
Sales	68.3	23.6	8.1	161
Blue collar	69.2	25.4	5.3	169
No work	96.1	3.4	0.5	386
Husband's Education				
University	39.6	34.1	26.4	103
Grades 8-12	61.6	27.6	10.8	209
Grades 5-7	90.7	9.3	0.0	110
< Grade 5	86.8	10.4	2.8	402
Religion				
Buddhist	74.3	18.2	7.5	707
Other	75.2	22.2	2.6	117

Table 2: Logit regression coefficients relating child's year of birth to whether mother provided main child care when child was aged 2, with and without control variables: Life-long Bangkok residents.

Control variables	Logit coefficients
None	
Born before 1970[a]	.52*
Born 1971-1980	.21
Number of siblings	
Born before 1970	-.09
Born 1971-1980	-.04
Mother's education	
Born before 1970	-.09
Born 1971-1980	-.17
Mother's occupation	
Born before 1970	.19
Born 1971-1980	-.07

*--Significant, $p<.05$.

a--Excluded category is born 1981-1989; hence, coefficients show contrast between included category and the excluded one.

Table 3: Means and logit coefficients relating background and early marital characteristics to whether mother provided main child care when child was aged 2: Life-long Bangkok residents.

Predictors	Means	Logit Coefficients
Child's year of birth		
Before 1969	.20	-.45
1969 - 1979	.44	-.38
1981 - 1989	.36	--[a]
Number of siblings	3.12	.24*
Birth order	2.07	.06
Mother's education		
< Grade 5	.59	2.05*
Grades 5-7	.12	2.60*
Grades 8-12	.21	1.56*
University	.08	--[a]
Mother's occupation[b]		
Prof., adm., clerical	.13	-2.71*
Sales	.20	-2.43*
Craft & agricultural	.17	-2.23*
Service & transport'n	.04	-2.39*
Not working	.46	--[a]
Husband's education		
< Grade 5	.43	.84*
Grades 5-7	.12	1.47*
Grades 8-12	.22	.11
University	.23	--[a]
Mother is Buddhist	.86	-.03
Mean Dep Var/Constant	.74	-.08
Log likelihood	--	-313.04*

*--Significant, $p<.05$.

a--Indicates excluded category.

b--Occupation held after marriage but before first child's birth.

Table 4: Child's current primary caregiver by child's age.

Primary Caregiver	Child is 0 - 2	Child is 3 - 5	Child is 6 - 12
Mother	77.3%	40.6%	3.0%
Other relative	18.7	11.8	1.0
Non-relative	4.0	8.9	0.0
School	0.0	38.7	94.7
Self care	0.0	0.0	1.3
Base N	150	271	603

Table 5. Child's primary caregiver by personal and parental characteristics: Children aged 0-5.

Predictor	Mother	Other relative	Non-relative	School	Base N
Total sample	53.7%	14.3%	7.1%	24.9%	421
Mother's employment					
Working	32.0	25.7	12.1	30.1	206
Not working	74.4	3.3	2.3	20.0	215
For whom she works[a]					
Self or family	51.3	11.5	3.8	33.3	78
Other	24.1	32.1	16.8	27.0	137
Earnings[a]					
< 2600 Baht	51.9	18.5	7.4	22.2	81
2600-4000 B	37.5	31.2	7.8	23.4	137
> 4000 Baht	6.2	26.2	23.1	44.6	65
Occupation[a]					
Prof/admn/cler	6.5	32.3	17.7	43.5	62
Sales	45.0	16.7	11.7	26.7	60
Blue collar	45.2	24.7	8.6	21.5	93
Mother's education					
< Grade 5	64.8	12.1	5.5	17.6	199
Grades 5-7	58.4	14.3	0.0	27.3	77
Grades 8-12	44.1	14.0	9.7	32.3	93
University	21.2	23.1	19.2	36.5	52
Household income					
< 5300 Baht	75.6	5.1	2.3	17.0	176
5300-9400 B	45.6	23.7	6.1	24.6	114
> 9400 Baht	25.8	17.2	17.2	39.8	93
Woman in household[b]					
Yes	53.1	23.5	2.5	21.0	81
No	53.8	12.1	8.2	25.9	340

Table 5, cont.

Predictor	Mother	Other relative	Non-relative	School	Base N
Mother from rural area[c]					
Yes	62.5%	13.5%	7.3%	16.7%	192
No	46.5	14.5	7.0	32.0	228
Mother's religion[d]					
Buddhist	52.4	14.5	7.2	25.9	359
Muslim	66.7	13.0	3.7	16.7	54

a--Working women only.

b--Whether a married women aged 15-49 other than the mother resides in the household.

c--Whether mother lived from birth until age 12 in a rural area.

d--A small number of cases with other religions have been excluded here.

Table 6: Means and Pearsonian correlation coefficients relating employment, socio-economic and background variables (N=381).

	Means	Self/ fam	Employ-ee	Prof occ	Sales	Blue collar	Earns	< Gr 5	Gr 5-7	Gr 8-12	Univer.	Income	Women presnt	Rural	Buddh
Age	41.2	.22*	.05	-.00	.13*	.16*	.14*	.11	-.02	-.04	-.10	.07	-.05	-.08	-.05
Self/ fam	.18	--	-.32*	-.18*	.68*	.17*	.23*	.22*	-.04	-.13*	-.12	.02	.07	-.12	-.21*
Empl-oyee	.32		--	.61*	-.15*	.42*	.63*	-.29*	-.06	.09	.39*	.27*	-.04	-.07	.07
Prof occ	.16			--	-.17*	-.23*	.66*	-.40*	-.13*	.09	.63*	.40*	.02	-.17*	.04
Sales	.13				--	-.20*	.23*	.11	-.08	-.01	-.05	.04	-.00	-.09	-.08
Blue col	.22					--	.15*	.14*	.07	-.09	-.18*	-.07	.00	.04	-.08
Earns	1867						--	-.30*	-.14*	.11	.47*	.54*	-.02	-.22*	-.04
<Gr 5	.48							--	-.45*	-.50*	-.37*	-.19*	.01	.25*	.02
Gr 5-7	.18								--	-.25*	-.18*	-.15*	.01	.04	.01
Gr 8-12	.22									--	-.20*	.04	.02	-.17*	-.08
Univ	.12										--	.40*	-.05	-.22*	.05
Inc	7641											--	.00	-.19*	.03
WoPrs	.17												--	.00	-.16*
Rural	.46													--	.16*
Buddh	.85														--

*--Significant, p<.05 or better.

Table 7: Multinomial logit coefficients relating family characteristics to current child care arrangements: Children ages 0-5.

Predictors	Mother vs Non-fam	Rels vs Non-fam	Mother vs Rels
Child's age[a]	-.12*	-.09*	-.03*
Mother's work			
Employee	-1.11*	1.46*	-2.57*
Self or family employed	-.37*	.42*	-.79
Not working	--	--	--
Mother's earnings			
< 2500 Baht	2.56*	-.43	2.99*
2500-4000 Baht	2.48*	.87	1.60*
> 4000 Baht	--	--	--
Mother's ed			
< Grade 5	1.58*	1.26	.31
Grades 5-7	.63	.76	-.13
Grades 8-12	-.15	.09	-.24
University	--	--	--
HH income(1000s)[b]	-.06	-.09	.03
Other married woman is present[c]	.16	.98+	-.82
Rural background	.01	.28	-.27
Buddhist	-1.06*	-.44	-.62
Constant	4.71*	2.77	1.94
Log-likelihood		-215.01*	

*--Significant, p<.05.

+--Significant, p<.10

a--In months.

b--In Baht.

c--Presence of an ever-married woman aged 15-49 in the child's household.

Table 8: Logit coefficients relating main child care arrangement in the past month to whether child was ill in the past week or past month, with and without control variables: Children aged 0-5 not chronically ill.

Child care arrangement	Ill past week?	Ill past month?
Without controls		
Mother	--	--
Relative	-1.06+	-.79+
Non-relative	-1.55	-.36
Kindergarten or school	-.98*	-1.04*
Log-likelihood	-120.34*	-187.04+
With controls[a]		
Mother	--	--
Relative	-1.03	-.81+
Non-relative	-1.51	-.34
Kindergarten or school	-.68	-.87+
Log-likelihood	-118.77	-185.42+
Mean of the dep var	.11	.23
Number of cases	355	355

*--Significant, p<.05.

+--Significant, P<.10

a--The control variables are child's age in months, mother's earnings in Baht, mother's education (four-category classification), and total household income in Baht.

DETERMINANTS OF CONTRACEPTIVE USE DYNAMICS IN THAILAND: AN ANALYSIS OF CONTRACEPTIVE STATUS CALENDAR

East-West Center
East-West Population Institute
1777 East-West Road
Honolulu, Hawaii 96848

May 1991

May 21, 1991

DETERMINANTS OF CONTRACEPTIVE USE DYNAMICS IN THAILAND: AN ANALYSIS OF CONTRACEPTIVE STATUS CALENDAR

Varachai Thongthai
Deputy director and Assistant Professor
Institute for Population and Social Research
Mahidol University, Bangkok

Minja Kim Choe
Research Associate
East-West Population Institute
East-West Center, Honolulu

and

Kua Wongboonsin
Deputy Director and Associate Professor
Institute of Population Studies
Chulalongkorn University, Bangkok

(May 1991)

A Summary Report

Submitted to

Ellen H. Starbird
Project Monitor
Policy and Evaluation, S&T/POP
United States Agency for International Development
Washington, D.C. 20523

Acknowledgements

The study reported here used data from the 1987 Determinants and Consequences of Contraceptive Use Pattern in Thailand (CUPS) which was supported by a grant from the Special Programme of Research, Development, and Research Training in Human Reproduction, World Health Organization. The survey was conducted by the Institute for Population and Social Research, Mahidol University. Most of the analysis for this report was carried out at the East-West Population Institute, East-West Center in Honolulu with funding support provided by the Demographic Data Initiatives Project through a Cooperative Agreement (DPE-3046-A-8050-00) between the Agency for International Development and the East-West Center. These funds included Research Fellowships at EWPI for Kua Wongboonsin, April 1 to May 22, 1991 and Varachai Thongthai, March 25 to May 10, 1991.

Objectives of the study

Understanding women's contraceptive use dynamics and factors associated with them can provide important quidelines for formulating successful family planning programs for a population. This report summarizes findings from a research on determinants of contraceptive use dynamics in Thailand.

A recent report on measuring contraceptive use dynamics concludes that among various survey instruments employed to collect information on contraceptive use dynamics, the method of questioning through a month-to-month calendar spanning a set period prior to the interview proposed by Laing (1985) provide superior estimates compared to other methods (United Nations, 1991). In Thailand, the contraceptive use status calendar was used in the 1987 Survey of Determinants and Consequenses of Contraceptive Use Pattern in Thailand (CUPS).

Using data from the CUPS survey, we examine factors associated with changes in contraceptive use status of women. The CUPS data consist of nationally representative sample of 6,835 ever married women of ages 15-49, and include socioeconomic background, information on contraceptive knowledge, and access to contraceptive service points (Leoprapai and Thongthai, 1989) in addition to the contraceptive use calendar which include detailed information on pregnancies, contraceptive use, and reason for not using contraceptives for every month since January 1, 1982. Our focus is on what factors determine use continuations and failures

among women who are using one of the three major non-permanent contraceptive methods in Thailnad: pills, injectables, and IUDs.

Background

The pattern of contraceptive use by married women in Thailand is summarized in Table 1. It is characterized by younger women using temporary methods for spacing and older women using sterilization for further limiting births. The trend of contraceptive prevalence by methods is given in Figure 1. It shows that the pills have been the most popular method since the beginning of the national family planning program, and still is among the temporary methods. The prevalence of sterilizations and injectables began increasing since 1975, while the prevalence of IUD has declined during the same period. The overall prevalnece level shows rapidly increasing trend reaching the 70 percent level among the currently married women at the time of survey.

Table 2 presents the annual continuation and failure rates of pills, injectables, and IUD. The different annual continuation and failure rates are considered to be due to differences in the nature of methods, the characteristics of users, and program implementation. In the following we try to estimate effects of user characteristics and porgram implemention on the continuation and failure rates of IUD, pills, and injectables.

Methodology

We first define a set of variables indicating monthly transition of use status for the months February 1986 to January 1987. This twelve months period leaves minimum of three months interval prior to the interview (interview was May-July, 1987). The three months cut-off is imposed because pregnancies of less than three months of gestation are often undetected (Trussell and Kost, 1987). Twelve months period is chosen for analysis to minimize possible biases arising from using calendar data for long span of time. The monthly status calendar can be affected by underreporting of events in the distant past. In addition, if women have heterogeneous risks of discontinuing, estimates based on a long period of observation could be biased by multiple inclusion of use episodes of women who have repeated short use-intervals (Choe and Zablan, 1991).

If a woman was using one of the contraceptive methods among pills, injectables, and IUDs during month *i* (*i* ranges from 1 to 12; included in the analysis, transition of use status is indicated by a variable TRANS(i) as follows.

TRANS(*i*) = 0 if in month *i+1*, the woman was using the same method she was using in month *i*. This category is referred to as CONTINUATION.

TRANS(*i*) = 1 if in month *i+1*, the woman was using a contraceptive method but the method was different from the

method used in month *i*. This category is referred to as SWITCH.

TRANS(*i*) = 2 if in month *i+1*, the woman was not using a method and reason for not using was not associated with the method itself, but were reasons such as "no sex," "uable to conceive," "menopause," "desire pregnancy," or "gestation which is not a result of contraceptive failure." This category is referred to as DISCONTINUATIONDUE TO INDIRECT REASONS.

TRANS(*i*) = 3 if in month *i+1*, the woman was not using a method and reason for not using was associated with method such as "side effects" and "disliking of the method." This category is referred to as DISCONTINUATION DUE TO DIRECT REASONS.

TRANS(*i*) = 4 if in monthe *i+1*, the woman was pregnant as a result of contraceptive failure. This category is referred to as DISCONTINUATION DUE TO FAILURE.

For each month a woman was using one of the contraceptive methods among pills, injectables, and IUDs, a record was created with background characteristics of women, the variable TRANS, and the number of children ever born as of the month. These records were sorted by the contraceptive methods, and constituted the method-specific use-month records.

The use-month records were analyzed to estimate effects of socioeconomic and demographic variables on the probability to (1) switch to other methods, (2) discontinue due for indirect

reasons, (3) discontinue due to direct reasons, (4) discontinue due to failure, or (5) continue to use.

Women who discontinue a specific method but switch to a different contraceptive method are considered to be successful contraceptive users but who have problems with the specific method they stopped using. The problems may be due to personal factors such as side effects or dislike of the method by either the women or husbands, or the problem may be due to program factors such as inadequate supplies or services. Women who discontinue for such reasons as wanting more children, or not needing protection (indirect discontinuation) are part of successful users, together with women who continue to use. Women who stop using contracetpives for reasons such as side effects or dislikes and do not switch to anoher method need special attention for better management of the program. These women may need to be counseled to become better users or may need to switch to a more appropriate method. Women who experience contraceptive failure and become pregnant while using a method need somewhat different attention from the program. They may need counseling to become more successful user to maximize the potential effectiveness of the method or may need to find a different method. They may also need counseling services to manage unwanted pregnancies.

Table 3 shows the annual discontinuations rates by reasons for discontinuation for pills, injectables, and IUD users, by duration of use. The discontinuation rates are high for the

users who have been using for less than 12 months. Many women discontinue pills after a very short period of using (less than 3 months) for indirect reasons. Pills may be the mthod of choice among women who have need for short term protection. Many women who begin using injectables and IUDs switch to different methods before 12 months of use.

What factors are associated with women's behavior such as switching to different method, stopping for different reasons, and experiencing failures? We try to answer this quesion by estimating a multinomial logit regression model (Retherford and Choe, 1991, Chapter 6) with monthly contraceptive use transition (TRANS) as dependent variable and women's characteristics as independent variables. The characteristics considered are: women's age, number of children ever born, source of contraceptive supply or service, region, religion, education, husband's occupation, and duration of use. We estimate different models for users of IUD, pills, and injectables. The information on the source of contraceptive supplies or services is available only for the last method used. We assume that the service points women used during the period of analysis is the same as the service points they used for the last method.

Summary of findings

Table 4 presents the means and standard deviations of the independent variables used in the model, for each set of use-

months of IUD, pills, and injectables. The IUD acceptors are slightly older and have more children than acceptors of injectables and pills. Private sources are used to a larger extent by pill users (29 percent) than users of other methods. The IUD users are least likely to use a private source for their contraceptive services (4 percent).

The estimated effects of each factors are shown in Tables 4 through 10, and summarized in the following. The effects are presented in the form of esitmated monthly probabilites of transition from the "current use" status to one of the five status indicated by the dependent variable. The estimated monthly transition probabilities are converted to the more customary annual probabilites.

For example, the probabilities for duration 0-2 months are the probabilities that women who have been using a contraceptive method for 0-2 months would continue to use, stop using and switch to a different method, stop using for indirect reasons, stop using for direct reasons, or experience failure during next month, converted to equivalent annual probabilities.

Duration of use. Table 5 presents estimated probabilities of discontinuations (by reasons), failures, and continuations by duration of use, controlled by age, number of children born, educational attainment, work status, religion, source of service, and region of residence. For shorter durations, continuation probabilities vary widely from method to method. The probabiliites of failure are very low for all of the tnree

methods: pills, injectables, and IUDs, except that for the pills at 0-2 months of use durations. This result is not surprising because the effectiveness of pills are highly dependent on the behavior of the users. Probability of discontinuation for such reasons as wanting more children or not being exposed to conception is very high among pill users, moderate among users of injectables, and low among IUD users during the first 3 months of use. This pattern is quite consistent with characteristics of the methods themselves.

Age. Age is found to be a significant factor associated with swtiching to different method among pill users. Older women are more likely to switch while younger women are likely to continue if they have been using for more than 2 months. If they have been using for a short time period, they are likely to stop using for indirect reasons.

Education. Education is a significant factor only for pill users. Women with higher level of education are less likely to experience problems or failure while using pills.

Husband's occupation. Women whose husband works in non-agricultural occupation are more likely to switch from pills to some other methods. Women whose husband is in agricultural occupation and are using injectables are more likely to discontinue than women whose husbands are in non-agricultural occupations.

Region. Region is a significant factor for contraceptive use dynamics of users of pills and injectables. Pill failure

rates are high in Bangkok and Northeast region. Switching from pills is more common in Bangkok and South region. Users of injectables in Bangkok and Northeast region experience higher rates of contraceptive failure than women in other regions. Stopping injectables for problems is more common in Bangkok and Northeast.

Religion. Religion is not a statistically significant covariate of contraceptive use dynamics.

Source of supply/services. Contraceptive use dynamics does not seem to rely on the sources of supplies and services.

Number of children ever born. This is a significant covariate only in explaining women's behavior of not stopping use of contraceptives for indirect reasons.

Conclusions

In gerneral, Thai women's behavior on contraceptive use dynamics are quite reasonable. During the initial few months of adoption, continuation of a contracpeitve use varies according to the method used. Pills seem to be the favorite method among those who need protection against becoming pregnant for only a short duration of time. Regional differences call for special attention. Quality of services and level of motivations among users may be different in different regions.

References

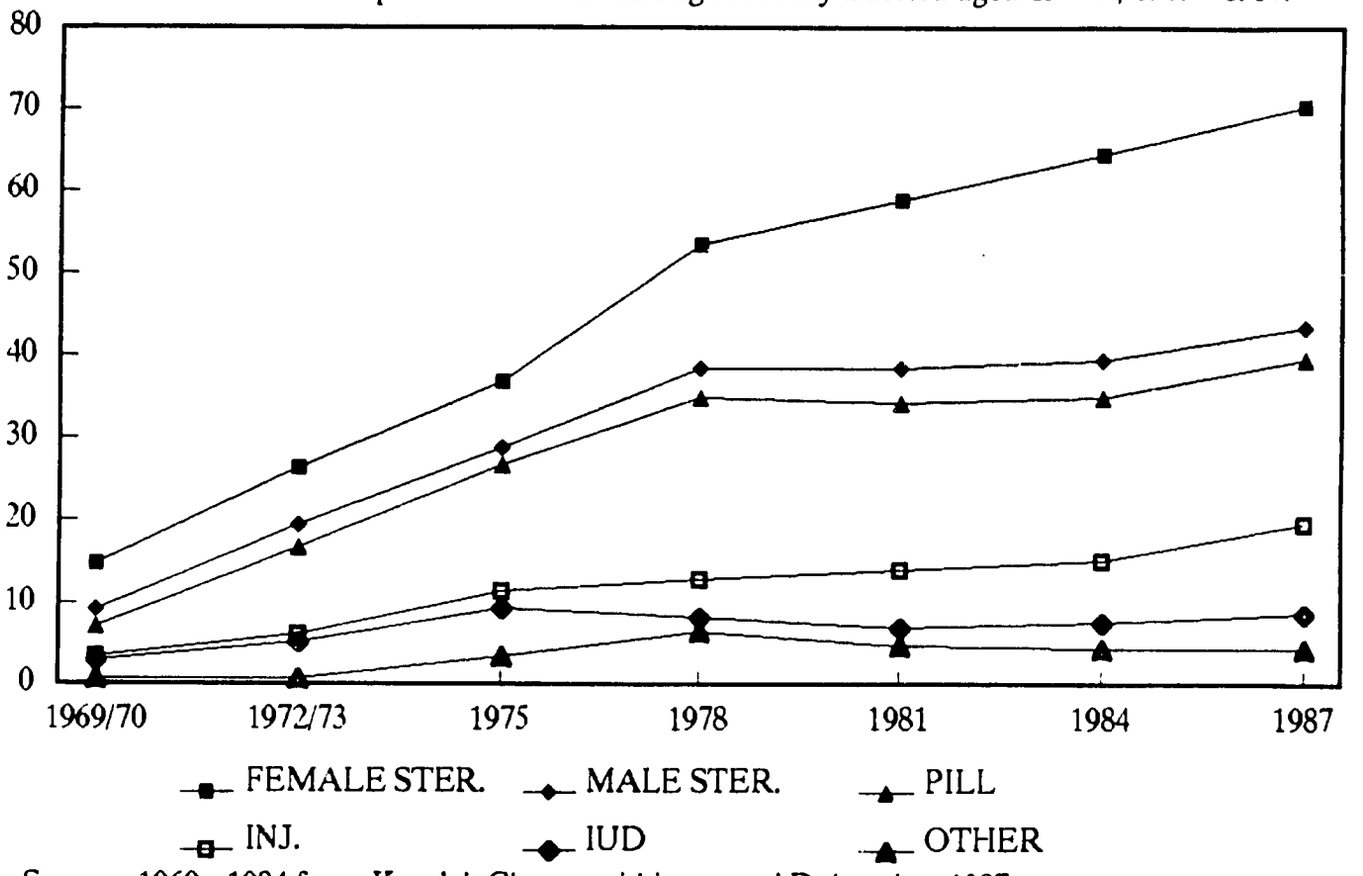
Choe, Minja Kim and Z. C. Zablan. 1991. "Contraceptive Use Discontinuation and Failure Rates in the Philippines: Estimates from the 1986 Contraceptive Prevalence Survey," in United Nations (Department of International Economic and Social Affairs), Measuring the Dynamics of Contraceptive Use. New York: United Nations.

Leoprapai, Boonlert and V. Thongthai. 1989. Contraceptive Practise of Thai WOmen 1987. Salaya, Thailand: Institute for Population and Social Research, Mahidol University

Retherford, Robert D. and M. K. Choe. 1991. Statistical Models for Causal Analysis. A book manuscript. Forthcoming.

FIGURE 1

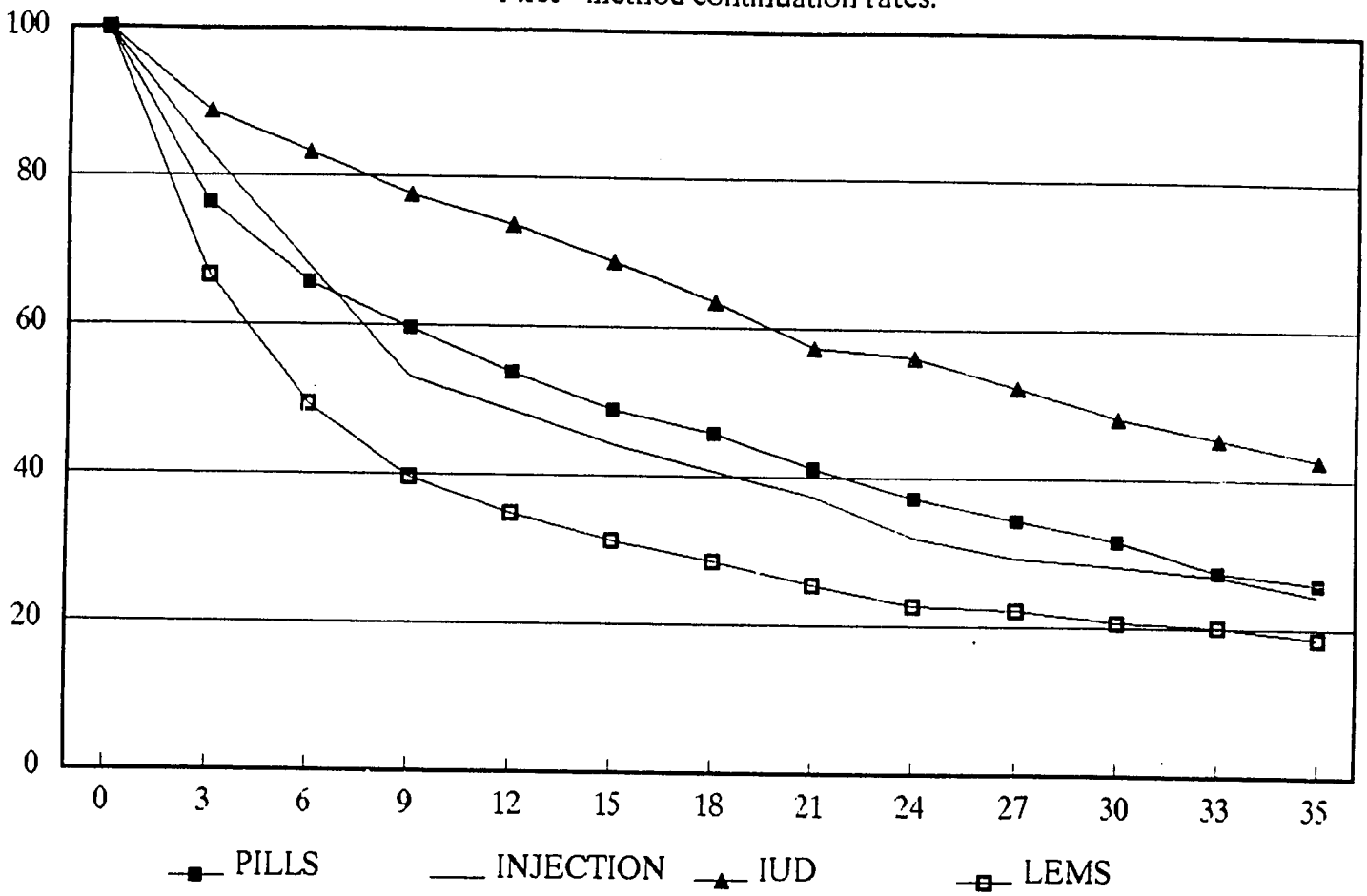
Trends in contraceptive method use among currently married aged 15–44, 1969–1987.



Source: 1969–1984 from Knodel, Chamratrithirong and Debavalya, 1987.
1987 from Leoprapai and Thongthai (1989), Table 5.1

FIGURE 2

First–method continuation rates.



Source: Wongboonsin, Thongthai and Choe, (1991): Figure 1–4.

FIGURE 3

Contraceptive use prevalence (ever married women 15–44)

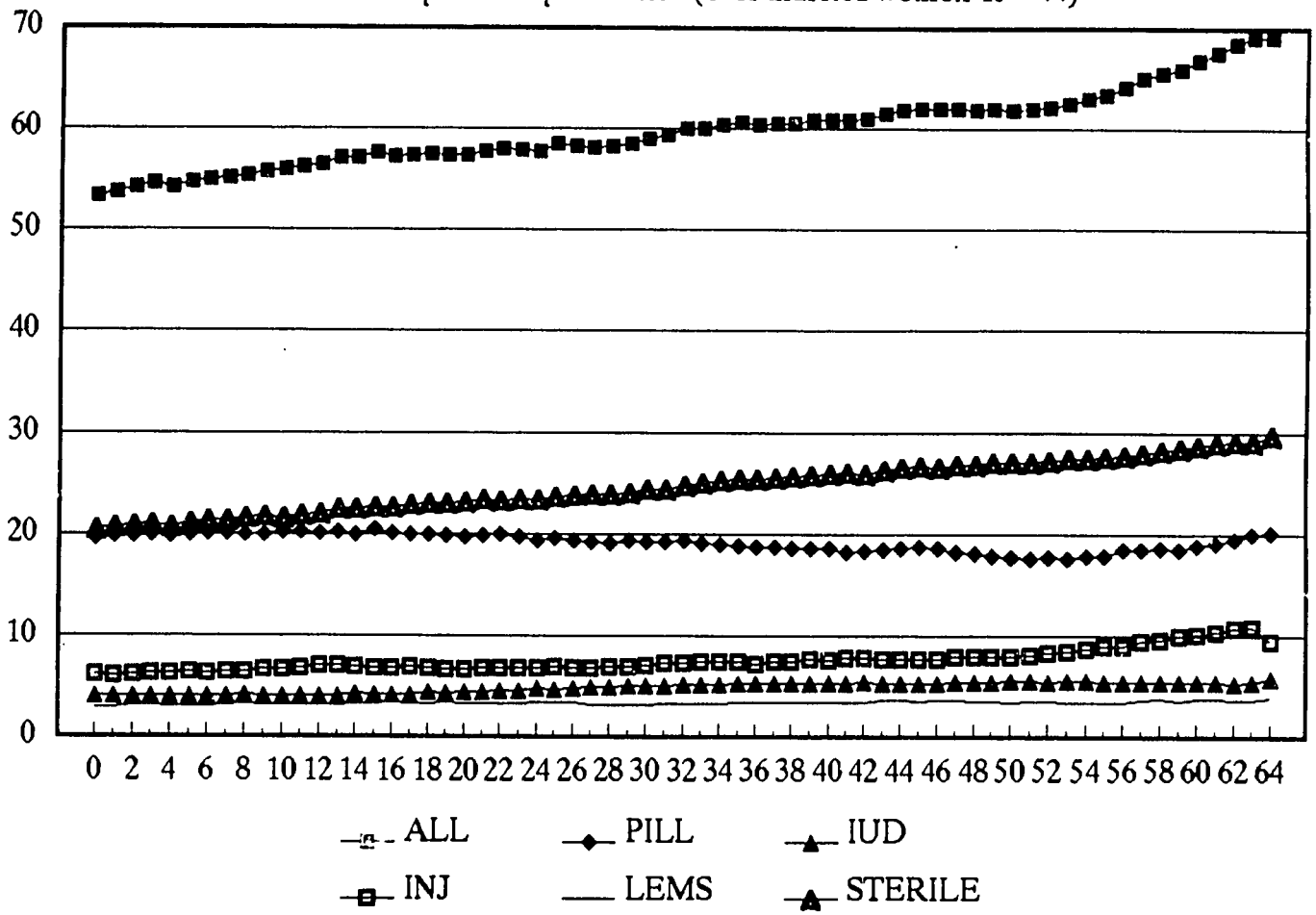


Table 1: Percent distribution of currently married women aged 15-49 by contraceptive method and age, 1987.

Method	Age group							All
	15-19	20-24	25-29	30-34	35-39	40-44	45-59	
Female ster.	1.3	7.2	19.1	31.9	42.2	38.4	27.9	25.5
Male ster.	0.9	0.3	3.0	4.0	5.8	9.0	6.1	4.0
Pills	26.3	26.1	22.5	20.0	12.9	12.2	10.9	19.3
Injectables	14.6	17.5	12.4	8.2	8.0	5.7	4.2	10.5
IUD	4.4	5.9	7.6	6.7	5.4	4.4	3.2	6.0
Condom	3.2	0.9	2.4	2.1	1.9	1.2	0.2	1.7
Others	0.9	2.1	2.5	3.0	2.7	2.3	1.0	2.4
None	48.5	40.1	30.6	24.1	21.2	26.8	46.7	30.7
Total	100.%	100.%	100.%	100.%	100.%	100.%	100.%	100.%

Table 2: Annual cross-sectional continuation and failure rates by method and period, 1987.

Period	Pill	Injection	IUD
12 months: 1986			
ACR	63.9	60.8	74.5
AFR	3.1	0.8	2.9

Source: Wongboonsin, Thongthai and Choe (1990) Table 7.

Table 3: Anual discontinuation rates by reasons, failure, and continuation by contraceptive method and duration of use.

Duration of use	Discontinue			Failure	Continue
	Switch	Indirect	Direct		
Pills					
0-2	21.65	52.50	10.19	1.37	14.29
3-5	37.90	4.74	5.41	0.00	51.95
6-11	26.46	1.48	2.82	0.11	69.13
12-23	0.31	0.90	1.20	0.25	97.33
24+	0.20	1.62	0.00	0.00	98.18
Injectables					
0-2	44.38	24.17	11.68	0.00	19.77
3-5	54.06	1.51	4.29	0.00	40.14
6-11	37.18	1.35	8.43	0.00	53.04
12-23	3.91	0.00	0.38	0.00	95.71
24+	2.28	0.00	0.09	0.00	97.63
IUD					
0-2	39.32	9.71	2.10	0.11	48.75
3-5	47.91	0.00	1.15	1.93	50.94
6-11	34.75	0.00	0.19	0.00	65.07
12-23	0.00	0.00	0.00	0.01	99.99
24+	1.70	0.03	0.00	0.00	98.27

Notes: 1. Indirect discontinuation includes discontinuation due to "no sex,", "unable to conceive", "menopause", "desired pregnancy" or "gestation which is not a result of contraceptive failure".

2. Direct discontinuation includes discontinuation due to "side effects" or "disliking of the method".

Table 4: Estimated contraceptive use transition probabilities by method, duration of use and age.

Method	Duration	Age	Discontinue			Failure	Continue
			Switch	Indirect	Direct		
Pills	0-2	20	11.88	59.18	11.07	1.57	16.30
		30	22.31	52.08	10.13	1.35	14.13
		40	38.54	42.13	8.52	1.07	9.73
	3-5	20	22.21	5.71	6.27	0.00	65.81
		30	38.91	4.69	5.36	0.00	51.05
		40	61.35	3.46	4.11	0.00	31.08
	6-11	20	14.88	1.71	3.14	0.13	80.14
		30	27.24	1.46	2.80	0.11	68.38
		40	46.36	1.17	2.32	0.09	50.06
	12-23	20	0.16	0.97	1.24	0.28	97.35
		30	0.32	0.90	1.20	0.25	97.32
		40	0.64	0.84	1.16	0.23	97.13
	24+	20	0.11	1.73	0.00	0.00	98.16
		30	0.21	1.61	0.00	0.00	98.18
		40	0.42	1.50	0.00	0.00	98.08
Injection	0-2	20	46.25	18.26	9.05	0.00	26.43
		30	44.15	24.72	11.92	0.00	19.20
		40	40.47	32.14	15.08	0.00	12.30
	3-5	20	51.97	1.05	3.07	0.00	43.91
		30	54.23	1.56	4.41	0.00	39.80
		40	56.09	2.29	6.30	0.00	35.33
	6-11	20	35.63	0.94	6.01	0.00	57.43
		30	37.30	1.40	8.68	0.00	52.63
		40	38.58	2.05	12.39	0.00	46.98
	12-23	20	3.61	0.00	0.26	0.00	96.13
		30	3.93	0.00	0.39	0.00	95.67
		40	4.29	0.00	0.59	0.00	95.12
	24+	20	2.10	0.00	0.06	0.00	97.83
		30	2.29	0.00	0.10	0.00	97.61
		40	2.50	0.00	0.14	0.00	97.35

Table 4 (cont.).

Method	Duration	Age	Discontinue			Failure	Continue
			Switch	Indirect	Direct		
Iud	0-2	20	34.42	6.86	3.63	0.23	54.87
		30	38.82	9.38	2.23	0.12	49.45
		40	43.06	12.61	1.34	0.06	42.92
	3-5	20	41.61	0.00	1.97	0.00	56.42
		30	47.25	0.00	1.21	0.00	51.54
		40	53.14	0.00	0.74	0.00	46.12
	6-11	20	29.77	0.00	0.32	0.00	69.91
		30	34.21	0.00	0.20	0.00	65.59
		40	39.08	0.00	0.12	0.00	60.80
	12-23	20	0.00	0.00	0.00	0.01	99.99
		30	0.00	0.00	0.00	0.01	99.99
		40	0.00	0.00	0.00	0.00	100.00
	24+	20	1.41	0.02	0.00	0.00	98.57
		30	1.67	0.02	0.00	0.00	98.30
		40	1.98	0.03	0.00	0.00	97.98

See footnotes to Table 3 for definitions of Indirect and Direct discontinuations.

Table 5: Estimated contraceptive use transition probabilities by method, duration of use and education.

Method	Duration	Education	Discontinue			Failure	Continue
			Switch	Indirect	Direct		
Pills	0-2	<4	10.67	58.95	19.05	4.50	6.82
		4	23.96	48.37	10.26	1.52	15.89
		5+	19.34	61.65	7.27	0.55	11.20
	3-5	<4	25.01	7.13	13.54	0.00	54.31
		4	39.82	4.15	5.17	0.00	50.87
		5+	37.29	6.13	4.25	0.00	52.33
	6-11	<4	17.53	2.23	7.09	0.49	72.66
		4	27.85	1.30	2.70	0.12	68.03
		5+	26.06	1.91	2.22	0.05	69.76
	12-13	<4	0.20	1.31	2.90	1.08	94.51
		4	0.33	0.80	1.16	0.27	97.44
		5+	0.31	1.17	0.94	0.11	97.47
	24+	<4	0.13	2.37	0.00	0.00	97.49
		4	0.22	1.43	0.00	0.00	98.35
		5+	0.20	2.08	0.00	0.00	97.72
Injection	0-2	<4	52.20	21.99	3.43	0.00	22.38
		4	44.73	20.34	13.38	0.00	21.54
		5+	37.97	38.57	11.42	0.00	12.04
	3-5	<4	59.15	1.28	1.17	0.00	38.40
		4	53.06	1.24	4.79	0.00	40.91
		5+	54.60	2.85	4.95	0.00	37.61
	6-11	<4	42.04	1.18	2.38	0.00	54.39
		4	36.25	1.10	9.35	0.00	53.30
		5+	37.63	2.55	9.75	0.00	50.06
	12-13	<4	4.36	0.00	0.11	0.00	95.53
		4	3.80	0.00	0.42	0.00	95.78
		5+	4.06	0.00	0.45	0.00	95.49
	24+	<4	2.54	0.00	0.03	0.00	97.43
		4	2.22	0.00	0.10	0.00	97.68
		5+	2.37	0.00	0.11	0.00	97.52

Table 5 (cont.).

Method	Duration	Education	Discontinue			Failure	Continue
			Switch	Indirect	Direct		
IUD	0-2	<4	55.26	8.94	2.55	0.00	33.25
		4	40.96	8.31	1.97	0.34	48.42
		5+	28.07	18.45	2.46	0.20	50.81
	3-5	<4	65.67	0.00	1.36	0.00	32.98
		4	49.40	0.00	1.07	0.00	49.54
		5+	36.85	0.00	1.45	0.00	61.70
	6-11	<4	50.75	0.00	0.24	0.00	49.01
		4	35.97	0.00	0.17	0.00	63.86
		5+	25.93	0.00	0.23	0.00	73.84
	12-13	<4	0.00	0.00	0.00	0.02	99.98
		4	0.00	0.00	0.00	0.01	99.99
		5+	0.00	0.00	0.00	0.00	100.00
	24+	<4	2.85	0.03	0.00	0.00	97.13
		4	1.78	0.02	0.00	0.00	98.20
		5+	1.20	0.05	0.00	0.00	98.76

See footnotes to Tables 3 for definitions of Indirect and Direct discontinuations.

Table 6: Estimated contraceptive use transition probabilities by method, duration of use and husband occupation.

Method	Duration	Occupation	Discontinue			Failure	Continue
			Switch	Indirect	Direct		
Pills	0-2	Agriculture	20.83	54.20	9.73	1.18	14.06
		Non agriculture	28.94	44.64	11.77	1.01	13.64
		Not working	14.18	59.27	8.81	3.50	14.23
	3-5	Agriculture	37.00	4.97	5.24	0.00	52.80
		Non agriculture	47.21	3.76	5.82	0.00	43.21
		Not working	27.13	5.85	5.11	0.00	61.91
	6-11	Agriculture	25.76	1.54	2.72	0.10	69.87
		Non agriculture	33.97	1.21	3.13	0.08	61.61
		Not working	18.36	1.77	2.58	0.30	77.00
	12-13	Agriculture	0.30	0.94	1.16	0.22	97.38
		Non agriculture	0.42	0.78	1.41	0.19	97.19
		Not working	0.20	1.02	1.04	0.65	97.08
	24+	Agriculture	0.20	1.68	0.00	0.00	98.12
		Non agriculture	0.28	1.40	0.00	0.00	98.32
		Not working	0.13	1.83	0.00	0.00	98.04
Injection	0-2	Agriculture	43.28	33.93	7.27	0.00	15.53
		Non agriculture	42.12	16.35	21.75	0.00	19.78
		Not working	43.32	11.71	17.37	0.01	27.59
	3-5	Agriculture	56.74	2.28	2.87	0.00	38.10
		Non agriculture	51.14	1.02	7.96	0.00	39.88
		Not working	48.38	0.67	5.85	0.00	45.10
	6-11	Agriculture	39.75	2.08	5.75	0.00	52.42
		Non agriculture	34.18	0.89	15.21	0.00	49.72
		Not working	32.32	0.58	11.17	0.00	55.93
	12-13	Agriculture	4.20	0.00	0.26	0.00	95.54
		Non agriculture	3.70	0.00	0.71	0.00	95.59
		Not working	3.32	0.00	0.49	0.00	96.19
	24+	Agriculture	2.45	0.00	0.06	0.00	97.49
		Non agriculture	2.16	0.00	0.17	0.00	97.66
		Not working	1.93	0.00	0.12	0.00	97.95

Table 6 (cont.).

Method	Duration	Occupation	Discontinue			Failure	Continue
			Switch	Indirect	Direct		
IUD	0-2	Agriculture	43.53	10.53	2.13	0.14	43.67
		Non agriculture	40.43	10.59	1.05	0.09	47.85
		Not working	17.01	4.37	4.95	0.03	73.63
	3-5	Agriculture	53.08	0.00	1.16	0.00	45.75
		Non agriculture	49.31	0.00	0.57	0.00	50.12
		Not working	20.70	0.00	2.70	0.00	76.60
	6-11	Agriculture	39.14	0.00	0.19	0.00	60.67
		Non agriculture	35.78	0.00	0.09	0.00	64.13
		Not working	14.08	0.00	0.41	0.00	85.50
	12-13	Agriculture	0.00	0.00	0.00	0.01	99.99
		Non agriculture	0.00	0.00	0.00	0.01	99.99
		Not working	0.00	0.00	0.00	0.00	100.00
	24+	Agriculture	1.99	0.03	0.00	0.00	97.99
		Non agriculture	1.77	0.03	0.00	0.00	98.20
		Not working	0.60	0.01	0.00	0.00	99.39

See footnotes to Tables 3 for definitions of Indirect and Direct discontinuations.

Table 7: Estimated contraceptive use transition probabilities by method, duration of use and region

Method	Duration	Region	Discontinue			Failure	Continue
			Switch	Indirect	Direct		
Pills	0-2	Bangkok	30.49	48.18	6.70	4.77	9.86
		Central	20.66	43.45	12.18	6.42	17.29
		North	20.22	54.91	6.07	4.58	14.22
		Northeast	12.98	51.06	17.41	7.83	10.72
		South	30.10	44.41	10.94	0.00	14.55
	3-5	Bangkok	53.38	4.35	3.56	0.00	38.71
		Central	34.62	3.76	6.18	0.00	55.44
		North	36.50	5.11	3.32	0.00	55.07
		Northeast	26.59	5.40	10.81	0.00	57.21
		South	47.89	3.65	5.27	0.00	43.19
	6-11	Bangkok	38.99	1.42	1.94	0.40	57.25
		Central	23.80	1.15	3.18	0.49	71.38
		North	25.14	1.57	1.71	0.38	71.20
		Northeast	18.30	1.66	5.56	0.73	73.75
		South	34.45	1.17	2.83	0.00	61.55
	12-13	Bangkok	0.50	0.95	0.91	1.02	96.62
		Central	0.27	0.69	1.33	1.11	96.60
		North	0.29	0.95	0.72	0.86	97.19
		Northeast	0.21	0.97	2.26	1.61	94.96
		South	0.43	0.76	1.28	0.00	97.53
	24+	Bangkok	0.33	1.71	0.00	0.00	97.96
		Central	0.18	1.25	0.00	0.00	98.57
		North	0.19	1.70	0.00	0.00	98.11
		Northeast	0.14	1.76	0.00	0.00	98.11
		South	0.28	1.36	0.00	0.00	98.36
Injection	0-2	Bangkok	34.65	20.21	21.94	3.20	20.00
		Central	34.85	39.43	5.93	0.00	19.79
		North	52.95	21.76	2.99	0.00	22.30
		Northeast	40.19	20.84	23.44	2.17	13.36
		South	51.54	30.05	9.04	0.00	9.38
	3-5	Bangkok	44.59	1.33	8.52	0.00	45.56
		Central	46.42	2.69	2.38	0.00	48.50
		North	59.77	1.26	1.02	0.00	37.96
		Northeast	53.89	1.43	9.47	0.00	35.21
		South	68.60	2.05	3.63	0.00	25.72

Table 7 (cont.).

Method	Duration	Region	Discontinue			Failure	Continue
			Switch	Indirect	Direct		
	6-11	Bangkok	29.11	1.13	15.89	0.00	53.87
		Central	31.42	2.38	4.61	0.00	61.59
		North	42.61	1.17	2.07	0.00	54.14
		Northeast	36.15	1.25	18.16	0.00	44.43
		South	50.38	1.96	7.61	0.00	40.04
	12-13	Bangkok	3.05	0.00	0.71	0.00	96.24
		Central	3.08	0.00	0.19	0.00	96.72
		North	4.43	0.00	0.09	0.00	95.48
		Northeast	4.12	0.00	0.89	0.00	94.9
		South	5.99	0.00	0.39	0.00	93.6
	24+	Bangkok	1.77	0.00	0.17	0.00	98.05
		Central	1.79	0.00	0.05	0.00	98.16
		North	2.58	0.00	0.02	0.00	97.40
		Northeast	2.41	0.00	0.22	0.00	97.37
		South	3.51	0.00	0.10	0.00	96.40
IUD	0-2	Bangkok	25.15	10.70	18.99	3.94	41.23
		Central	75.59	0.00	5.39	7.93	11.09
		North	42.18	20.27	0.00	0.00	37.55
		Northeast	31.74	22.94	7.59	1.64	36.09
		South	31.91	32.47	5.58	0.00	30.05
	3-5	Bangkok	34.21	0.00	11.57	0.00	54.22
		Central	87.11	0.00	2.79	0.00	10.11
		North	54.85	0.00	0.00	0.00	45.15
		Northeast	44.47	0.00	4.77	0.00	50.77
		South	47.59	0.00	3.73	0.00	48.68
	6-11	Bangkok	25.45	0.00	1.94	0.00	72.61
		Central	76.84	0.00	0.55	0.00	22.60
		North	40.36	0.00	0.00	0.00	59.64
		Northeast	32.67	0.00	0.79	0.00	66.54
		South	35.07	0.00	0.62	0.00	64.31
	12-13	Bangkok	0.00	0.00	0.00	0.27	99.73
		Central	0.00	0.00	0.00	0.94	99.06
		North	0.00	0.00	0.00	0.00	100.00
		Northeast	0.00	0.00	0.00	0.12	99.88
		South	0.00	0.00	0.00	0.00	100.00

Table 7 (cont.)

Method	Duration	Region	Discontinue			Failure	Continue
			Switch	Indirect	Direct		
	24+	Bangkok	1.18	0.03	0.00	0.00	98.79
		Central	6.01	0.00	0.00	0.00	93.99
		North	2.06	0.06	0.00	0.00	97.88
		Northeast	1.59	0.07	0.00	0.00	98.35
		South	1.73	0.11	0.00	0.00	98.16

See footnotes to Tables 3 for definitions of Indirect and Direct discontinuations.

Table 8: Estimated contraceptive use transition probabilities by method duration of use and religion.

Method	Duration	Religion	Discontinue			Failure	Continue
			Switch	Indirect	Direct		
Pills	0-2	Buddhist	22.41	51.92	9.82	1.34	14.50
		Others	11.17	59.68	18.14	1.73	9.29
	3-5	Buddhist	38.81	4.64	5.16	0.00	51.39
		Others	24.14	6.65	11.88	0.00	57.33
	6-11	Buddhist	27.13	1.45	2.69	0.11	68.62
		Others	16.73	2.06	6.15	0.17	74.89
	12-13	Buddhist	0.32	0.89	1.15	0.25	97.39
		Others	0.19	1.20	2.50	0.38	95.74
	24+	Buddhist	0.21	1.59	0.00	0.00	98.20
		Others	0.12	2.16	0.00	0.00	97.72
Injection	0-2	Buddhist	45.74	23.99	10.93	0.00	19.35
		Others	28.56	24.74	24.78	0.00	21.92
	3-5	Buddhist	55.49	1.49	4.00	0.00	39.02
		Others	37.41	1.66	9.79	0.00	51.14
	6-11	Buddhist	38.41	1.35	7.91	0.00	52.34
		Others	23.76	1.38	17.77	0.00	57.09
	12-13	Buddhist	4.06	0.00	0.36	0.00	95.58
		Others	2.42	0.00	0.78	0.00	96.80
	24+	Buddhist	2.37	0.00	0.09	0.00	97.54
		Others	1.41	0.00	0.19	0.00	98.40
IUD	0-2	Buddhist	38.41	14.79	1.94	0.17	44.69
		Others	26.25	0.00	8.36	0.00	65.40
	3-5	Buddhist	48.53	0.00	1.10	0.00	50.38
		Others	31.08	0.00	4.43	0.00	64.48
	6-11	Buddhist	35.25	0.00	0.18	0.00	64.57
		Others	21.92	0.00	0.70	0.00	77.38
	12-13	Buddhist	0.00	0.00	0.00	0.01	99.99
		Others	0.00	0.00	0.00	0.00	0.00
	24+	Buddhist	1.74	0.04	0.00	0.00	98.22
		Others	0.99	0.00	0.00	0.00	99.01

See footnotes to Tables 3 for definitions of Indirect and Direct discontinuations.

Table 9: Estimated contraceptive use transition probabilities by method, duration of use and outlets

Method	Duration	Outlets	Discontinue			Failure	Continue
			Switch	Indirect	Direct		
Pills	0-2	government	21.88	51.83	10.94	1.35	14.00
		private	21.04	54.08	8.54	1.39	14.95
	3-5	government	38.34	4.69	5.81	0.00	51.17
		private	36.80	4.88	4.53	0.00	53.79
	6-11	government	26.84	1.46	3.04	0.11	68.54
		private	25.52	1.51	2.35	0.11	70.52
	12-13	government	0.32	0.90	1.30	0.25	97.23
		private	0.30	0.92	0.99	0.26	97.54
	24+	government	0.21	1.61	0.00	0.00	98.18
		private	0.19	1.64	0.00	0.00	98.17
Injection	0-2	government	42.20	24.12	13.15	0.00	20.53
		private	53.80	23.74	6.79	0.00	15.68
	3-5	government	51.68	1.52	4.85	0.00	41.95
		private	64.51	1.46	2.45	0.00	31.58
	6-11	government	35.14	1.34	9.43	0.00	54.08
		private	46.65	1.38	5.07	0.00	46.91
	12-13	government	3.66	0.00	0.42	0.00	95.92
		private	5.17	0.00	0.24	0.00	94.59
	24+	government	2.14	0.00	0.10	0.00	97.76
		private	3.02	0.00	0.06	0.00	96.92
IUD	0-2	government	34.76	18.81	4.37	0.21	41.85
		private	81.21	0.00	0.00	0.00	18.79
	3-5	government	45.83	0.00	2.58	0.00	51.59
		private	86.03	0.00	0.00	0.00	13.97
	6-11	government	33.33	0.00	0.42	0.00	66.25
		private	72.77	0.00	0.00	0.00	27.23
	12-13	government	0.00	0.00	0.00	0.01	99.99
		private	0.00	0.00	0.00	0.00	100.00
	24+	government	1.62	0.05	0.00	0.00	98.33
		private	5.28	0.00	0.00	0.00	94.72

See footnotes to Tables 3 for definitions of Indi and Direct discontinuations.

Table 10: Estimated contraceptive use transition probabilities by method, duration of use and children ever born.

Method	Duration	CEB	Discontinue			Failure	Continue
			Switch	Indirect	Direct		
Pills	0-2	0	19.32	66.04	7.85	1.04	5.74
		1	20.63	59.86	8.99	1.20	9.32
		2	21.58	53.15	10.09	1.35	13.82
		3	22.12	46.26	11.10	1.50	19.02
		4	22.26	39.51	11.98	1.62	24.63
	3-5	0	43.27	7.63	5.33	0.00	43.77
		1	40.73	6.10	5.38	0.00	47.79
		2	38.15	4.85	5.41	0.00	51.60
		3	35.58	3.84	5.41	0.00	55.17
		4	33.06	3.03	5.40	0.00	58.52
	6-11	0	31.34	2.47	2.88	0.11	63.19
		1	28.95	1.94	2.86	0.11	66.15
		2	26.67	1.51	2.82	0.11	68.88
		3	24.52	1.18	2.79	0.11	71.40
		4	22.50	0.92	2.74	0.11	73.73
	12-13	0	0.25	2.81	0.00	0.00	96.94
		1	0.23	2.16	0.00	0.00	97.61
		2	0.21	1.66	0.00	0.00	98.13
		3	0.19	1.28	0.00	0.00	98.54
		4	0.17	0.98	0.00	0.00	98.85
	24+	0	0.25	2.81	0.00	0.00	96.94
		1	0.23	2.16	0.00	0.00	97.61
		2	0.21	1.66	0.00	0.00	98.13
		3	0.19	1.28	0.00	0.00	98.54
		4	0.17	0.98	0.00	0.00	98.85
Injection	0-2	0	46.60	22.81	14.57	0.00	16.01
		1	45.66	23.44	13.22	0.00	17.67
		2	44.64	24.03	11.97	0.00	19.36
		3	43.55	24.58	10.82	0.00	21.06
		4	42.39	25.09	9.75	0.00	22.77
	3-5	0	65.29	1.32	10.86	0.00	47.51
		1	56.30	1.48	4.92	0.00	37.31
		2	54.50	1.51	4.41	0.00	39.58
		3	52.69	1.53	3.95	0.00	41.84
		4	50.86	1.54	3.53	0.00	44.07

Table 10 (cont.).

Method	Duration	CEB	Discontinue			Failure	Continue
			Switch	Indirect	Direct		
	6-11	0	40.31	1.32	10.86	0.00	47.51
		1	38.93	1.34	9.71	0.00	50.02
		2	37.52	1.35	8.67	0.00	52.46
		3	36.11	1.36	7.73	0.00	54.80
		4	34.70	1.37	6.88	0.00	57.05
	12-13	0	4.45	0.00	0.51	0.00	95.03
		1	4.20	0.00	0.45	0.00	95.35
		2	3.96	0.00	0.39	0.00	95.64
		3	3.74	0.00	0.34	0.00	95.92
		4	3.53	0.00	0.30	0.00	96.17
	24+	0	2.60	0.00	0.13	0.00	97.27
		1	2.45	0.00	0.11	0.00	97.44
		2	2.31	0.00	0.10	0.00	97.59
		3	2.18	0.00	0.08	0.00	97.74
		4	2.05	0.00	0.07	0.00	97.87
IUD	0-2	0	39.93	10.84	2.21	0.11	46.91
		1	39.71	10.41	2.17	0.11	47.60
		2	39.49	10.00	2.13	0.11	48.28
		3	39.25	9.59	2.09	0.11	48.95
		4	39.02	9.21	2.05	0.11	49.61
	3-5	0	49.01	0.00	1.21	0.00	49.78
		1	48.60	0.00	1.19	0.00	50.21
		2	48.19	0.00	1.17	0.00	50.64
		3	47.79	0.00	1.14	0.00	51.07
		4	47.39	0.00	1.12	0.00	51.50
	6-11	0	35.68	0.00	0.20	0.00	64.12
		1	35.33	0.00	0.19	0.00	64.48
		2	34.99	0.00	0.19	0.00	64.82
		3	34.64	0.00	0.19	0.00	65.17
		4	34.30	0.00	0.18	0.00	65.51

Table 10 (cont.).

Method	Duration	CEB	Discontinue			Failure	Continue
			Switch	Indirect	Direct		
	12-13	0	0.00	0.00	0.00	0.01	99.99
		1	0.00	0.00	0.00	0.01	99.99
		2	0.00	0.00	0.00	0.01	99.99
		3	0.00	0.00	0.00	0.01	99.99
		4	0.00	0.00	0.00	0.01	99.99
	24+	0	1.76	0.03	0.00	0.00	98.21
		1	1.74	0.03	0.00	0.00	98.23
		2	1.72	0.03	0.00	0.00	98.25
		3	1.70	0.03	0.00	0.00	98.28
		4	1.68	0.02	0.00	0.00	98.30

See footnotes to Tables 3 for definitions of Indirect and Direct discontinuations.

Appendix 1. Estimated multinomial logit regression coefficients, and means and standard deviation of determinants of contraceptive use transition for pill users of aged 15-49.

Covariates	logistic coefficients				Mean	S.D.
	switch/ cont.	ind./ cont.	dir./ cont.	fail/ cont.		
Constant	-10.810*	-5.287*	-24.656	-22.503		
Age	0.069*	-0.007	-0.003	-0.009	29.50	6.59
Children ever born	-0.103	-0.266*	-0.032	-0.026	2.10	1.54
Private source	-0.065	0.017	-0.273	0.002	0.29	0.45
Region						
Central	-0.605	-0.319	0.381	0.082	0.13	0.34
Northern	-0.549*	-0.007	-0.237	-0.178	0.25	0.44
Northeastern	0.885*	0.027	0.924*	0.465	0.28	0.45
Southern	-0.160	-0.229	0.343	-18.540	0.08	0.27
Religion not Buddhism	-0.529	0.307	0.781	0.423	0.05	0.23
Education						
Elementary	0.497	-0.510	-0.932*	-1.395*	0.70	0.46
Secondary	0.418	-0.133	-1.141*	-2.280*	0.21	0.41
Husband's occupation						
Agriculture	0.389	-0.085	0.104	-1.085*	0.54	0.50
Non-agriculture	0.729*	-0.267	0.306	-1.228*	0.29	0.45
Duration of use						
0-2 months.	5.557*	4.371*	21.461	20.729	0.15	0.36
3-5 months.	5.552*	1.402*	20.262	0.115	0.06	0.23
6-11 months.	5.050*	0.093	19.468	17.508	0.11	0.31
12-23 months.	0.427	-0.578	18.437	18.162	0.19	0.39

* $p<0.05$

Note: Dependent variable of the model indicates contraceptive use transition from month i to month i+1 as follows:
0: if woman is continuing to use the same method (CONT)
1: if woman switched to different method (SWITCH)
2: if woman stopped using for reasons not directly associated with the method (IND)
3: if woman stopped using for reasons directly related to the method (DIR)
4: if woman became pregnant while using (FAIL)

Appendix 2. Estimated multinomial logit regression coefficients, and means and standard deviation of determinants of contraceptive use transition for injection users of aged 15-49.

Covariates	logistic coefficients					
	switch/ cont.	ind./ cont.	dir./ cont.	fail/ cont.	Mean	S.D.
Constant	-6.713*	-27.580	-10.693*	-37.591		
Age	0.009	0.044	0.041	-0.035	29.20	6.47
Children ever born	-0.060	-0.012	-0.137	-0.089	2.25	1.43
Private source	0.352	0.094	-0.552	-0.421	0.19	0.39
Region						
Central	0.010	0.673	-1.303*	-19.037	0.07	0.26
Northern	0.379	0.028	-2.039*	-17.994	0.25	0.43
Northeastern	0.310	0.192	0.227	-0.227	0.24	0.43
Southern	0.691*	0.690	-0.594	-17.364	0.11	0.32
Religion not Buddhism	-0.523	-0.021	0.767	-14.527	0.07	0.26
Education						
Elementary	-0.138	-0.062	1.378	16.425	0.68	0.47
Secondary	-0.071	0.810	1.451	15.946	0.28	0.42
Husband's occupation						
Agriculture	0.239	1.303*	-0.632	-1.881	0.56	0.49
Non-agriculture	0.114	0.475	0.367	-1.883	0.28	0.45
Duration of use						
0-2 months.	3.728*	21.984	5.590*	19.400	0.15	0.35
3-5 months.	3.614*	18.900	4.277*	-0.801	0.12	0.32
6-11 months.	3.106*	18.656	4.819*	-0.040	0.17	0.38
12-23 months.	0.550	-0.047	1.416	0.073	0.22	0.41

* $p<0.05$

Appendix 3. Estimated multinomial logit regression coefficients, and means and standard deviation of determinants of contraceptive use transition for IUD users of aged 15-49.

Covariates	logistic coefficients				Mean	S.D.
	switch/ cont.	ind./ cont.	dir./ cont.	fail/ cont.		
Constant	-7.972*	-11.293*	-20.554	-39.814		
Age	0.017	0.036	-0.044	-0.058	31.15	6.51
Children ever born	-0.013	-0.048	-0.025	-0.010	2.70	1.61
Private source	1.200*	-17.372	-19.050	-17.091	0.04	0.20
Region						
Central	1.652	-15.854	-0.708	1.250	0.06	0.23
Northern	0.561	0.682	-18.583	-18.309	0.09	0.28
Northeastern	0.294	0.824	-0.855	-0.814	0.65	0.48
Southern	0.383	1.254	-1.080	-17.623	0.09	0.29
Religion not Buddhism	-0.568	-14.481	1.275	-15.069	0.03	0.18
Education						
Elementary	-0.475	-0.249	-0.430	17.194	0.76	0.43
Secondary	-0.876	0.526	-0.231	16.636	0.18	0.38
Husband's occupation						
Agriculture	1.199	1.137	-0.587	1.663	0.72	0.45
Non-agriculture	1.081	1.099	-1.339	1.144	0.17	0.38
Duration of use						
0-2 months.	3.497*	6.305*	20.072	20.114	0.09	0.29
3-5 months.	3.673*	-15.008	19.445	-0.086	0.03	0.18
6-11 months.	3.230*	-15.157	17.512	-0.294	0.14	0.35
12-23 months.	-17.217	-15.243	-0.536	16.993	0.19	0.39

* $p<0.05$

315

ANALYSIS OF THE 1987 NATIONAL INDONESIAN CONTRACEPTIVE PREVALENCE SURVEY: IMPLICATIONS FOR PROGRAM EVALUATION AND POLICY FORMULATION

East-West Center
East-West Population Institute
1777 East-West Road
Honolulu, Hawaii 96848

August 1991

Analysis of the 1987 National Indonesian Contraceptive Prevalence Survey: Implications for Program Evaluation and Policy Formulation

Sumarsono[1]

Sudibyo Alimoeso[1]

Srihartati P. Pandi[2]

Andrew Kantner[3]

Office of Planning[1]
Office of Program Development[2]
National Family Planning Coordinating Board (BKKBN)
Jakarta, Indonesia

East-West Population Institute[3]
East-West Center
Honolulu, Hawaii

Paper prepared for presentation at the Demographic and Health Surveys World Conference, August 5-7, 1991, Washington, D.C.

Paper supported by the U.S. Agency for International Development under Cooperative Agreement (No. DPE-3046-A-00-8050-00) with the East-West Center.

Introduction

The 1987 National Indonesian Contraceptive Prevalence Survey (NICPS) was conducted from September through December 1987 in 20 of the country's 27 provinces. Interviews were obtained from 11,884 ever-married women (a sample design that represents 93 percent of Indonesia's total population). The survey was a collaborative undertaking involving the Indonesian National Family Planning Coordinating Board (NFPCB), the Institute for Resource Development (IRD/Westinghouse), and the Central Bureau of Statistics (CBS). Financial support for the survey was provided by the Covernment of Indonesia, the Institute for Resource Development, USAID/Jakarta and UNFPA/Jakarta.

Indonesia has completed an extensive research agenda for the 1987 NICPS. In January 1989, the main national survey report was issued containing basic descriptive information on such topics as fertility, mortality, nuptiality, the knowledge and use of contraception, and the non-use and future intention to use contraception. Following the release of this report, an ambitious program of secondary analysis was initiated involving researchers from the National Family Planning Coordinating Board, the Central Bureau of Statistics, the National Development

Planning Board (BAPPENAS), the Lembaga Demografi at the University of Indonesia, the Center for Child Survival at the University of Indonesia, and the Population Studies Center at Gadjah Mada University. In addition, collaborative technical support for this work was provided by the East-West Population Institute, Honolulu, Hawaii. This secondary analysis effort has resulted in the release of a two volume report, the first volume consisting of studies on fertility and family planning program evaluation and the second volume focusing upon breastfeeding, post-partum infecundability, and child survival (a listing of the topics covered in these two volumes is provided in Appendix A).

Results from the 1987 NICPS have important implications for the evaluation of family planning program performance and the formulation of future policies. While it is beyond the scope of this presentation to summarize all research findings, it is possible to highlight policy issues that can be addressed from analysis of the 1987 NICPS.

Major Findings and Policy Implications from Analysis of the 1987 NICPS

Demographic Estimation

Fertility

Results from the 1987 NICPS clearly indicate that Indonesia has undergone a rapid decline in fertility since 1971. As of 1987, the total fertility rate was between 3.3 and 3.8 births, which constitutes a decline of at least 35 percent since 1971 and 16 percent since 1980. Fertility is lower on the islands of Java and Bali than on the Outer Islands, which in part is a reflection of the more advanced level of family planing program effort on

Java-Bali.

The half-birth spread in fertility rate estimates for 1987 (between 3.3 and 3.8 births) reflects the range of results obtained from both direct and indirect estimation methods. Since direct fertility estimates from birth histories may be prone to error (owing in part to age misreporting, underreporting of births, especially children born alive who subsequently died, and temporal inaccuracy in the reporting of live births), indirect estimates were computed in order to assess the reliability of direct estimates (1). Results indicate that the average total fertility rate for the period 1984-1987 derived directly from 1987 NICPS birth history data was 3.3 births. Last live birth and own children fertility rates for 1987 were roughly consistent with the average birth history rate for 1984-1987. However, indirect estimates based upon regression analysis procedures (i.e. the Rele, Palmore, and Gunasekaran-Palmore techniques) tended to be somewhat higher. This variation, which constitutes a rather modest range of inconsistency, is likely due to such factors as age misstatement, age-specific patterns of underreporting and overreporting, and possible error in the estimation of mortality input data employed in several indirect procedures (e.g. mortality rates among children less than five years of age and life expectancy).

---

1. Indirect techniques utilized (the last live birth, own children, Rele, Palmore, and Gunasekaran-Palmore methods) are not dependent upon assumptions of constant fertility and mortality.

It is important to note that regional fertility rates derived from different estimation methodologies show greater variation than national estimates. Fertility on Java-Bali likely declined between 35 and 48 percent since 1971, resulting in a total fertility rate of between 2.6 and 3.7 in 1987. Between 1971 and 1987, fertility may have fallen from 29 to 41 percent on Outer Islands I and 14 to 38 percent on Outer Islands II (1987 fertility rates range from 4.3 to 3.7 on Outer Islands I and from 4.9 to 3.7 on Outer Islands II). Clearly, there is still some uncertainty regarding regional patterns of fertility decline in Indonesia, an issue that will be receiving considerable attention when statistics from the 1990 Population Census and 1991 Demographic and Health Survey become available.

Infant and Child Mortality

Infant and child mortality computed directly from 1987 NICPS birth history data show that infant mortality (1q0) declined from 80.7 deaths per 1,000 births in 1972-76 to 70.2 in 1982-87, a decline of 13.0 percent(1). Child mortality (4q1) fell 42.3 percent over this same period; namely, from 58.1 to 33.5 deaths per 1,000 population aged 1-4. This pattern of decline is typical of many societies experiencing mortality reductions; namely, as nutrition, personal hygiene, sanitation, and public health facilities improve, survivorship increases most rapidly

1. Women may more likely underreport children that have died less recently (i.e. recall lapse increases over time). Therefore, the average infant mortality rate for the period 1972-76 may be somewhat underreported relative to estimates for 1982-87.

among children who are able to survive the first year of life.

Infant and child mortality are higher among women with less educational attainment, higher in rural than urban areas, and lower on Java-Bali than on the Outer Islands. On Java-Bali, Yogjakarta has the lowest infant mortality rate (37.6 per 1,000 births) and Bali has the lowest child mortality rate (16.3 per 1,000 population aged 1-4)), while West Java has the highest infant and child mortality (94.7 and 51.3 respectively).

Fewer female than male infants die in Indonesia, although the female advantage is reversed among children aged 1-4 years. Infant mortality is higher among first and higher order births (7 and over) while child mortality tends to increase among higher birth orders. Therefore, smaller families can expect to experience lower infant and child mortality (although one child families may encounter somewhat higher infant mortality owing to the elevated risk associated with first order births). In addition, infant and child mortality are higher among women aged less than 20 and over 30 years of age. This finding provides additional evidence that the risk of infant and child mortality is minimized if child bearing occurs when women are between 20 and 29 years of age.

An important result from the 1987 NICPS is that infant and child mortality are considerably lower if births are spaced farther apart. If an infant is born less than 2 years following the birth of its sibling, there is a 76 percent greater probability that the child will die than if the birth interval is 2-3 years in length. The risk of an infant death is more

than 200 percent greater when comparing birth intervals of less than two years with intervals of more than four years. The same pattern exists for child mortality; namely, children aged 1-4 have roughly half the chance of surviving if their previous sibling was born less than 2 years as opposed to more than 4 years apart. Since family planning plays a crucial role in providing women with the means to space children, the use of contraception is a major factor contributing to the reduction of infant and child mortality in Indonesia.

Proximate Determinants Analysis

Marriage Patterns and Fertility

An important proximate determinant contributing to the decline of fertility in Indonesia has been change in the age at marriage and the incidence of divorce. Women in Indonesia have traditionally married at young ages and divorce rates have been relatively high by Asian standards. However, evidence from the 1987 NICPS indicates that marriage age has been increasing and the proportion of women married more than once declining. The mean age at first marriage for women increased from 19.1 years in 1976 to 21.2 years in 1985. Between 1976 and 1987, the proportions of currently married women who had married more than once declined from 15 to 7 percent for ages 15-24, 28 to 15 percent for ages 25-34, and 37 to 29 percent for ages 35-49. In addition, from 1980 to 1987 the percentage of women aged 15-49 who had never married increased from 21.5 to 26.4 percent. Despite these changes, marriage is still nearly universal in Indonesia (in 1987 more than 98 percent of women over the age of

40 had been married at least once) and Indonesian women still marry at relatively young ages.

In Indonesia, rural women marry at younger ages than urban women. In addition, marriage age is lower on Java and Bali than on the Outer Islands, among women with less education, women who do not work prior to marriage, and women who identify Islam as their religion. Contraceptive use tends to be higher among women who marry later, although this association cannot be identified for women under age 25 (an inconsistency that may be due in part to shorter marriage durations reported by younger women at the time of the survey). Women who have been married more than once are less likely to be current users of contraception, which may be symptomatic of a desire to "catch up" with original fertility preferences during second (and subsequent) marriages.

The 1987 NICPS also reports that a five year delay in the age at marriage is associated with 1.1 fewer children and being married more than once reduces fertility by 2.1 children. If current trends continue, rising age at marriage will likely lead to further reductions in fertility. On the other hand, declining proportions of women marrying more than once (due in part to falling divorce rates) may act to increase fertility. While it is difficult to predict the future net effect of these two factors on fertility, future reductions in fertility could most readily be promoted by (1) having younger women further delay their entry into marriage and (2) strengthening the provision of family planning services to women who have been married more than once.

Breastfeeding, Length of Fertile Period, Duration of Sexual Exposure, and Contraceptive Use

Analysis of the 1987 NICPS shows that proximate determinants in addition to nuptiality are important in lowering fertility. Among the proximate determinants studied, contraceptive use is the most important factor in lowering the probability of having a birth 12 months prior to the 1987 NICPS interview date. Current fertility is also lower among women with longer breastfeeding durations (although this fertility inhibiting effect is weaker than the association between contraceptive use and fertility). Women with longer fertile periods (i.e. periods of non-amenorrhea) and greater sexual exposure (i.e. continuous months of having intercourse) tend to have higher fertility. However, these stimulative fertility effects are counteracted by the influence of contraceptive use on fertility.

While the proximate determinants, and in particular the use of contraception, account for much of the variation in current fertility, socio-economic factors have important effects on the proximate determinants (and therefore can indirectly influence the level of fertility). For example, wives and husbands with greater educational attainment are more inclined to use contraception, which indicates that improvements in educational status may be highly effective in promoting further reductions in fertility. While Moslem women tend to breastfeed longer than other women, they generally have higher fertility and lower contraceptive prevalence. This finding suggests that more rapid reductions in fertility could occur if

non-Moslem women breastfeed longer and Moslem women more readily adopt suitable forms of contraception. Women with urban living experience (i.e. women currently residing in an urban area or resident in a town or city up to the age of 12) have longer fertile periods and shorter durations of breastfeeding. Future declines in urban fertility could therefore result from efforts to promote longer breastfeeding durations among urban women.

As socio-economic development gathers strength over the coming decades, Indonesian couples can be expected to increasingly choose to have smaller families. Therefore, socio-economic factors that stimulate greater use of contraception are likely to play an important role in future fertility declines. Results from the 1987 NICPS demonstrate that promoting greater educational attainment among wives and husbands, encouraging the growth of non-agricultural employment, and strengthening family planning service delivery among Moslem women and women living on the Outer Islands may be important in achieving higher levels of contraceptive use.

Family Planning Program Evaluation

Contraceptive Prevalence: Implications for the Evaluation of Program Performance

The most crucial information for assessing the progress of Indonesia's family planning program is the contraceptive prevalence rate. The 1987 NICPS found that 47.7 percent of Indonesia's ever-married women aged 15-49 years were using contraception. 44.0 percent of ever-married women were using modern contraceptive methods while 4 percent of women reported

using traditional methods (periodic abstinence, withdrawal and other). Among modern methods, the pill (16.1 percent), IUD (13.2 percent) and injectables (9.4 percent) were most commonly employed. Contraceptive prevalence was higher on Java-Bali (50.9 percent) than on Outer Islands I (41.7 percent) and Outer Islands II (39.6 percent), an ordering that reflects the initiation of family planning activities in different regions of the country.

The 1987 NICPS is an important source of information for use in assessing the level of family planning program performance as measured by BKKBN service statistics. According to the 1987 NICPS, 62.0 percent of ever-married women of reproductive age had used contraceptives at some point in their lives (58.2 percent had ever-used a modern method of contraception).

Duration of Contraceptive Use

While contraceptive prevalence is a major concern of family planning administrators, an equally important indicator of program performance is the duration and effectiveness of contraceptive use. A family planning program with high continuous use of effective methods will generally be more successful in reducing fertility than one typified by high discontinuation and reliance upon methods entailing greater risk of accidental pregnancy.

As part of the secondary analysis of the 1987 NICPS, various indicators of contraceptive use duration were derived; namely, continuation rates, reason-specific discontinuation

rates, and method failure rates (1). In addition, socio-economic measures from the 1987 NICPS and program variables derived from BKKBN's service statistics were employed to assess the determinants of use duration.

Findings indicate that the IUD had the highest continuation rate after 12 and 24 months of use, followed by pills, injectables and condoms. After 12 months of use, 87.3 percent of IUD users, 74.4 percent of pill users, 73.6 percent of injectable users, and 57.5 percent of condom users were still using. However, after 24 months of use, 77.3 percent of IUD users were still using, while only 57.6 percent of pill users, 54.7 percent of injectable users and 40.8 percent of condom users were continuous users. Condom continuation rates are not exceptionally low given the periodic nature of use that typifies this method. The nearly 50 percent decline in pill and injectable use after 24 months implies that these methods are more readily used for spacing. However, results also suggest that there may be further scope for promoting longer durations of pill and injectable use in the future.

Reasons-specific discontinuation rates following twelve

---

1. Given the tabular reporting format utilized in the 1987 NICPS (similar to the DHS Model A questionnaire), it is not possible to account for all intervals of contraceptive use. Intervals that cannot be measured are as follows: (1) for current users, women who had more than two use intervals since their last birth, (2) for current non-users, women who had more than one use interval since the last birth, and (3) women with more than one use interval in each closed birth interval. These potential omissions may result in the generation of continuation rates that somewhat overestimate the true duration of contraceptive use.

months of use show that health concerns are most commonly cited by women as the reason for discontinuing use of pills, IUDs and injectables. Women who stop using after longer durations of use more often discontinue in order to have a child. Improved follow-up and out-reach services for women using these methods may help alleviate health concerns in the future and thereby promote greater continuous use of these methods. The most important reason for discontinuing condoms is inadequate access and availability of the method, which suggests that more efficient distribution through public and private channels would significantly enhance the average duration of use.

Several policy implications can be drawn from the patterns of contraceptive use duration identified in the 1987 NICPS (using multivariate analysis that assesses the net effect of independent variables when controlling for the influence of other measures). For example, women with more children generally use contraception for longer periods. Therefore, greater use of spacing methods might be most appropriately promoted among lower parity women. Greater knowledge of contraception is associated with shorter intervals of use (a pattern that may reflect a greater propensity to switch methods as awareness of contraceptive options increases). More effective counselling and follow-up care may therefore be required in order to deal with problems experienced in using a method and help ensure that women adopt appropriate contraception if a method switch is deemed advisable.

Findings from the 1987 NICPS also show that the duration of

contraceptive use is longer among women experiencing lower infant and child mortality. This result suggests that women suffering the loss of a child may be more inclined to have additional children (the child-replacement effect resulting from high infant and child mortality). Efforts to reduce infant and child mortality through family planning and MCH interventions may therefore also result in longer contraceptive use intervals.

Contraceptive Failure and Use Compliance

Method failure in Indonesia (discontinuation resulting from an accidental pregnancy) is generally comparable to international experience. Following 12 months of use, only 2-3 percent of pill, IUD, and injectable users had experienced an accidental pregnancy. Roughly 5 percent of condom users became pregnant over the same 12 month period of use. Therefore, Indonesian women have very high probabilities of avoiding pregnancy if they use contraception in a prescribed manner over a prolonged period of time.

Patterns of use compliance can be measured for pill and injectable users in the 1987 NICPS. Findings indicate that 87.7 percent of pill users and 99.3 percent of injectable users were employing their methods correctly (1). There were no major

---

1. Pill users were judged to be compliant if they met all three of the following criteria: (1) users can show their pill packages, (2) pills are being taken in proper order, and (3) users took a pill at least two days prior to interview. Women who report having periods at the time of the survey are treated as compliant users. A women is defined as a compliant injectable user if she received an injection at least three months prior to interview.

distinguishing characteristics (e.g. age, parity, marital status, educational attainment, urban/rural status, religious affiliation, etc.) that typified women who were non-compliant pill users. This result suggests that pill use compliance is essentially an idiosyncratic phenomenon in Indonesia. In addition, since no statistically significant regional variation was found in pill use compliance, one might conclude that the quality of pill service provision is relatively uniform throughout the country. BKKBN may therefore be achieving some success in promoting equity in the provision of contraceptive services.

One notable finding from the 1987 NICPS is that 27.5 percent of women who had not taken a pill within two days from the date of interview reported that they "ran out" of pills. Use compliance might therefore be improved substantially through efforts to improve pill re-supply mechanisms and strengthen IEC efforts to inform women of the importance of keeping adequate pill supplies in the home.

Policy Implications for Self-Reliant Family Planning (KB Mandiri) in Indonesia

The Indonesian National Family Planning Coordinating Board has recently instituted a program known as KB Mandiri (self-reliant family planning) that is promoting greater private-sector and community participation in the delivery of family planning services. KB Mandiri is designed to (1) increase personal responsibility for utilizing family planning services, (2) enhance the participation of community-based institutions in

service delivery and recovery of program costs, and (3) reduce the ratio of public to private costs in support of the family planning program. The Blue Circle Social Marketing Project (Lingkaran Biru), first introduced in urban localities in late 1987, constitutes an initial effort to promote private sector distribution of family planning services in Indonesia.

The 1987 NICPS provides policy relevant information pertaining to the KB Mandiri program. The price paid by family planning clients for various contraceptive methods can be estimated from the 1987 NICPS. This information permits the derivation of contraceptive price elasticities of relevance to the marketing of family planning products. Cost data can also be employed to assess the choice of contraceptive method and service delivery point.

Contraceptive Prices

Contraceptive services are still highly subsidized in Indonesia. The 1987 NICPS reports that 84.1 percent of pills, 79.6 percent of IUDs, 27.5 percent of injectables, 49.6 percent of condoms, and 48.1 percent of sterilizations are provided to clients free of charge. Mean prices reported for Indonesia's three main program methods are as follows: one pill cycle (Rp. 97.55), an IUD (Rp. 2077.09), and one injection (Rp. 1423.43)(1). These prices combine product, registration, and service charges. Additional cost factors such as expenditures on transportation, waiting times, and foregone income (opportunity costs) cannot be measured in the 1987 NICPS.

The prices charged by public and private sector service providers tend to vary widely. Even though the precise demarcation of private and public sources of supply is not possible in the 1987 NICPS (e.g. while most hospitals and clinics are government operated, some private-sector facilities may also be included in the NICPS sample), rough comparisons between average public and private sector prices can be made. Estimates based only upon reported prices (inclusive of clients provided with contraception free of charge) indicate that private sector pill prices are roughly 30 times higher, IUD prices 20 times higher, and injectable prices 3 times greater than public sector prices. As of 1987, 4.9 percent of pill users, 9.5 percent of IUD users, and 23.2 percent of injectable users obtained services from private sector providers.

Price elasticities computed from the 1987 NICPS provide estimates of potential shifts in contraceptive prevalence based upon changes in price. If all public sector services were supplied at price levels prevailing in the private-sector in 1987 (a scenario not likely to happen in the foreseeable future), the following outcomes might result: (1) overall prevalence could decline from 43 to 29 percent, (2) pill use could decline roughly 56.4 percent (from a prevalence rate of 13.3 to 5.8 percent), (3) IUD prevalence could fall 26.6 percent (from 15.4 to 11.3

1. The exchange for the Indonesian rupiah by mid-1987 was approximately $US1.00=Rp.1,750.

percent), (4) injectable prevalence could decline 20.6 percent (from a rate of 9.2 to 7.3 percent), and other methods could potentially fall 11.5 percent (from 5.2 to 4.6 percent).

These results suggest that the adoption of private-sector pricing for commodities currently supplied at subsidized rates by the public-sector would cause a substantial proportion of women to abandon the use of contraception (32.6 percent of current users). Therefore, the current policy of maintaining a dual pricing structure for private and public sector commodities may be a prudent course over the near term. A gradual expansion of private-sector services and cost structures appears preferable to the rapid adoption of market-driven pricing mechanisms for all family planning products and services.

Additional policy implications can be identified from the estimation of price elasticities among households of differing economic status. Unfortunately, the 1987 NICPS did not collect information on household income. However, using educational attainment as a proxy for income and economic status, it is possible to assess differential patterns of household demand for contraception resulting from changes in price.

Findings show that women with more education (more than six years of schooling) may not reduce their total contraceptive prevalence in response to an increase in price. For example, if these women (who presumably have higher household income) experience an increase in the price of pills from Rp 100 to Rp. 1,400 per cycle (approximately the average 1987 pill price range between the public and private sector) pill prevalence will

decline but IUD use will increase, resulting in a small net gain in overall contraceptive prevalence. However, among women with less than six years of schooling (and presumably lower average household income), a similar pill price increase will not result in method switching, but rather a substantial decline in contraceptive use (from a prevalence rate of 43 to 26 percent) (1). Therefore, in considering future pricing strategies for contraception, one must account for shifts in price elasticity occurring among households with different levels of economic status. Failure to consider this issue could result in the emergence of inequity in the access to and utilization of family planning services among different socio-economic groups within the country.

At present there is little evidence that low standard of living households adopt contraception less readily than other socio-economic groups. In fact, women resident in lower standard of living households may more readily adopt effective methods of contraception. A major challenge for the Indonesian family planning program in future years will be to ensure that socio-economic disparities do not come to distinguish patterns of contraceptive use.

Price elasticities derived from the 1987 NICPS suggest that demand for contraception may fall once prices are increased (or instituted for products now supplied free of cost to clients).

---

1. Increases in IUD and injectable prices produce more modest differential effects on prevalence within the high and low education groups considered in this analysis.

However, if contraceptive demand is effectively stimulated by community interventions as well as price, there may be more modest shifts in use than predicted directly from price elasticity estimates. In fact, if price increases are linked to improved quality of care, greater privatization and commericalization could conceivably increase contraceptive prevalence. In addition, regional commodity supply patterns can play an important role in determining the choice of method. This issue will require more careful study in future years.

Determinants of Contraceptive Method and Service Point Choice

An analysis of factors associated with the choice of contraceptive method and service point provides additional policy relevant findings for Indonesia's KB Mandiri program. Results generally show that Indonesia's current socio-economic and programmatic environment is favorable to expansion of self-reliant family planning and adoption of more effective methods of contraception (a program known officially as Metode Kontrasepsi Efektif dan Terpilih (MKET), or the Selection of Effective Contraceptive Methods, i.e. IUDs, injectables, implants and sterilization).

With regard to contraceptive method choice, multivariate results show that high parity communities have greater probabilities of using sterilization than pills, IUDs or injectables. While this relationship in part reflects the greater use of pills and IUDs (the programs's two main methods) in areas with reduced fertility, the fact that sterilization

appears to be an acceptable method in higher parity areas suggests that sterilization may become increasingly important in communities with continuing high levels of unwanted childbearing. However, the cost of promoting sterilization (and developing requisite medical infrastructure) may frustrate efforts to make this method widely available, especially in less accessible regions.

According to the 1987 NICPS, there is higher probability of using injectables and sterilization in urban areas and greater likelihood of using IUDs in rural areas. In fact, when controlling for the effect of other factors, there is greater likelihood of using sterilization than IUDs in urban areas. To some extent, these findings reflect regional variation in method distribution. For example, IUD use is heavily concentrated in Yogjakarta and Bali. However, there is no reason to expect that consumer demand for IUDs should be lower in urban areas. Therefore, major gains in IUD prevalence might be achieved through a more effective promotion of IUDs in urban areas.

Method choice is also influenced by the type of provider from which women receive family planning services. Pills are more likely to be used if services are obtained from auxiliary midwives and paramedics. Sterilization is more readily adopted if there are more doctors and midwives per eligible couple in a given area. Therefore, in promoting more effective methods of contraception, greater attention will need to be given to the allocation of medical personnel. In particular, additional doctors and midwives will need to be

recruited and more medical facilities established or upgraded in order to accelerate the adoption of more effective methods of contraception. However, such efforts may adversely affect short-term cost recovery goals of the family planning program.

In this analysis, higher contraceptive prices tend to discourage contraceptive use, but when assessing the net effect of price in a multivariate framework (i.e. controlling for the influence of other individual, socio-economic and program variables), relationships between price and the probability of use are often not statistically significant. In addition, prices are more likely to determine choice of service point than choice of method (both the probability of use versus non-use and the likelihood of choosing one method in favor of another method).

Private sector supply sources usually charge higher prices than public sector service points. Therefore, reducing public-sector contraceptive price subsidies might tend to increase the use of private sector delivery points (assuming that private-sector services are widely available throughout the country). Of course, qualitative considerations not necessarily captured by the effect of price (e.g. shorter waiting times, better follow-up care, greater privacy, more attentive staff treatment, etc.) may also influence the choice of service point. In fact, such qualitative distinctions may become increasingly important as Indonesia's family planning program evolves in the direction of a more pluralistic service delivery system.

Other service point characteristics noted in the 1987 NICPS are that women who have more education, who live in urban areas,

and reside in communities with more doctors and midwives are more likely to use private sector service points. These findings are not exceptional given that KB Mandiri activities were based primarily in urban areas as of 1987. Public sector community based distribution typifies women who have less education, who live in rural areas, who reside in communities with higher numbers of auxiliary midwives and paramedics per eligible couple, and who receive services from fieldworkers. As private sources of supply become more widely available throughout the country, fieldworkers should probably be encouraged to make more referrals to private-sector service delivery outlets. In addition, women who have heard messages promoting family planning on radio and television are more likely to use private-sector service points. However, since many women do not yet associate the Blue Circle program logo with private-sector products and service outlets, more directed IEC effort will be required to effectively promote alternative sources of supply.

Future Family Planning Program Potential

Fertility Preferences and Intentions

According to the 1987 NICPS, the mean ideal number of children among ever-married women aged 15-49 was 3.2. Younger women generally report lower ideal family size (e.g. women aged 15-19 desire only 2.6 children while women aged 45-49 indicate that 3.8 children constitutes an ideal family size). While many Indonesian women still report average family size preferences that exceed the official goal of the two child family, it is also apparent that Indonesian women increasingly desire smaller

families.

Among currently married women in the 1987 NICPS, 37.8 percent said they wanted to have more children while 41.3 percent did not want additional children (the remaining 20.3 percent of women interviewed were either undecided, already sterilized, or infecund). 45.5 percent of all women with two children definitely want to have an additional child, a figure showing that a substantial number of women in Indonesia still prefer more than two children. However, fertility preferences decline rapidly for women with three or more children, which implies that small family size norms are gaining increasing acceptance among Indonesian women.

Unmet Need for Family Planning

The 1987 NICPS provides information that can be used to estimate the level of unmet need that still exists for family planning services in Indonesia. Two measures of unmet need are derived: manifest (or individually defined need) and latent (or program defined) need. Manifest unmet need is as follows:

- the proportion of currently married women not using contraception who are pregnant or amenorrheic and who either mistimed or did not want their last pregnancy or birth
- the proportion of currently married women not using contraception who are not pregnant or amenorrheic but are fecund and who either want more children later or

do not want more later (1).

Latent unmet need is measured as follows:

- the proportion of currently married women not using contraception who are pregnant or amenorrheic and either want more than two children or want another child in less than three years,
- the proportion of currently married women not using contraception who are not pregnant or amenorrheic but want more than two children and want their next child in less than three years.

Results show that 14.4 percent of currently married women have manifest unmet need for family planning. 9.6 percent of currently married women have latent unmet need (i.e. they have fertility preferences inconsistent with national family planning program goals; namely, wanting to have more than two children and space births less than three years apart). While limiting and spacing need is evenly distributed among women with manifest need (7.3 and 7.1 percent respectively), latent unmet need is characterized by women with need for limiting methods (8.0 percent for limiting methods and only 1.7 percent for spacing methods)

Total unmet need in 1987 constitutes 24.1 percent of all currently married women of reproductive age (the sum of manifest

---

1. Infecund women are those who have not had a birth and have not used contraception in the last five years and have been currently married for the past five years.

and latent unmet need). If this unmet need can be satisfied in future years, contraceptive prevalence will increase to 72 percent, a level likely to ensure the attainment of replacement level fertility.

Socio-economic and program measures tend not to be statistically significant determinants of unmet need. One might therefore conclude that unmet need is equitably distributed throughout much of Indonesia. This implies that Indonesia's national family planning program may be achieving some success in providing equitable coverage of family planning services.

While total unmet need for contraception appears to be equitably distributed at present, results from the 1987 NICPS also show that some women are still not being well supplied with appropriate methods. For example, spacing methods could be more effectively promoted among younger women with low parity. In addition, there is higher reported unmet need for limiting methods among older high parity women. Such targeting of appropriate methods to better address identified need can be expected to encourage more rapid gains in contraceptive prevalence in future years.

Several additional policy issues relevant to the design of new program initiatives can be identified from differential patterns of unmet need. For example, higher unmet need for limiting methods in West Java and the Outer Islands should be reflected in service provision and IEC strategies. Since total unmet need for family planning is generally higher among less educated women, contraceptive services and IEC efforts

might be more effectively directed toward such women. In addition, higher unmet need for limiting methods is reported by less educated women, while women with more education are more likely to express a need for spacing methods.

Despite the fact that door-to-door provision of family planning services is now a less prominent service delivery mechanism in Indonesia, fieldworker activity is still effective in lowering the level of unmet need. The strengthening of fieldworker service delivery in areas with low prevalence, high unmet need, and less developed family planning infrastructure might bring about more rapid declines in fertility. Total unmet need is lower among respondent's that have received an IEC message promoting family planning within six months prior to the date of interview. Among women who report receiving an IEC message, limiting need is higher than spacing need. Limiting methods might therefore be more readily emphasized in future IEC efforts.

Future Directions

The 1987 National Indonesia Contraceptive Prevalence Survey clearly documents many dramatic changes in the demography of Indonesia: later ages at first marriage, lower divorce rates, higher contraceptive prevalence, and substantial reductions in current fertility and completed family size. Indonesia's rate of population growth is slowing, and the 1987 survey may be taken as a benchmark reporting the end of the first important phase of BKKBN's work. While the fertility transition has not yet been fully completed, much of the country has already participated in

the expansion, institutionalization, and maintenance of family planning and acceptance of the small family norm. Now, as the program shifts towards greater emphasis on self-reliance (KB Mandiri), it should build on these advances to accelerate improvements in the social and economic welfare of Indonesian families. The ultimate goal of the government program is, after all, to improve the quality of life in Indonesia and strengthen the capacity of each Indonesian family to improve their own welfare with the government providing a supporting role.

This change in the emphasis of the program will be enhanced by a number of new developments in the program. The first of these is that efforts are currently being made to establish six regional "Family and Social Development Research and Training Centers." These new centers will help redirect research and training away from narrowly defined concerns of demographers and public health specialists, and institute a broader social science perspective. This expanded orientation would entail de-emphasizing traditional research concerns centered upon the number and socio-economic characteristics of family planning acceptors, and instead attempt to assess causes and consequences of change in reproductive behavior occurring within families. The idea is to involve sociologists, anthropologists, economists, and others in research and training directed towards helping Indonesian families to attain better living standards by discovering more about current family strategies and finding out how the government might provide support that will enable each family to meet its goals.

In the past, population and health research in Indonesia has not paid sufficient attention to change in the social welfare of individual families. For example, there is currently little clear understanding of transformations in family structure and wealth generation resulting from the demographic transition to low fertility and mortality. Enhanced opportunities for employment and social mobility resulting from Indonesia's rapid socio-economic development over the past twenty-five years may also have unforeseen effects upon family life. Of particular concern will be studies accounting for change in the welfare of families, and the identification of mechanisms to promote sustained improvements in living standards.

Greater effort also needs to be made to identify characteristics of families in which contraception is readily adopted or used sparingly or not at all. Such analysis may be useful in developing new service delivery strategies for different segments of the population (e.g. giving greater emphasis to safe motherhood services among families residing in low performance areas and to KB Mandiri distribution among families located in high performance areas). Increased attention should also be given to such issues as change in marriage and family formation patterns, the perceived role of children in household production, and characteristics of inter-generational wealth transfers.

Future family planning program effort will be directed towards coordination, integration, and quality, with particular attention to individual families. The program will be moving

towards a highly segmented approach to development, not only in its information, education, and communication activities, but also in terms of the services provided. Coordination with other development agencies, integration of family planning and other services provided through the government program with other development programs, and improvements in the quality of BKKBN's activities will all be geared towards enabling and empowering each Indonesian family with the ability to improve its own welfare.

Appendix A

Issues Addressed in the Secondary Analysis of the 1987 National Indonesian Contraceptive Prevalence Survey

Volume 1 - Fertility and Family Planning

1. Fertility Estimates
2. Proximate Determinants Analysis
3. Marriage and Reproductive Behavior
4. Duration of Contraceptive Use
5. Method Failure
6. Contraceptive Price Elasticities
7. Determinants of Contraceptive Method and Service Point
8. Fertility Preferences
9. Unmet Need for Family Planning

Volume 2 - Child Survival

1. Breastfeeding Determinants
2. Analysis of Post-Partum Infecundability
3. Breastfeeding, Amenorrhea, and Family Planning
4. Effect of Family Planning on the Length of the Birth Interval
5. Effect of Child Loss on the Adoption of Family Planning

SO FAR FROM POWER, SO NEAR TO THE FOREST: A STRUCTURAL ANALYSIS OF GAIN AND BLAME IN TROPICAL FOREST DEVELOPMENT

East-West Center
Population Institute
1777 East-West Road
Honolulu, Hawaii

August 1991

SO FAR FROM POWER, SO NEAR TO THE FOREST: A STRUCTURAL ANALYSIS OF GAIN AND BLAME IN TROPICAL FOREST DEVELOPMENT.

Presented in:
The Conference on "Interactions of People and Forests in Kalimantan", held at The New York Botanical Garden on 21-23 June 1991; and The Summer Institute of the East-West Center's "Asian Studies Development Program", in Honolulu on 1 August 1991.

By

Michael R. Dove
East-West Population Institute
Honolulu, Hawaii

Submitted to:

Ms. Ellen Starbird
Policy Development Division
Office of Population
Agency for International Development
Washington, D.C. 20523

This analysis was written with partial funding support from the Demographic Data Initiatives Project through a cooperative agreement (DPE-3046-A-00-8050-00) with the United States Agency for International Development and the East-West Center.

TABLE-OF-CONTENTS

> The environment is often little more than a medium for the expression of social concerns. Once we see environmental problems as social rather than environmental phenomena, many of the obstacles to our understanding of them disappear. (Thompson, Warburton & Hatley 1982:62)

I. INTRODUCTION

1. The Perils of Riches

Among the forest dwellers who search for diamonds in the hills above Martapura in Southeastern Kalimantan, there is a saying: Siapa yang mendapat batu besar, dia pasti susah nanti "Whoever finds a big stone, he will eventually suffer [as a result]".[2] Tales are told in the area of the woe that befell men who found truly large, valuable stones. The problem with such stones is that they cannot be sold: their value over-whelms the marketing channels normally used by these part-time miners (who gather diamonds in the same way that forest dwellers elsewhere in Kalimantan gather rattan or birds nests). Big gemstones become sources of "dissonance" within the local and regional political-economic structure: they represent great wealth held by orang kecil "small men" - but never for long. News of such finds quickly comes to the attention of orang besar "big men" in Martapura, Banjarmasin, and even Jakarta.

A problem is then posed: how can the finder of the stone be relieved of it without giving him wealth that is deemed inappropriate for a poor tribesman in a remote corner of the country? To put the question in more structural terms, how can the "center" extract such wealth from the "periphery" while still maintaining the appearance of a non-hierarchical society? The answer typically is to carry out this extraction in the name of the

nation (e.g., with the announced intention to deposit the stone in a "national museum"), with payment to the finder of a nominal "honorarium" (or one or two years' installments on a "life-long pension"). (In some cases the stone actually may go to the state, while in other cases it goes to state elites.) The carefully constructed image of a self-less contribution to a benevolent state notwithstanding, the essential injustice of this extraction is perceived by most of the parties involved. This is reflected in the fact that it usually estranges the finder from the political structure. He is estranged - he suffers (is susah) - because it is his ill luck that brought him fortune that would never have come to him by virtue of his place in society and that thereby revealed the fundamentally hierarchical nature of this society.

The lesson of the parable of the "big stone and the small man" applies to much of the resource development in the tropical forest.[3] The more successful the development, the more likely external political and economic forces will become involved, and the less likely the indigenous inhabitants of the forest will retain control. The reverse is also true: resource development by forest peoples that is encouraged by the outside world, and that is left in the hands of the forest peoples, is by definition likely to be development that is of less interest to the outside world and less successful for the forest peoples themselves. This category includes the "basket-weaving" types of activities that are so often proposed for forest peoples today (although if prices of tribal baskets ever soared into the hundreds or thousands of dollars,

basket producers associations, established for the ostensible good of the basket weavers, would doubtless instantly appear.) I suggest that today's search for "new" sources of income for tropical forest dwellers is often, in reality, a search for opportunities that have no other claimants, a search for unsuccessful (or minimally successful) development alternatives. This raises the question: do tropical forest peoples need to be helped to develop by the outside world or allowed to develop? Are the tropical forest people poor because the outside world will not allow them to be rich? These and other questions raised by the parable are highly relevant to the current debate concerning the future of the tropical forest and its inhabitants.

2. Is the Goal to Develop or Under-Develop Tropical Forest Peoples?

Tropical deforestation is often depicted as the consequence of poor farmers' material needs, the solution to which is deemed to be redirection of the farmers' economies through development of new sources of income. This framing and resolution of the problem of deforestation assumes that the forest-dwelling and forest-using peoples of the world have limited traditional sources of income, and that the development of such sources depends upon external assistance. I suggest that these assumptions are frequently flawed, that such sources of income (actual or potential) exist, and that the principal obstacle to their further development is not internal incapacity but external competition. I suggest that the real issue in the development of tropical forest peoples is not

tropical forest ecology, or even economics, but the marginality of the tropical forests and their peoples in regional political-economies. I suggest that the forest peoples' distance from political power handicaps them in developing forest resources, just as their physical proximity to these resources earns them the blame for all resource degradation. Ultimately, I question whether the solution to tropical deforestation is to change the behavior of peasants, or to change the behavior of governments.

The development of smallholder rubber cultivation among the forest dwellers of Kalimantan (and Indonesia's other outer islands), affords an ideal case in which to examine these and other questions. Cultivation of Para rubber (Hevea brasiliensis) fits all of the purported requirements for tropical forest development: it involves the native forest peoples in production for national and international markets, it diminishes their dependence upon forest-based food cropping, and it is adopted with alacrity by them. But this success, far from earning the forest peoples the support of the central government, has earned them governmental neglect at best and opposition at worst. There are analogous cases from the mining, agriculture, and non-timber forest product sectors - all of which cast doubt on the current paradigm for interpreting the problem of tropical forest development and conservation.

3. Outline of Study

I will present, first, a brief description of smallholder rubber cultivation among the Kantu' of West Kalimantan, followed by an

analysis of both historic and contemporary government policy towards the smallholder rubber sector and its basis in government versus smallholder self-interest. I will next review analogous government policies pertaining to the production of a variety of other commodities in the tropical forest. Finally, I will discuss the structural principles that underlie tropical forest development, looking at common historical patterns of resource development and common patterns in contemporary efforts to "solve" development problems in the tropical forest. The final section of the paper will present my conclusions and recommendations.

II. THE CASE OF SMALLHOLDER RUBBER PRODUCTION

1. Para Rubber Cultivation in Indonesia

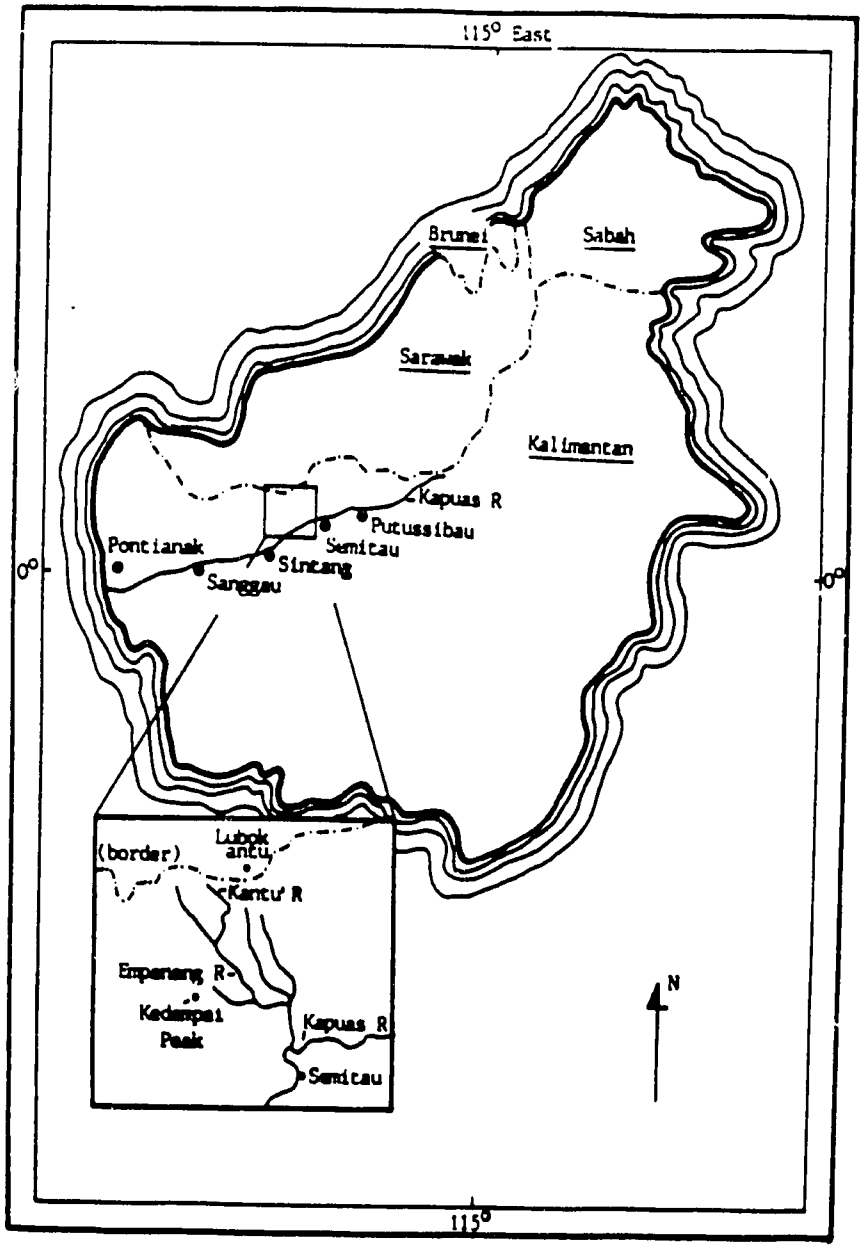
Para rubber is one of Indonesia's major resources: it is a principal source of household income for over eight million people, it is the country's third largest generator of foreign exchange after oil and timber (Effendi 1985:108), and it makes Indonesia the world's second-largest rubber producer. Some of this rubber is produced on large plantations or estates, which employ modern agricultural technology, heavy capital investment, and a wage labor force. But the bulk of Indonesia's rubber, 84 percent at the most recent count (Booth 1988:201; Effendi 1985:108), is produced in tiny gardens of a hectare or so, with century-old technology, by so-called "smallholders"[4] - ordinary farmers who produce rubber with household labor to meet part, typically not the major part, of their household's income requirements.[5] These smallholders are

notable for their number and the volume but not efficiency of their production. Among the major producers, Indonesia's smallholders have the most primitive technology (Barlow and Muharminto 1982:92-93) and the rubber that they produce has the lowest quality and fetches the lowest price (Barlow 1978:411; Ching 1985:81).

The Kantu', an Ibanic-speaking tribe of West Kalimantan (Figure 1), are a good example of Indonesia's rubber smallholders.[6] To meet their subsistence food needs, they grow dry rice (as well as some swamp rice), maize, cassava, and a wide variety of non-rice cultigens in swiddens cut from both primary and secondary forest. The Kantu' also cultivate several types of perennial, cash crops in the fallowed swidden land. These include a variety of trees yielding edible fruits and oils; the pepper plant (Piper nigrum); and, especially, the Para rubber tree. At the time of the fieldwork for this study, thirteen of the fourteen households in the Kantu' longhouse in which I based my study owned a total of 66 separate rubber kebun "gardens", for an average of almost five gardens per household. The gardens average a little less than a hectare in size and contain 200-400 trees, for a total of over four hectares and 1,000-2,000 trees per household. At the time of this study, 61 percent of these gardens contained mature trees, and 39 percent contained immature trees.

Rubber is the Kantu's primary source of cash or tradeable commodities, used to obtain the basic trade goods of salt, tobacco, clothing, and kerosene. Its role is to provide what subsistence agriculture cannot provide or has failed to provide (Chamala

FIGURE 1 - THE LOCATION OF THE MELABAN KANTU' TERRITORY



.357

1985:145; Ward and Ward 1974:38); its role is to fill discrete, distinctive needs. As the Kantu' say, they only tap rubber when they are lapar "hungry" (cf. Geddes 1954:95). This combination of market- and extensive, subsistence-oriented agricultural activities is quite common among the forest-dwelling peoples of Indonesia. Other examples are swidden agriculture and rattan production in East Kalimantan (Lindblad 1988:59-60; Peluso 1983a,1983b; Weinstock 1983), swidden agriculture and coffee in Sulawesi (Burch 1986), swidden agriculture, coffee and damar in Sumatra (Mary and Michon 1987), and sago palm extraction and spice cultivation in the Moluccas (Ellen 1979).[7]

The combination of cash cropping with extensive, subsistence-oriented food-cropping has enabled the Kantu' and similar groups to achieve great success in smallholder production of Para rubber and other export commodities. The combination of activities, in addition to making better use of production inputs, mitigates fluctuation in the returns on production. On the one hand, the productivity of the swidden system permits the household to accept low returns on labor devoted to rubber cultivation during periods of low prices, or to cease tapping entirely, while still preserving the rubber gardens for future use. On the other hand, the reliable return from rubber cultivation enables cultivators to survive occasional failures of the swidden system. In short, swidden cultivation helps farmers to cope with market risk in the rubber system, while rubber cultivation helps farmers to cope with environmental risk in the swidden system. The combination of the

two systems is, as a result, extremely flexible and resilient.[8]

The combination has conferred unusual autonomy on the farmers with respect to the logic of external market and government forces, which is reflected in the fact that the rubber smallholders' contemporary 84 percent market share is the product of more than three-quarters of a century of direct competition between the smallholders and the estates. Estates held a commanding share of Indonesia's rubber production during the industry's early years in the second decade of this century, and they have steadily lost ground to the smallholders ever since.

2. Historic Government Policy Toward Rubber Smallholders

The historical success of rubber smallholders is remarkable not least because it was attained without support from the successive national governments of Indonesia, and often in spite of active government hindrance. The cultivation of rubber, along with most other export crops, was initially developed by private European planters, in close collaboration with the colonial Dutch government. The government's participation in this collaboration was based on the potential contribution of estate agriculture to its revenues. The government supported the planters both directly, through financing estate-oriented research (e.g.), and indirectly, through creation of a regulatory environment that facilitated the estate's acquisition of land (e.g.). The colonial government initially supported the adoption of rubber by smallholders (Boeke 1953:121; Lindblad 1988:60,66); but the speed, magnitude and

consequences of this adoption - in particular with regards to estate production - greatly exceeded government expectations (Booth 1988:205). Smallholdings, due to lower-cost labor inputs and minimal or non-existent capital inputs, proved to have an almost 13-to-1 cost advantage over the estates.[9] As a result, smallholders were able to plant more rubber than the estates and as a result gained a progressively greater share of the market. This caused the government's response to change from supportive to punitive.

The most glaring example of punitive government actions against the smallholders occurred under the International Rubber Regulation Agreement, enacted by the Netherlands, Great Britain, France, India and Siam in 1934 and eventually extended to 1944 (Barlow 1978:62-67; Boeke 1953:124-125,248; Thee 1977:26). The agreement was in theory designed to stabilize rubber prices by limiting production. In practice, in Indonesia and elsewhere, the agreement was used in an attempt to limit production by smallholders for the benefit of estates, through the imposition of export levies ranging up to 83 percent on the smallholders rubber (Dillon 1985:116; cf. Barlow 1990:39; Barlow and Jayasuriya 1986:647-649). In spite of such drastic measures, the levy failed to achieve its purpose. Smallholders responded to the tax increases by increasing both the amount and quality of their production (Boeke 1953:125; Lindblad 1988:75), forcing the colonial government to increase the smallholders' production quota and decrease the estates' (and also forcing the international

consortium to increase Indonesia's overall quota [Boeke 1953:125]). The levy's sole accomplishment was enrichment of the colonial treasury.

3. Contemporary Government Policy Toward Rubber Smallholders

The colonial rubber (and other) estates were nationalized in the late 1950s and early 1960s. Their management has since ostensibly been reoriented, with prodding by the World Bank, in the direction of the private sector. Thus, while some contemporary rubber estates remain Perusahan Negara Perkebunan "Government Plantation Corporations", others are Perusahan Terbatas Perkebunan Semi-Private Plantation Corporations". In either case, however, the government has retained considerable interest in and effective control of estate operations. Beginning in the 1970s, the national government, again with support from the World Bank, began to focus increasing amounts of resources on the development of the export crop sector, in the hope that increased production will help to compensate for declining oil and gas exports.

In its attempts to develop export crop production, the contemporary government, like the colonial government, has heavily favored the estate sector (cf. Booth 1988:206,225). Until the past decade, the government directed virtually all of its technical, material and regulatory support to the estate sector. The government now is directing some resources towards the smallholder sector, but the number of smallholders benefitting is limited. By the 1980s, a scant 8 percent of rubber smallholders were

participating in government extension programs to improve productivity (Booth 1988:217). (As an index of government attention, this can be compared with the 94 percent of all farmers who were participating in rice intensification programs at the same time [Barbier 1989:886]).

This disparity in government support is reflected in recent development in the estate and smallholder sectors. Real returns per unit of area have remained flat for rubber smallholders since the 1950s, while they have improved for estates (Booth 1988:227). Overall production in the estate sector has grown as a result of this improvement in yields; whereas all of the production growth that has occurred in the smallholder sector has been due to an increase in acreage (Booth 1988:199-200).[10] This official favoritism toward the estates has produced the anomaly of an historically-successful and still-growing smallholder sector, which is making a major contribution to the nation's economy and foreign exchange, but that is employing a technology more than fifty years out of date. The backwardness of the smallholder sector is peculiar to Indonesia. In the other major rubber-producing countries (Malaysia, Thailand and Sri Lanka), new technologies to improve productivity and technical efficiency are in wide use among smallholders; but in Indonesia "virtually no use" is made of them (Barlow and Muharminto 1982:92-3).

The assistance that the government is now offering to a limited number of smallholders - in response to criticism by international donors that it has ignored the ever-growing

smallholder sector - does not refute this estate bias so much as "reproduce" it. The government has taken a so-called "focussed" approach, developed in conjunction with the World Bank (Barlow and Jayasuriya 1984:90; Chamala 1985:34). The best example of this approach is the "NES" system (from "Nucleus Estate"), which utilizes government estates as nuclei for the development of smallholdings. The estate clears the land, and plants and manages to maturity high-yielding rubber trees (or another perennial); while government contractors build model villages. When finished, each participating farm family is given on credit a two-hectare plot of rubber, a house, and a small amount of food crop land. When the trees begin to produce, the produce is sold to and processed by the government nucleus estate.[11] The project design is based on the assumption that the principal obstacle to the development of smallholdings is their small size and scattered location (Effendi 1985:108) and, by implication, absence of government control. It is based on the assumption, that is, that the principal problem with smallholdings is the degree to which they are unlike estates. The government solution is to create smallholdings that are more like estates than smallholdings, in their capital intensity, economies of scale, limited scope, and central management by government versus local management by individuals (Barlow and Jayasuriya 1984:90).[12]

There are major problems with these "focussed" projects. They monopolize government extension services (Barlow and Muharminto 1982:92,116), leaving non-participating smallholders entirely on

their own. Their costliness ensures - given the large number of smallholders in Indonesia - that it will take the better part of a century to involve all existing smallholders in them (Barlow & Jayasuriya 1984:90; Barlow & Muharminto 1982:92,96,116), not to mention any additions to the smallholder population in the interim. They are proving difficult to implement due to failure to adequately compensate local farmers for land appropriated for the projects, failure to provide participating farmers an adequate subsistence agricultural base, and failure to grant participants adequate say in the running of the projects (Dove 1985b;1986).[13] Some of these projects fail even to meet the basic subsistence needs of their participants: there are reports from some nucleus estates of participants resorting to eating tree leaves or prostitution in order to survive (Down to Earth 1990b:10-11).[14]

The reason the government has treated the smallholder sector so differently from the estate sector is, as Booth (1988:237) suggests, political-economic in origin: "The estates have fared well in the New Order era by virtue of being themselves part of the bureaucracy, or at least associated with powerful figures in either the military or the civil service." Estate development suits the general, over-arching governmental imperative of centralized control and extraction of resources, whereas smallholder development only frustrates this imperative. The strength of the smallholder sector, from the smallholder's point-of-view, is its ability to flourish independently from the policy and market environment. This same virtue is inimical to the principal

strength of the government estate sector, however, which is the ability to manipulate supply and thus price to its own advantage. The purpose of government policy over the years has been to try to augment this control by improving the estate's technological edge and by reducing the smallholders' independence. These efforts have met with modest success: the rate of growth of the smallholders' production share has been slowed, and the estates' historical decline has been delayed.

III. OTHER EXAMPLES OF TROPICAL FOREST RESOURCE PRODUCTION

The history of smallholder rubber development in Kalimantan (and Indonesia's other outer islands) and the central government's response to this development illustrate the key principles of economic and environmental development in the tropical forests of Indonesia and other countries. It demonstrates that forest peoples historically have developed non-forest sources of income, participated in national and international economies, and opened themselves to technological innovations from the outside world. It suggests that if these innovations prove successful, however, this is likely to elicit not support but opposition from the outside world, due to the politically subordinate status of forest people. It further suggests that what tropical forest people need is not more assistance but less opposition from the rest of the world. The validity of these points is demonstrated by their recurrence in other sectors of tropical forest development.

1. Other Commodities

Extraction of other resources from the tropical forests tends to follow the same pattern of domination by extra-forest interests to the detriment of forest dwellers. The parable of the "big stone and the small man" with which this study began, suggests that the forest dwellers are not in principle allowed, by the broader political-economic system in which they are enmeshed, to develop valuable forest resources. An illustrative case is currently taking place in the gold fields of Southeastern Kalimantan (and elsewhere in Indonesia's outer islands). These fields were initially developed by smallholders. Their modest successes attracted the attention of the national government a few years ago, which responded by licensing the mining rights out to corporate concessionaires and declaring the smallholders who originally developed the gold fields to be "illegal" (Jhamtani 1989:11).[15]

Another case of external appropriation involves rattan. Rattan, which has been gathered, cultivated, and traded by the forest dwellers of Kalimantan for centuries if not millennia, began to enjoy a boom in the 1980s, providing Indonesia with export revenue of $80 million annually (Jhamtani 1989:17). In 1989 the government banned the export of either raw or half-finished rattan, and placed all export of finished rattan under the control of ASMINDO (the Indonesian Association of Furniture Producers) (Environesia 1990:13; Jhamtani 1989:17). The political-economic tone of this move - its place within a pattern of external appropriation of forest resources and development - is reflected

in the fact that ASMINDO is headed by Bob Hasan, the self-proclaimed "king" of Indonesia's timber industry.

Another example involves exploitation of the forest biomass, the most important resource of the tropical forest. The biomass (in addition to being heavily exploited for lumber and pulp by outside interests) is exploited for crop-sustaining ash - through swidden agriculture - by the forest peoples, and also by non-forest, market-oriented "truck farmers". These are either lowlanders who have been outfitted - in many cases with chainsaws and trucks - by urban entrepreneurs, or transmigrants who turned to slash-and-burn agriculture when their World Bank-devised farming systems failed. Both types follow the logging roads into the hills and, as soon as logging operations have been completed, burn the remaining timber and plant cash crops. After 2-3 years of cropping, the land succeeds to Imperata cylindrica, and they move up the logging road and begin again. The first reports of this special type of shifting cultivator began to appear about ten years ago (Vayda 1981). Their existence is now generally recognized. A recent report terms them either "urban based entrepreneurial shifting cultivators" or "transitional or opportunistic shifting cultivator" (referring to the erstwhile transmigrants, among others), in contrast to the "bona fide or traditional shifting cultivator" (Ohlsson 1990:29-31).[16]

The government stance toward these various types of shifting cultivation reveals, again, a political-economic bias in the management of tropical forest resources. Most government officials

continue to blame all shifting cultivation on forest-dwelling tribesmen practicing traditional, sustainable swidden agriculture. Although the shifting cultivation of truck farmers and transmigrants is far more destructive, the political power of the urban business class and the transmigration program make it impossible for officials to even acknowledge, much less curtail, their involvement in shifting cultivation. (As Hurst [1990:24] writes "The government...consistently blames the tribal groups for the environmental havoc caused by wandering transmigrants".) For similar reasons, government officials do not acknowledge the central role of logging roads in making these destructive variants of shifting cultivation possible in the first place (cf. Brown 1991:79-80). In short, what is in reality, as Ohlsson (1990:31) writes, a straight-forward "law-and-order problem" involving exploitation of the forest by outsiders, is officially perceived as a "cultural" problem involving the forest dwellers. This is an example of abuse of forest resources by outsiders with the blame for this abuse being placed on forest dwellers. (There is some evidence to suggest that this pattern is beginning to change, however: in the past 2-3 years high Indonesian officials, such as the governor of South Kalimantan, have publicly acknowledged the existence of a traditional non-destructive variant of shifting cultivation.)

2. Other Development Alternatives

There is much well-intentioned discussion these days of finding alternative income-producing opportunities for forest dwellers. The premises of this approach - that forest dwellers traditionally lacked such opportunities, that this was due to lack of knowledge or technology, and that this explains their involvement in deforestation - both support and are supported by the political-economic bias under discussion. This is illustrated by a recent United Nations- (UNESCO and FAO) sponsored study of the prospects for contributing to forestry development and protection in Kalimantan through development of handicrafts and other sources of income (Ohlsson 1990).

The authors of the study visited villages in South Kalimantan in which forest-dwelling tribesmen had been resettled under government programs to control shifting cultivation. The authors claimed that they did not find the "cultural identity" or "cultural matrix" that they deemed necessary for craft development (Ibid:69-70). As a result, they recommended trying to transfer the "experience and talent" of Java and Bali to the outer islands (Ibid:69). They write (Ibid:69):

> Java and Bali have been known for centuries for fine crafts, crafts with style, quality and continuing invention, known for entrepreneurial talent, and for export skill. It should not be difficult to transfer that experience and talent to the Outer Islands.

The authors' conclusions and recommendations are not valid, but they are almost inevitable given the structure of the study. Resettlements, inhabited by forest peoples removed from a well-known, carefully modified and capitalized environment, are likely to show many more needs and shortcomings, and far fewer resources and capabilities, than otherwise. The fact these are the type of communities that the government wishes to develop, and that these are accordingly the type of villages selected for study, results in the worst possible picture of forest society being presented to outside observers - and inevitably generalized to all other forest peoples - and unwittingly supports existing Javanese-Balinese ethnocentrism in government.

The authors of the handicraft study point to the development of international trade in the art of the Asmat of Irian Jaya as a suitable model for emulation by other forest-dwelling groups in Indonesia. They note with approval the existence of a national "Asmat Foundation", and they suggest that efforts to develop tribal art as a source of income for forest groups should "work with" this organization (or organizations like it) (Ibid:72). I predicted earlier in this study that if tribal baskets ever attained prices in the hundreds or thousands of dollars, externally-supported export associations would suddenly appear. It is notable, therefore, that the Indonesian tribal art that has attracted the most international attention, and money, is the only art to have stimulated the creation of a "foundation". Whatever the actual character of the Asmat Foundation may be, it clearly fits the

thesis of this study, that whenever forest people develop a resource to the point that it is attractive to the broader society, external institutions will appear to control its further development.

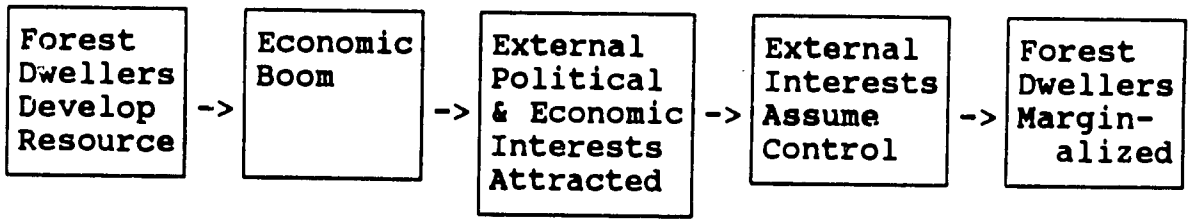
The authors of the study conclude by noting that in addition to handicrafts, the income of rural and isolated people can be supplemented by "agriculture or other activities, such as butterfly farms, crocodile farms, fish farms, and medicinal plant collection" (Ibid 69). Notably absent from this list are the tropical forest products of greatest interest to the broader society: trees for timber or pulp, valuable hardwoods, gems and other minerals, the world's greatest botanical gene pool, and rubber and other smallholder export crops such as coffee, tobacco, and coconuts. The list of potential sources of income is a list not of what the broader society values most, but of what it values least. It is a list of what the broader society is likely to <u>allow</u> the forest people to keep - so long, as the examples of Asmat art and the "big diamond" suggest, some twist of fate does not suddenly render one of these products more valuable than is deemed appropriate for a poor forest dweller. For a part of the world as rich in resources as the tropical forests, a list of potential income sources that cannot transcend butterfly and crocodile farms is a recommendation, however unintentional, not for the empowerment of the forest dwellers but for their impoverishment.

IV. DISCUSSION

1. The Pattern of Resource Development

The examples just discussed, along with the earlier-discussed case of Para rubber, suggest the existence of a common pattern of resource development in the tropical forest: forest people develop a resource for market, and when and if this market attains sufficient importance, central economic and political interests assume control. The method by which control is assumed varies - from appropriation of use-rights (which are then awarded to non-native concessionaires, as with gold today and also timber), to controlling exports (as with rattan today and rubber formerly), to preferential economic, technological, infrastructural, and regulatory assistance (as with rubber both historically and today) - but the outcome invariably is the same: marginalization of the original forest-dwelling producers. This developmental sequence is summarized in Figure 2.

FIGURE 2 - PATTERN OF TROPICAL FOREST DEVELOPMENT



This model throws into question much current development planning for the tropical forests. A key premise of this planning is that forest reserves are being over-exploited by forest dwellers, that the reason for this is the absence of non-forest

sources of income, and that the solution is to help the forest peoples to find and develop such sources. However, my analysis of past development shows that there has been no lack of such sources in the past; the problem has been in maintaining the forest peoples' control of them. The problem has not been one of faulty economics within the tropical forest, therefore; the problem has been what happens when this economy encounters the economic and political structures of the broader society. These latter structures have been oriented since pre-colonial times not toward development of marginal areas but toward extraction from them. The involvement of these structures has led not to the development of forest peoples but to their under-development.

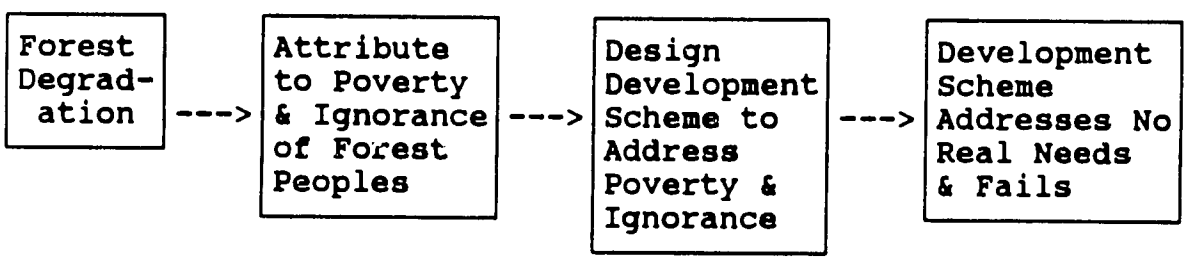
This analysis suggests that if the broader society (and the international community) is truly committed to assisting the forest peoples, this should consist not of searching for resources that the forest peoples do not already have, but of first searching for the institutional forces that restrict their ownership and productive use of existing resources.[17] The former approach has been preferred in the past, because it is less problematic to assume that the forest peoples have no resources than to explain why the resources that they had have been taken away.[18] It is no coincidence that the emphasis on what the broader society needs to do for the forest peoples effectively precludes any attention to what this society has already done to them. It is no coincidence that the emphasis on the forest dwellers' poverty precludes attention to their resource wealth: identifying the development

problem as a lack of resources lends rhetorical support to their resource disenfranchisement.

2. The Pattern of Development Problem-Solving

The distinctive pattern of tropical resource development that has just been described results in resource degradation and economic under-development. It is sustained and the persistence of these problems is assured, by a pattern of problem-solving that rests on the same erroneous assumptions. The government attributes most deforestation to the under-development of the indigenous forest-dwelling population, and it accordingly designs most of the development programs involving these populations to promote development. Since the premises of these programs are incorrect, they typically fail. This failure is reflexively attributed to the under-development of the forest peoples.[19] In this fashion, the circle of reasoning is completed, and the possibility of achieving a genuine development solution is foregone. The process is presented graphically in Figure 3.

FIGURE 3 - PATTERN OF TROPICAL FOREST PROBLEM-SOLVING



V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

1. Summary

I began this study with a parable from Kalimantan, which relates how too big a diamond can bring misfortune to a poor miner. I suggested that the political-economic principles that underlie this parable apply more generally to all resource development in the tropical forest and that the principal challenge is not to give more development opportunities to the forest peoples but to take fewer away. I developed this thesis looking first at the case of smallholder rubber development in Indonesia. I argued that Para rubber presented a textbook case of a development opportunity for the forest dwellers, but that it has been actively opposed by broader economic and political structures that wished to monopolize rubber production on government-supported estates. I then discussed several analogous cases, involving development of gold, rattan, truck gardens, and handicrafts. Each case illustrates the predisposition of political and economic forces in the broader society to appropriate successful resource development in the tropical forest. These findings open to question government concern over insufficient access of forest peoples to such development and the government intention to provide such access. Finally, I noted that negative feedback from government policies is avoided, and their ill-consequences are maintained, by a focus on the shortcomings of forest dwellers as opposed to external political-economic elites.

2. Conclusions

The findings of this study suggests that the problem of tropical deforestation is due less to the shortcomings of the local forest communities than to the shortcomings of the broader society, that it is due less to problems of local economics or technology than to problems of national political economy. Degradation most often is the result not of resource-use decisions made in the forest, but of decisions made in the cities - in Banjarmasin, Samarinda, Pontianak and, especially, Jakarta. The nature of the relationship between forest degradation and the under-development of forest peoples is the reverse of that commonly claimed: forests are not degraded because forest peoples are poor and impoverished; rather, forest peoples are impoverished by the degradation of their forests and other resources by external forces. In a perverse irony, the instrument of the forest peoples' own impoverishment, deforestation, is blamed on them. Their proximity to the forest makes them an easy target for blame for forest degradation; while their lack of political capital makes them incapable of refuting this charge.[20]

The problem is not that the forest peoples are poor, therefore, but that they are politically weak; the problem is not that the forest is environmentally fragile, but that it is politically marginal. In short, the problem for the forest peoples, the single most important determinant of their fate, is that they inhabit a resource that is coveted by groups more powerful than they; while the problem for the forest is that it is

inhabited by peoples who are too weak to insist on its rational use. The problems stem not from an ecological imbalance, therefore, but from a political-economic imbalance. It is an imbalance (like the parable of the large diamond found by the small man) created by an association of rich resources and weak peoples.

The challenge for contemporary forest peoples is less developmental, therefore, than political. The challenge for development planners is not to address an imagined economic weakness, through searching for methods of "supplementing the forest people's income", but to mediate the integration of the forest peoples into broader political and economic arenas so that they are not disadvantaged by their political weakness. The focus not on "development" but on "mediation", and the finding - that while forest peoples may need government to do some things that are helpful, they also need government to stop doing some things that are hurtful - suggests a new perspective on development planning. It suggests that the prerequisite for tropical forest development and conservation is not just change on the part of the forest dwellers but also change on the part of government. It suggests that the first step in the development process is to change the policies and priorities of government, which in turn requires de-mystification of the debate over tropical deforestation and development.

This re-orientation will challenge not only national governments, but also the international donors, non-governmental organizations, and scholars who are active in tropical forest

conservation and development issues. Past activism did not greatly jeopardize the activists' own political and economic reality, because the focus of attention was on the micro-economics and ecology of politically marginal forest dwellers (which surely is one of the reasons why this was the focus of attention). This situation will change if the focus shifts, as I am urging it should, to the political-economics of the wider society. Since the activists are part of this wider society (broadly defined), this re-focus will necessitate some self-critique, as relationships between the activists and the local political-economic institutions are re-defined. The outcome of this process is likely to be beneficial, but it will not be painless, and there inevitably will be some reluctance to abandon the politically innocuous (albeit ineffective) "butterfly farm" paradigm.

3. Recommendations

If the political-economic will to develop rather than under-develop the forest peoples is ever attained, much will be possible. Consider, for example, the possibilities for developing smallholder Para rubber cultivation.[21] Among the major rubber producers, Indonesia's smallholders have the most primitive technology (Barlow and Muharminto 1982:92-93), and the rubber that they produce has the lowest quality and fetches the lowest price (Barlow 1978:411; Ching 1985:81). Malaysia shows what can be accomplished if the Indonesian government wishes: between 1965 and 1980, Malaysian government efforts to assist smallholders raised average yields by

126 percent (by comparison, yields in Indonesia rose just 17 percent during the same time period [Booth 1988:211-212]).

Perhaps the single most important principle to follow in planning development interventions, whether with Para rubber or some other commodity, is to avoid centralization. All available evidence suggests that the historical centralizing tendency in Indonesian statecraft leads too easily to local economic hardship and resource degradation. In the case of smallholder rubber, therefore, instead of developing expensive and problematic nucleus estate projects, the government would be better advised to assist existing traditional smallholders in situ - at far less cost. In the case of rattan, if some type of export organization is deemed necessary, a non-governmental organization with no commercial aspirations or ties to industry probably would be preferable to a trade association like ASMINDO. In many cases it will be preferable to simply let the smallholder interact with the market on his own. While the logic of the market is not infallible, it often does better by the smallholder than the formal organizations that central government creates on his purported behalf.

AFTERWORD

The image of the great treasure and the small man occurs (in varying form) in many different societies. The most famous exploration of this image in English literature is Steinbeck's "The Pearl" - set in Latin America. At one point in this novel, Steinbeck's protagonist recalls a sermon that the local priest

delivered after the pearl divers tried, and failed, to bypass the local pearl-buying syndicate (1945/1974:59-60):

> The loss of the pearl was a punishment visited on those who tried to leave their station. And the Father made it clear that each man and woman is like a soldier sent by God to guard some part of the castle of the Universe. And some are in the ramparts and some far deep in the darkness of the walls. But each one must remain faithful to his post and must not go running about, else the castle is in danger from the assaults of Hell.

We may reasonably ask if it is similar beliefs (viz., that some of us are entitled to position and resources, while others are not) that explain why so much development planning for tropical forest peoples is, in outcome if not announced intention, planning not for their development but for their continued under-development.

NOTES

1. This analysis was written during the tenure of a fellowship at the East-West Center's Population Institute (partially supported by the "Demographic Initiatives Project", under agreement #DPE-3046-A-00-8050-00 with the U.S. Agency for International Development). The field research was supported by the National Science Foundation (Grant #GS-42605), the Rockefeller Foundation, the Ford Foundation, and the East-West Center (EAPI). Earlier versions of this paper were prepared for the Conference on "Interactions of People and Forests in Kalimantan", held at The New York Botanical Garden on 21-23 June 1991, and a seminar in the Summer Institute of the East-West Center's Asian Studies Development Program, on 1 August. None of the afore-mentioned organizations necessarily agrees with the analysis presented here, however, for which the author alone is responsible.

2. The forested hills above Martapura have been famous since pre-colonial times as a source of alluvial diamonds. Diamond mining, carried out by digging holes several feet wide and 2-3 times that in depth into the ground, is an important non-farm source of cash for the local people to this day. Tribesmen deep in the forested interior carry jeweler's scales about with them, and they can quote current world market prices of stones of any given quality and size.

3. As Geertz has done with images like the cockfight and the theater state, I intend to use a single image - that of the "big stone and the small man" - to throw light on a broader pattern of

thought and behavior in society (Cf. Marcus and Fischer 1986:14).

4. A rubber "smallholder" is defined as someone with less than 25 hectares (Barlow and Muharminto 1982:86). Barlow and Jayasuriya (1986:635) write that "Smallholdings of up to a few hectares have been a major and dynamic component of most tropical tree crop industries from very early years. They produce the dominant share of output in the rubber, cocoa and coconut production industries, are very important in the coffee industry and contribute small but quite substantial shares of the outputs of palm oil and tea."

5. See the historical studies of Indonesian economics by Boeke (1953), Booth (1988), Lindblad (1988) and Pelzer (1978b) for general analyses of smallholder cultivation; see Barlow and Jayasuriya (1984), Collier and Tjakrawedaya (1972), Dove (1985b,1986), and Seavoy (1980) on contemporary smallholders; see Barlow and Muharminto (1982), Chamala (1985), Cottrell et al. (1985), Dillon (1985), and Effendi (1985) on smallholder rubber; and see Best (1988), Chin (1982), Colfer et al. (1988), Cramb (1988), Dove (1983), Padoch (1980), Pelzer (1978a), and Thomas (1965) on the relationship between smallholder rubber (and other export crops) and extensive agriculture.

6. I lived and carried out research among the Kantu' for two years. The particular sub-group that I studied, the Melaban Kantu', live along a western, secondary tributary of the Kapuas river, which is two weeks' travel by river from the coast of Kalimantan (at Pontianak), and two days's travel by foot from the international border with Sarawak (at Lubok Antu). I gathered data on the

Banjarese of Southeastern Kalimantan in 1980 and 1982. I gathered additional, relevant data on other groups between 1979 and 1985 while based on Java and making periodic field trips to most of Indonesia's principal outer islands.

7. This linkage between swidden agriculture and export crop production in Indonesia is often missed by development planners, as in a recent United Nations (FAO/UNDP) -sponsored review of the forestry sector (Ohlsson 1990:47).

8. There is an additional benefit of rubber cultivation that in some cases surpasses in importance all others: establishment of tenure. Under the adat law of the Kantu' (and many other of Indonesia's tribal minorities), and under national law as well, planting rubber establishes greater rights to land than simply clearing the forest for a swidden (cf. Barlow and Muharminto 1982:92-93; Cramb 1988:122-123; Drake 1982:102; Weinstock and Vergara 1987:318-9).

9. In the 1920s it cost smallholders an average of 5-6 Dutch florins to establish one acre of mature rubber, compared with 60-80 florins for the European plantations (Bauer 1948:68).

10. The increase in smallholder acreage is partly due to the fact that smallholders still hold a competitive advantage in rubber establishment: while less than the 13-to-1 advantage of the colonial era, it still averages more than 6-to-1 relative to the estates and between 3 and 11-to-1 relative to the government's smallholder projects (Barlow and Muharminto 1982:100,113).

11. The government's two other principal smallholder development

programs, the SRDP "Smallholders' Rubber Development Project", and the PRPTE Proyek Rehabilitasi Perluasan Tanaman Ekspor "Project for the Rehabilitation and Extension of Export Crops", take a focussed approach like the NES system, but they are somewhat less capital-intensive (Barlow and Muharminto 1982:116).

12. Goldthorpe (1987:32,35) suggests that such projects are really "quasi-plantations", whose participants are not really smallholders at all.

13. Barlow et al. (1985:46) claim that analogous problems have beset similar projects in Malaysia. Barlow (1978:388) elsewhere suggests that rural people "should not ... require long-term direction as members of large centralized units which attract government for the wrong reasons of administrative tidiness and amenability to close control".

14. Similar problems have led the Sarawak government to abandon this approach to smallholder development (Cramb and Willis 1990:354).

15. Before the entry of the corporate concessionaires, the fame of these gold fields also attracted many "outside" smallholders, which resulted in a variety of social and environmental problems. Some kind of intervention by the national government probably was necessary, but this could have been accomplished while still leaving the gold fields in the hands of smallholders and local peoples. Large corporate concessions are not a prerequisite for government regulation, and it is not unlikely - if experience elsewhere in Indonesia is any guide - that these concessions will

result in more social and environmental problems than existed under the smallholder exploitation.

16. The Bugis pepper cultivators described by Vayda (1985,1988) perhaps represent some combination of the "entrepreneurial" and "opportunistic" categories.

17. This is perceived by the forest peoples themselves, who first ask outsiders not for resources but for understanding of their use of existing forest resources. In a pcignant example of this, Brosius (1991) says that the Penan of Sarawak seem to think that if they can just find the right explanatory analogy, they will be able to persuade outsiders to stop clearing their forests. So the Penan patiently explain that the forest is to them as an office is to an official, or as a wet-rice field is to a lowland farmer, and so on. The Penan, as these analogies indicate, are far ahead of most of us in recognizing that the proper dimensions of this dialogue are economic. They fail only in thinking that it is their economics that need to be better understood, as opposed to the economics of the outside world.

18. As Jhamtani (1989:24-25) writes "It is easy to say that forest destruction is caused by poverty, ignorance and mismanagement. The solution would be very easy. More aid for income-generating programs and institutional development...."

19. For example, a farmer was recently shot in Riau province, during a protest against appropriation of land and destruction of private rubber gardens by a new nucleus estate project. The government official who headed the subsequent investigation into

the shooting attributed the entire disturbance to the fact that the local people are still bodoh "ignorant", and his proposed solution was to teach the people the "right skills" (Down to Earth 1990a:3).

20. The forest peoples of Indonesia are physically and culturally distant from the seats of power. Residence in the forest is associated, for related reasons (see Dove 1985a), with anti-establishment political views, which has been one of the principal justifications for ongoing government programs to resettle people out of the forests.

21. Rubber offers one of the best avenues for development of Indonesia's tribal, swidden-cultivating minorities, as Geddes (1954:98) concluded for the Dayak of Sarawak. Cf. Goodland's (1990:191) recommendation to "reactivate Asian sleeping [viz., under-exploited] rubber" in his "Appendix A: How to Save Tropical Forests - a Conspectus".

REFERENCES CITED

ACIAR

1985 Smallholder Rubber Production and Policies: Proceedings of an International Workshop held at the University of Adelaide. Canberra: ACIAR.

Barbier, Edward B.

1989 Cash Crops, Food Crops, and Sustainability: The Case of Indonesia. World Development 17(6):879-895.

Barlow, Colin

1978 The Natural Rubber Industry: Its Development, Technology, and Economy in Malaysia. Kuala Lumpur: Oxford University Press.

1990 Changes in the Economic Position of Workers on Rubber Estates and Smallholdings in Peninsular Malaysia, 1910-1985. In The Underside of Malaysian History: Pullers, Prostitutes, Plantation Workers, P.J. Rummer and L.M. Allen eds., pp.25-49. Singapore: Singapore U. Press.

Barlow and Jayasuriya

1984 Problems of Investment for Technical Advance: The Case of Indonesian Smallholders. Journal of Agricultural Economics 35(1):85-95.

1986 Stages of Development in Smallholder Tree Crop Agriculture. Development and Change 17,4:635-658.

Barlow, Colin and Muharminto

1982 The Rubber Smallholder Economy. Bulletin of Indonesian Economic Studies XVIII(2):86-119.

Barlow, Colin; C.C. Findlay; P.J. Forsyth; and S.J. Jayasuriya

1985 Malaysian Structural Change and Its Impact on Rubber. In ACIAR, pp.39-56.

Bauer, P.T.

1948 The Rubber Industry: A Study in Monopoly and Competition. London: Longmans, Green.

Best, J.R.

1988 Change over Time in a Farming System Based on Shifting Cultivation of Hill Rice in Sarawak, Malaysia. Agricultural Administration and Extension 29:69-84.

Boeke, J.H.

1953 Economics and Economic Policy of Dual Societies: As Exemplified by Indonesia. New York: Institute of Pacific Relations.

Booth, Anne

1988 Agricultural Development in Indonesia. Asian Studies Association of Australia, Southeast Asia Publications Series No. 16. Sydney: Allen and Unwin.

Brosius, J. Peter

1991 The Penan Gang Landscape: Ecology, History and Society in the Borneo Rain Forest. Paper read at the Conference on "Interactions of People and Forests in Kalimantan", held at The New York Botanical Garden, 21-23 June.

Brown, Lester R.

1991 State of the World 1991: A Worldwatch Institute Report on Progress Toward a Sustainable Society. New York: W.W. Norton.

Burch, Carol-Carmen

1986 Coffee as Cash in Highland Indonesia: Evidence on a Debate. Paper read at Annual Meeting of American Anthropological Association, 5 December, Philadelphia.

Chamala, S.

1985 Transfer of Rubber Technology among Smallholders in Malaysia and Indonesia: A Sociological Analysis. In ACIAR, pp.30-34.

Chin, S.C.

1982 The Significance of Rubber as a Cash Crop in a Kenyah Swidden Village in Sarawak. Federation Museum Journal 27:23-28.

Ching, Lim Sow

1985 Malaysian Smallholders: Issues and Approaches in Further Processing and Manufacturing. In ACIAR, pp.73-85.

Colfer, Carol J. Pierce; Dan W. Gill; and Agus Fahmuddin

1988 An Indigenous Agricultural Model from West Sumatra: A Source of Scientific Insight. Agricultural Systems 26:191-209.

Collier, William L. and Suhud Tjakrawedaya

1972 Smallholder Rubber Production and Marketing. Bulletin of Indonesia Economic Studies 8(2):67-92.

Cottrell, A.; D. Ip; and J.S. Western

1985 Sociological Perspectives on the Rubber Smallholder Industry in Malaysia and Indonesia. In ACIAR, pp.16-21.

Cramb, R.A.

1988 The Commercialization of Iban Agriculture. In Development in Sarawak: Historical and Contemporary Perspectives, R.A. Cramb and R.H.W. Reece eds., pp.105-134. Monash Paper on Southeast Asia No. 17, Center of Southeast Asian Studies, Monash

University.

Cramb, R.A. and I.R. Wills

1990 The Role of Traditional Institutions in Rural Development: Community-Based Land Tenure and Government Land Policy in Sarawak, Malaysia. World Development 18,3:347-360.

Dillon, H.S.

1985 Development of Rubber Smallholders in North Sumatra. In ACIAR, pp.116-126.

Dove, Michael R.

1983 Theories of Swidden Agriculture and the Political Economy of Ignorance. Agroforestry Systems 1:85-99.

1985a The Agroecological Mythology of the Javanese, and the Political Economy of Indonesia. Indonesia 39:1-36.

1985b Plantation Development in West Kalimantan I: Extant Population/Land Balances. Borneo Research Bulletin 17(2):95-105.

1986 Plantation Development in West Kalimantan II: The Perceptions of the Indigenous Population. Borneo Research Bulletin 18(1):3-27.

Down to Earth

1990a "Farmer Shot in Plantation Dispute", No.7 (March):3.

Down To Earth

1990b "Farmers Impoverished by World Bank-Funded Plantation project", No.11 (November):10-11.

Effendi, Suryatna

1985 Improvement of Smallholder Rubber Farming Productivity in Indonesia. In ACIAR, pp.108-115.

Ellen, Roy F.

1979 Sago Subsistence and the Trade in Spices: A Provisional Model of Ecological Succession and Imbalance in Moluccan History. In Social and Ecological Systems, P.C. Burnham and R.F. Ellen eds., pp.43-74. London: Academic Press.

Environesia

1990 ITTO Meeting Promotes Unsustainable Logging. No. 4,2:12-15.

Geddes, W.R.

1954 The Land Dayaks of Sarawak. Colonial Research Study No. 14. London: H.M.S.O.

Goldthorpe, C-C.

1987 A Definition and Typology of Plantation Agriculture. Singapore Journal of Tropical Geography 8,1:26-43.

Goodland, Robert (ed.)

1990 Race to Save the Tropics: Ecology and Economics for a Sustainable Future. Washington, D.C.: Island Press.

Hurst, Philip

1990 Rainforest Politics: Ecological Destruction in Southeast Asia. London: Zed Books

Jhamtani, Hira

1989 An Overview of Forestry Policies and Commercialization in Indonesia. Presented in the Workshop on the U.S. Tropical Timber Trade: Conservation Options and Impacts, 14-15 April.

Lindblad, J. Thomas

1988 Between Dayak and Dutch: The Economic History of Southeast Kalimantan, 1880-1942, Verhandelingen No.134. Dordrecht: Foris

Publications.

Marcus, George E. and Michael M.J. Fischer

1986 Anthropology as Cultural Critique: An Experimental Moment in the Human Sciences. Chicago: University of Chicago Press.

Mary, Fabienne and Genevieve Michon

1987 When Agroforests Drive Back Natural Forests: A Socio-Economic Analysis of a Rice-Agroforest System in Sumatra. Agroforestry Systems 5:27-55.

Ohlsson, Bo

1990 Socio-Economic Aspects of Forestry Development. Indonesia Forestry Studies VIII-3. Jakarta: Ministry of Forestry/Food and Agriculture Organization.

Padoch, Christine

1980 The Environmental and Demographic Effects of Alternative Cash-Producing Activities among Shifting Cultivators in Sarawak. In Tropical Ecology and Development, J.I. Furtado ed., pp.475-481. Kuala Lumpur: International Society of Tropical Ecology.

Peluso, Nancy P.

1983a Networking in the Commons: A Tragedy for Rattan? Indonesia 35:95-108.

1983b Markets and Merchants: The Forest Product Trade of East Kalimantan in Historical Perspective. M.Sc. thesis, Cornell University.

Pelzer, Karl J.

1978a Swidden Cultivation in Southeast Asia: Historical, Ecological, and Economic Perspectives. In Farmers in the

Forest: Economic Development and Marginal Agriculture in Northern Thailand, Peter Kunstadter et al. eds., pp.271-286. Honolulu: East-West Center.

1978b Planter and Peasant: Colonial Policy and the Agrarian Struggle in East Sumatra, 1863-1947. Verhandelingen No.84. The Hague: Martinus Nijhoff.

Seavoy, Ronald E.

1980 Population Pressure and Land Use Change: From Tree Crops to Sawah in Northeastern Kalimantan, Indonesia. Singapore Journal of Tropical Geography 1:61-67.

Steinbeck, John

1945/1974 The Pearl. New York: Bantam Books.

Thee, Kian-Wie

1977 Plantation Agriculture and Export Growth: An Economic History of East Sumatra, 1863-1942. Jakarta: LEKNAS-LIPI.

Thomas, K.D.

1965 Shifting Cultivation and Production of Small Holder Rubber in a South Sumatran Village. Malayan Economic Review 10:100-115.

Thompson, M.; M. Warburton; and T. Hatley

1986 Uncertainty on a Himalayan Scale: An Institutional Theory of Environmental Perception and a Strategic Framework for the Sustainable Development of the Himalaya. London: Ethnographica.

Vayda, Andrew P.

1981 Research in East Kalimantan on Interactions between People and Forests: A Preliminary Report. Borneo Research Bulletin

13,1:3-15.

1988 Bugis Migration to Kalimantan Forests. In People of the Tropical Rain Forest, Julie Sloan Denslow and Christine Padoch eds., pp.153-154.

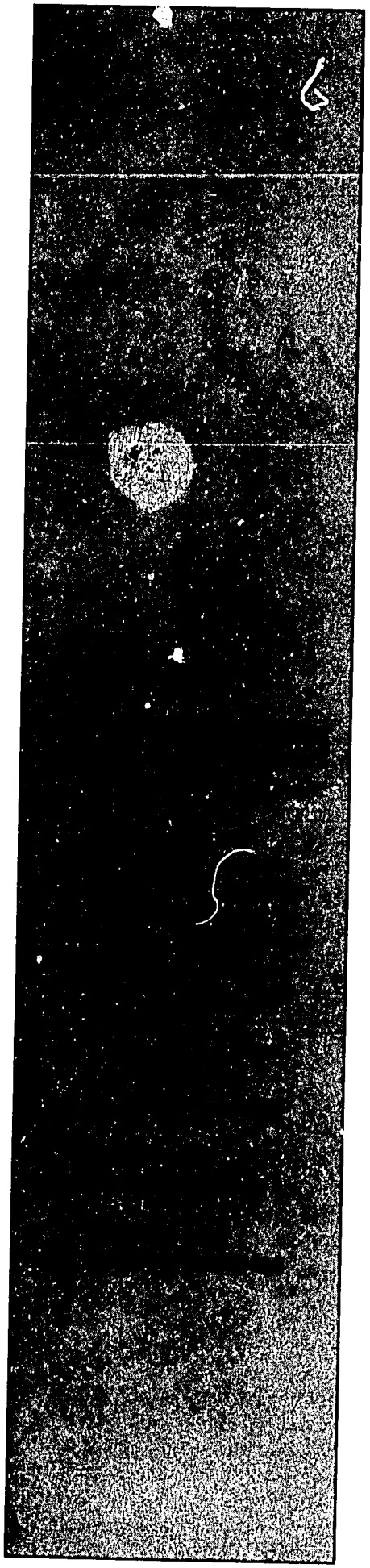
Ward, Marion W. and R. Gerard Ward

1974 An Economic Survey of West Kalimantan. Bulletin of Indonesian Economic Studies X(3):26-53.

Weinstock, Joseph A.

1983 Rattan: Ecological Balance in a Borneo Rainforest Swidden. Economic Botany 37(1):58-68.

APPENDIX V



East-West Population Institute
East-West Center

ISSN: 0891-2823

ASIAN AND PACIFIC POPULATION FORUM

Volume 4, Number 4

Winter 1990

The AIDS Prevention Dilemma in Thailand

Acquired immune deficiency syndrome (AIDS) and its causative human immunodeficiency virus (HIV) have become a rapidly spreading menace in Asia as elsewhere. This article summarizes the current status of the AIDS epidemic in Thailand, identifies the patterns of HIV transmission through Thai society, describes governmental and private responses to the epidemic, and suggests further countermeasures.

The number of HIV positive cases has risen dramatically since 1988. By September 1990 the Ministry of Public Health estimated 100,000 Thais to be HIV positive, a figure thought by other observers to be conservative. Until recently intravenous drug use and sexual contact among male homosexuals accounted for nearly all cases, but a new pattern of transmission—through heterosexual contact between female prostitutes and their male clients—is emerging, particularly in Northern Thailand. Through such casual, unprotected sex, the virus is now entering the general Thai population.

It is strongly recommended that every effort, public and private, be undertaken to educate the public about ways to avoid contracting and transmitting HIV, and to facilitate the widespread use of AIDS-preventive measures. A recently announced national policy to prevent AIDS represents a hopeful step in this direction.

ASIAN AND PACIFIC
POPULATION FORUM

Editor: Sandra E. Ward

Editorial Board: Fred Arnold, Minja Kim Choe, Robert D. Retherford, Robert C. Schmitt

Production: Clifford Takara, Lois M. Bender

The *Asian and Pacific Population Forum*, published quarterly by the East-West Population Institute, contains policy-relevant and technical articles on population issues affecting the Asia-Pacific region, reviews of demographic publications, and news about population activities in the region. Guidelines on manuscript submission are available from the editor. All manuscripts are peer-reviewed. Readers are invited to submit articles, news items, reviews, and letters to:

Editor, Asian and Pacific Population Forum
East-West Population Institute
1777 East-West Road
Honolulu, Hawaii 96848, U.S.A.

Single copies of the *Forum* are free to individuals and organizations engaged in population-related work. The subscription rate for the general public is $12 per year. Send/add $5 for overseas airmail delivery.

The U.S. Agency for International Development provided support for this issue.

The EAST-WEST POPULATION INSTITUTE, a unit of the East-West Center, conducts research, training, and related activities in the population field, with emphasis on economic, social, psychological, and environmental aspects of population problems in the Asia-Pacific region.

The EAST-WEST CENTER is a public, nonprofit educational institution established in Hawaii in 1960 by the United States Congress with a mandate "to promote better relations and understanding among the nations of Asia, the Pacific, and the United States through cooperative study, training, and research." Some 2,000 research fellows, graduate students, and professionals in business and government each year work with the Center's international staff on major Asia-Pacific issues relating to population, economic and trade policies, resources and development, the environment, culture and communication, and international relations. Since 1960, more than 25,000 men and women from the region have participated in the Center's cooperative programs. Principal funding for the Center comes from the United States Congress. Support also comes from more than 20 Asian and Pacific governments, as well as private agencies and corporations. The center has an international board of governors.

by Marjorie A. Muecke

EXPERIENCE with the unrelenting spread of the human immunodeficiency virus (HIV) in Sub-Saharan Africa indicates that, in the absence of a cure or vaccine for acquired immune deficiency syndrome (AIDS), the disease will create a major social crisis wherever it takes hold. The countries of Asia are only beginning to recognize the AIDS pandemic as a threat to themselves (Karel and Robey 1988: 2–4, 18).

Thailand is more advanced than its neighbors in recognizing AIDS as a threat of major proportions. It has a sentinel surveillance program to track the diffusion of HIV in the Thai population, and the proportion of its citizens who have heard about the disease is greater than in other countries of Southeast Asia.

However, many Thais who have heard of AIDS know little about it. Eighty-eight percent of a stratified random sample of 1,500 people in Bangkok knew that AIDS is a dangerous and contagious disease; but fewer than half knew that use of condoms can reduce the spread of HIV, more than one-third thought they could not be infected by people who look healthy, and another third did not know that AIDS is a fatal disease (Somchai Durongdej 1990).

Until recently the AIDS risk in Thailand has been associated primarily with intravenous drug use. Most estimates of the number of intravenous drug users in the country range between 100,000 and 200,000, the majority of users living in Bangkok. Other risk factors are high levels of population mobility and return migration from abroad, sexual mores that endorse male sexual freedom and restrict it for women who are not prostitutes, the large scale of its tourist and night entertainment industry, nonuse of condoms, and an uncircumsized male population (Fink 1989; Waugh and Spicer 1990). (See box on page 3.)

All these sociocultural characteristics bring people intimately together, providing the necessary environment for extensive HIV transmission. For these reasons, Thailand is selected for a case study AIDS update in the *Asian and Pacific Population Forum.*

It is characteristic of epidemics to begin quietly and capriciously, as depicted by Albert Camus in his novel *The Plague* (1948). In its early phase of surreptitious spread, few realize their vulnerability to AIDS. In Asia the epidemic is still invisible. In Thailand, with fewer than 200 persons known to be symptomatic out of a population of 56 million, hardly anyone feels vulnerable. The Thais have an aphorism: "*Mai hen long sop mai lang naamtaa*" (If you don't see the corpse in the coffin, you don't shed a tear).

Some government officials, health care providers, and nongovernmental organizations (NGOS) are profoundly aware of the dangers that AIDS poses to the Thai population at large. But other officials, the mass media, and the majority of

Marjorie A. Muecke is Associate Professor of Nursing, Adjunct Associate Professor of Anthropology, and Adjunct Associate Professor of Health Services, University of Washington at Seattle.

their audiences still associate AIDS with foreign male tourists and social deviants—intravenous drug users, homosexuals, and female prostitutes—not with high-risk sexual behavior that may be widespread among the general population.

Most Thais misleadingly associate AIDS with male tourists from abroad, intravenous drug users, homosexuals, and female prostitutes rather than with high-risk sexual behavior that may be widespread among the general population.

Attempts to control AIDS by associating it only with foreigners and "undesirables" are common national responses, particularly in countries where HIV prevalence rates are still low. Nevertheless, where AIDS is concerned such defenses of denial and displacement can be suicidal because they reinforce the false notion of personal safety among the general populace.

This approach also encourages a disease-based xenophobia. The Thai government's prohibition (until 1991) of known HIV carriers from entering the country and its concentration of HIV screening efforts on intravenous drug users, prostitutes, and clients of sexually transmitted disease (STD) clinics misleadingly suggest that Thais who are not prostitutes and do not abuse drugs or have an active STD are safe from AIDS. Anonymous random testing of other population segments at risk, such as military personnel, male youths, and truck drivers, would yield more valid information on the prevalence of the disease while still economizing resources.

Selective targeting of prostitutes and intravenous drug users for HIV testing reinforces negative attitudes toward these high-risk groups, as has happened in the United States, thus legitimating an inadequate governmental and public response to the problem of AIDS.

What Bateson and Goldsby (1988:134) argue in the case of the United States holds equally for countries such as Thailand: "If the population at large does not alter its sexual behavior until it has experienced the depth of loss and direct contact with suffering that

Survey of Foreign Tourists in Thailand Reveals Majority Experience Night Life

In mid-1990 a self-administered questionnaire gathered information from 1,200 foreign tourists in Bangkok and Pattaya, Thailand's two major tourist cities, about their sexual experiences and use of condoms while in Thailand. The survey, conducted by the Program on AIDS of the Thai Red Cross Society, also asked respondents about their demographic characteristics, knowledge of and attitudes toward AIDS, awareness of the AIDS situation in Thailand, and opinions about the possible impact of AIDS information campaigns on tourism.

Preliminary results indicate that 63 percent of those surveyed had experienced Thai night life (e.g., had patronized bars, clubs, or massage parlors). Among the Bangkok tourists, 40 percent of men and 5 percent of women said they had already had or were planning to have sex with a Thai person. Only 40 percent of the tourists interviewed were married. Of those 40 percent, 25 percent were traveling alone.

The research team included Werasit Sittitrai, deputy director of the Thai Red Cross Society's Program on AIDS and assistant professor at the Institute of Population Studies, Chulalongkorn University; Praphan Phanuphak, director of the Program on AIDS; and Charlotte Shum and Dominique Michaud, undergraduate students from the University of Pennsylvania. A complete report on the survey will be available in June 1991 from the Thai Red Cross Society. Requests for copies should be directed to:

Director of Program on AIDS
Thai Red Cross Society
1871 Rama 4 Road
Bangkok 10330, Thailand
Fax: (662) 255 3727

—by Werasit Sittitrai

[accompanies death from AIDS], . . . it will be too late to change."

Like other government officials around the world, Thai officials face a difficult set of challenges: Even if they have the vision to foresee the epidemic in its maturity, how are they to contain the spread of AIDS, when change in individual behavior is what is essential to stem the tide? (Rosenberg 1989:10) How can they protect the health of the public without discriminating against certain individuals or groups? How can they orchestrate change in social norms to reduce high-risk behavior without appearing to condone such behavior and without upsetting the political and economic stability of their nations?

Even if government officials have the vision to foresee the AIDS epidemic in its maturity, they face the dilemma of having to orchestrate change in social norms to reduce high-risk behavior without appearing to condone such behavior and without upsetting the nation's political and economic stability.

This report reviews the epidemiologic development of the HIV epidemic in Thailand, describes the Royal Thai Government's dilemma and its response to the epidemic, and discusses the implications of the government's actions, offering suggestions for improving the efficacy of AIDS preventive work in Thailand. Unless otherwise stated, all statistics cited herein, including those reported in the news media, are from the Department of Communicable Diseases Control (CDC), Ministry of Public Health, Bangkok.

Table 1. **Known numbers of new cases of HIV infection, ARC, and AIDS, by year: Thailand, 1984–90**

Type of case	1984	1985	1986	1987	1988	1989	1990	Total
HIV	0	5	10	171	5,045	10,648	11,151	27,030
ARC[a]	0	5	8	13	22	90	105	243
AIDS	1	1	0	7	5	29	48	91

Source: Thailand, Department of Epidemiology (1990b).

a. AIDS-related complex (ARC) is a combination of physical symptoms and signs, existing over time, that indicate infection of a person with HIV. In the United States it is now referred to as "constitutional disease."

■ The epidemiologic pattern of HIV infection in Thailand

The AIDS pandemic has crept into Thai society covertly, and official response has been equally quiet. The first case was diagnosed in 1984. By 1988 there were only 10 known cases; most were among gay (homosexual) men, who were said to have contracted the disease from foreigners.

Rapid rise in cases. Initially the small number of cases and their apparently foreign origin permitted complacency. But in 1988 Thailand experienced a sudden escalation of known HIV prevalence (Smith 1990). The rise evidently reflects actual seroconversion rather than more adequate screening because HIV screening began prior to the surge in prevalence. By the beginning of 1988, 186 asymptomatic persons had been found to be HIV positive (Table 1). Jonathan Mann, director of WHO's Global Programme on AIDS, was quoted in the *New York Times* (Altman 1988:12), "This Thai experience shows very clearly that Asia is just as vulnerable to an explosion of HIV infection as any other part of the world."

A sudden escalation of known HIV cases in 1988 appears to reflect actual seroconversion rather than more adequate screening. By mid-January 1991 the number of known cases had reached 27,030.

Within two years, the cumulative number of HIV positive cases shot up to 15,879; and just 10 months later, in October 1990, the Department of CDC reported a total of 23,279 known HIV cases, 200 AIDS-related complex (ARC) cases, and 69 cases of active AIDS. By 15 January 1991 the number of known HIV cases had risen to 27,030.

These figures, alarming as they are, probably indicate only the tip of the iceberg. The Department of Epidemiology in the Ministry of Public Health reported in September 1990 that an estimated 100,000 cases were HIV positive, but estimates by nongovernmental observers are much higher. Jon Ungphakorn, director of the Thai Volunteer Service, has estimated at least 200,00 are HIV infected. Mechai Viravaidya, secretary general of the Population and Community Development Association, estimated that in October 1990 between 300,000 and 400,000 Thais were infected with HIV, and some insurance companies' estimates at that time were as high as 800,000.

The meaning of the dramatic increase in HIV cases has not been widely reported in the Thai media, however. The director-general of the Department of CDC recently told the *Bangkok Post* (Ampa and Veera 1990) that the government strategy is to release AIDS data gradually to prevent panic and protect the tourist industry.

This restriction of information on the AIDS pandemic's emergence in Thailand is the continuation of a policy expressed as early as 1987. It was reiterated by the director-general of the Corrections Department when he recently declined to disclose the number of HIV carriers in prisons on the grounds that the figure is "alarming and might cause panic" (*The Nation* 29 November 1990). Nevertheless, the policy has allowed for full reporting of AIDS cases to the World Health Organization (WHO) since 1987 (*Bangkok Post* 28 November 1987; see also Truong 1990:158–191).

Patterns of transmission. The routes of transmission in Thailand initially appeared to conform to the pattern in developed countries, through male homosexual practices and intravenous drug use, with a consequent sex ratio strongly favoring males (May et al. 1989:166-167). In May 1990, 84 percent of the known living 17,328 cases were among males (*Bangkok Post* 17 June 1990).

At the beginning of 1988, fewer than 1 percent of intravenous drug users at Bangkok detoxification clinics were HIV positive; nine months later, over 40 percent were. As of 15 October 1990, 61.3 percent of known HIV-positive persons were male intravenous drug users and 2.5 percent were female intravenous drug users (Thailand, Department of Epidemiology, 1990a). Similar rapid rises and sex ratios of HIV prevalence among intravenous drug users have been reported for American and European cities such as New York and Edinburgh.

The government estimates there to be 80,000 to 100,000 intravenous drug users in Thailand, 75–80 percent of them in Bangkok (Thailand, Dept. of CDC, 1988:11). Until 1990, more than 75 percent of the known HIV positive cases were among intravenous drug users. The proportion is in a progressive decline owing to the increase in sexual transmission of HIV (Table 2).

Recent regional surveillance has identified another pattern, one more like that in Sub-Saharan Africa, where the sex ratio of AIDS cases is close to one female for every male (Quinn et al. 1989). Heterosexual behavior is now the paramount route of transmission in Northern Thailand, and it may soon become so for the nation. Nationally, the ratio of male to female HIV-infected persons was 8 to 1 in 1989, but by October 1990 it had dropped to 4 to 1 (*The Nation* 9 November 1990).

Because prostitutes have a high rate of change in sex partners and

Table 2. **Sources of HIV transmission among known HIV positive persons: Thailand, various dates, December 1988 to October 1990 (percentage distribution)**

Source	December 1988	June 1989	December 1989	October 1990
Intravenous drug use	91	84	78	64
Sexual contact	4	10	14	27
Blood transfusion	u	u	u	0.2
Maternal	u	u	u	0.0
Unknown	5	6	8	9.3
All sources	100	100	100	100

Sources: Vicharn (1990:24); Thailand, Department of Epidemiology (1990b:545).
Note: Percentages may not sum exactly to 100 because of rounding.
u—unknown.

are highly mobile, female prostitutes have been designated the major vector of HIV transmission into the general population (Sombat 1990: 535).[1] Estimates of the number of female prostitutes in Thailand range from more than one-half million to one million (Mattani 1984; Khin 1983). These numbers are equivalent to 2–4 percent of the total female population.[2] The National Commission of Women's Affairs estimated in 1990 that some 100,000 prostitutes were girls of ages 15 and under (Mayuree 1990).

Corresponding numbers of male prostitutes are not known, although the Department of CDC estimated the number at 5,000 in 1988 and the rate of HIV infection to be higher among them: 1.28 percent versus 0.09 percent for female prostitutes (Thailand, Dept. of CDC, 1988:9,18). HIV prevalence among three types of prostitute have been reported for Chiang Mai Province as of December 1990): undisguised female prostitutes, 23.2 percent; disguised or "hidden" female prostitutes (those working in nightclubs, bars, escort services, massage parlors, and the like), 8.4 percent; and male prostitutes, 14.0 percent (Chiang Mai Provincial Health Office).

TIM BROWN

Nightclub floor shows such as the one shown here are one aspect of Thailand's large entertainment industry. Prostitution is an integral part of that industry, and sexual intercourse between prostitutes and male clients who do not use condoms is thought to be the main source of HIV transmission to the general population.

The Thai government and nongovernmental organizations have mounted a variety of programs targeted to female prostitutes in cities that have large numbers of prostitutes in an effort to contain the spread of HIV infection. Worldwide, prostitutes are the focus of AIDS-prevention education programs for several reasons. They are more easily identified than the larger and more dispersed circle of their clients. They are also integrated with a broad spectrum of society. (WHO 1989:2)

Although prostitution is illegal in Thailand, Thai society is sexually permissive and the laws against it are seldom enforced. Werasit (1990) reports that over half of the married men interviewed in a recent study had up to five sex partners other than their wives in a 12-month period. (See shaded box on page 7.)

Most patrons of prostitutes are not foreign visitors, but rather Thais. It is widely accepted as normal for teenage boys to have their first sexual experiences with prostitutes, and for any men (except monks and royalty) to visit prostitutes. The greater need for men than for women to demonstrate sexual prowess may be associated with the Thai tolerance of both prostitution and polygyny, even though both practices are illegal (Khin 1980).

High concentration of cases among prostitutes in North. The highest HIV prevalence rates reported in Thailand to date—over 70 percent and in some areas up to 100 percent—are among low-priced female prostitutes in some northern provinces (Vicharn 1990:30). (See Table 3.) This high range appears not to be an artifact of reporting.

STD clinics in Chiang Mai, the capital province of the Northern Region, began testing for HIV in

Table 3. **Percentage of female prostitutes HIV positive, by price of service: Chiang Mai, June 1990**

Price (U.S. $)	Number tested	Percentage HIV+
>$4	12	17
$2–4	52	31
<$2	36	72

Source: Vicharn (1990:30).

1. Female prostitutes are thus viewed as vectors of the HIV, but not as recipients of it. This view is contrary to medical evidence that HIV is more concentrated in semen than in vaginal fluids, and so more readily transmitted by men than by women; and it is contrary to evidence that prostitutes become HIV infected from male clients, particularly from men who are intravenous drug users.

2. Government figures for numbers of prostitutes are consistently many times lower than those of other observers. The government estimates the total number of women in the "entertainment" services to be approximately 100,000 (Thailand, CDC, 1988:18)

January 1988. No HIV tests were positive until the seventh month of testing, when 447 cases were recorded (mean of 371 prostitutes tested per month for the first six months). The proportion testing positive increased monthly thereafter, to 44 percent by June 1989 (Vicharn 1990:28). By the same date the HIV prevalence among prostitutes in two other northern provinces was 54 and 59 percent (Vicharn 1990:27); one year later, analogous rates had risen to 62 and 64 percent, respectively (Kampol 1990).

Chiang Mai Province has the highest reported HIV prevalence rates in the nation among female service workers (prostitutes), male STD clinic clients, and blood donors (Vicharn 1990:29). Data-based explanations for the concentration of heterosexual transmission in the Northern Region are yet to come. One likely explanation is that the North is the home base of the majority of prostitutes who work in cities where intravenous drug users also congregate. It is not yet known whether the women contract HIV from clients who use intravenous drugs, as occurs among street prostitutes in the United States (Cohen et al. 1988), or whether the chronic poverty of lower-priced prostitutes is a cofactor for AIDS, the associated poor nutrition and untreated STDs contributing to their excess vulnerability (Cates 1990; Latif et al. 1989).

Vulnerability of teenage girls in poverty. Low-priced prostitutes, many of them teenagers, have the greatest numbers of customers. A sizable proportion of their customers may be teenage boys. A re-

Survey of Partner Relations Finds Many at Risk of AIDS in Thailand

Preliminary analysis of data from a 1990 nationwide survey in Thailand, soon to be published, indicates that Thai men, both married and unmarried, are engaging in high levels of casual sexual behavior that carry the risk of HIV infection. Although the survey finds low levels of casual sexual behavior by Thai women, many women may be placed at risk of contracting the AIDS virus by their sexually more active husbands and boyfriends.

The study, called the Survey of Partner Relations and Risk of HIV Infection in Thailand, collected information from 2,801 Thai men and women through interviews, using an anonymous structured questionnaire. Respondents ranged in age from 15 to 49 and were drawn from both rural and urban areas of Thailand, including Bangkok. Questions asked about respondents' demographic characteristics, types and frequency of sexual behavior, choice of sexual partners, alcohol and drug use, knowledge of and attitudes toward AIDS, knowledge of and history of other sexually transmitted diseases, first sexual experience, and their definitions of "having sex" and virginity.

The study was conducted by the Thai Red Cross Society Program on AIDS and the Institute of Population Studies of Chulalongkorn University with financial support from the Global Programme on AIDS of the World Health Organization. The project coordinator was Werasit Sittitrai. Other researchers included Praphan Phanuphak, director of the Red Cross Society's Program on AIDS; Jean Barry of the Department of Psychology, Chulalongkorn University; and Tim Brown of the Department of Electrical Engineering, University of Hawaii.

The investigators have presented preliminary results to policymakers and planners, focusing on implications of the findings for policy. For example, information from the survey on the early sexual behavior of youths suggests there is a need for a sex education curriculum in primary schools. Other results are being used to develop projections of the AIDS epidemic's spread in Thailand.

The Thai Red Cross Society will publish the results of the survey in the form of two major reports, the first of which will be available in June 1991. A series of journal and newspaper articles presenting further analyses of the data will follow.

Copies of the initial report can be ordered from:

Director of Program on AIDS
Thai Red Cross Society
1871 Rama 4 Road
Bangkok 10330, Thailand
Fax: (662) 255 3727

—by Werasit Sittitrai and Tim Brown

cent study of 400 males, ages 15 to 24, found that 46 percent had had their first experience of sexual intercourse between ages 15 and 17, most of them with prostitutes (Werasit 1990).

The highest HIV prevalence rates reported in Thailand are among low-priced female prostitutes in Northern Thailand, many of whom are teenagers.

The prostitutes whom teenagers are most likely to patronize are those who charge the least for their services—girls from rural, poor Thai families, from indigenous Hill People villages, and from poverty-stricken areas of neighboring Laos and Burma. The girls and their families are lured by the financial rewards promised for working in Thailand (Somchai Hareuthaihansa 1986).

Because they are young, may not speak standard Thai, and are poorly educated, they are easily exploited and not reached by AIDS education campaigns. They are least likely to know how AIDS is transmitted, least likely to be successful in convincing clients to use condoms, and least likely to have access to or to use STD clinic services. Some, perhaps a majority, are elusive to even government program intervention because they are in debt bondage to their procurers or brothel owners. Owners rarely permit HIV testing of "their girls" until the girls have paid off their purchase price in service.

Table 4. **Percentage of HIV positive persons among blood donors: Nakhorn Chiang Mai Hospital of Chiang Mai University, 1988 and 1989**

Type of donor	1988		1989	
	Number tested	% HIV+	Number tested	% HIV+
Voluntary	14,755	0.6	5,978	2.1
Exchange[a]	3,576	0.6	5,339	2.2
Commercial	6,747	1.6	3,293	6.0

Source: Vicharn (1990:33–34).

a. An exchange donor is one who donates blood to replace that used by a specific patient in order to defray charges for the blood used.

For these reasons, low-priced prostitutes and intravenous drug users are currently the highest-risk sector of the population. This positive association between low socioeconomic status and HIV susceptibility is also found in the United States and other countries (Curran et al. 1988).

Not only does the prevalence of HIV infection among prostitutes vary inversely by cost of service in Northern Thailand (Table 3), but also studies of blood donors at the Nakhorn Chiang Mai Hospital Blood Bank reveal an inverse relation between socioeconomic status and HIV infection rates (Table 4). Prevalence rates among commercial donors were substantially higher among volunteer donors, and the difference between the two types of donor increased between 1988 and 1989.

The heterosexual pattern of HIV transmission preeminent in the Northern Region (Table 5) has affected young women there disproportionately. July 1990 figures from HIV surveillance in Chiangrai Province, bordering Laos, show that females are the primary carriers, accounting for 64 percent of the total, compared with 15.9 nationally. The age distribution found in the Chiangrai study is particularly worrisome: over half (53 percent) of the HIV-infected females were teenagers, whereas most HIV-infected males were older, only 4

Table 5. **Sources of HIV transmission among known HIV positive persons: Three Northern provinces of Thailand, September 1989 (percentage distribution)**

Source	Province		
	A	B	C
Intravenous drug use	17	11	7
Sexual contact	59	83	91
Unknown	23	6	1
All sources	100	100	100

Source: Vicharn (1990:25).

Note: Percentages may not sum exactly to 100 because of rounding.

(continued on page 21)

Comments on Wardlow Friesen's "Economic Activity and Occupation in the Pacific Islands: Issues of Census Classification and Analysis"

by Eivind Hoffmann

IN HIS recent *Forum* article (Volume 4, No. 2, Summer 1990) Wardlow Friesen gives an overview of two statistical instruments developed by the International Labour Organisation (ILO) for the measurement of the economically active population, employment, unemployment and underemployment, and the occupations of the economically active population. The purpose of these comments is, on the basis of the more complete documentation now available in Hussmanns et al. (1990) and ILO (1990), to discuss further some of the issues raised in the article in order to avoid misunderstandings with respect to the appropriateness of applying these instruments in the Pacific region.

Who is "economically active"?

Friesen (1990:13) states that in the context of the Pacific Islands it is an anomaly to consider that "a woman who sells cooked food in the local market is performing an economic task in cooking for her own household, whereas her neighbors, who do similar work, are not." Several comments are in order:

In the present framework of both the United Nations System of National Accounts (SNA) and the International Labour Organisation (ILO) only a part of the woman's cooking for her own and her household's consumption is considered economic activity to be included in an estimate of the number of hours worked and the value of goods and services produced (in addition to the cooking she does for the market and for any hired workers engaged in the production activities of, say, the farm). This part refers to the preparation of foodstuffs that are identical to the items produced for the market but are prepared or retained for consumption by the household. It should be noted that the consideration of this part of cooking as economic activity has no effect on *head counts* of economically active persons.

It is useful, as Friesen recognizes, to distinguish between the concept of "economic activity" and other, perhaps wider, concepts of "work" and "useful activity." The production boundary of the revised SNA is likely to be extended to include more nonmarket activities than at present. The ILO concept of "economic activity" will be adapted to these changes.

There is nothing in the international guidelines or recommendations to prevent or discourage countries from applying several work-related concepts in their population censuses or household surveys, as long as such different concepts can be clearly distinguished from one another. Friesen's review of the census practices in the region demonstrates that this has in fact been recognized by some countries.

In a number of cases in the past the actual census measurement of "economic activity" has been more limited in scope than that of the SNA or ILO framework. The main reason is that the borderline cases for the concept of "economic activity" are difficult to handle in a population census when just one or two questions can be used and enumerators can be given little or no special training. As a consequence the questions (and the instructions to enumerators) have resulted in a substantial underestimation of the economically active population, in particular of economically active women. However, this problem must be blamed on census practices and limited resources, not on the underlying concepts.

What is ISCO–88?

ISCO–88 consists of a classification structure and a dictionary. A proper description of the classification structure will consist of three components: first, that the *primary*

Eivind Hoffmann is Chief of the Statistics of Employment and Unemployment Section, Bureau of Statistics, International Labour Office, Geneva, Switzerland. Wardlow Friesen, on whose article he comments, is Lecturer in Geography at the University of Auckland, Auckland, New Zealand.

unit of observation to be classified is a "job" (defined as a set of tasks carried out by one person, but not necessarily the set of all tasks carried out by that person during the reference period); second, that the *aspect (variable) being measured* is "the type of work performed" in the job (and not "working conditions" or "pay," for example); and third, that "skill level" and "skill specialization" are the main *similarity criteria* used to define groups in ISCO–88.

In reference to the differences between ISCO–68 and ISCO–88 discussed by Friesen (1990:17, col. 1), three points should be added. It was never intended that ISCO–68 should be used by any government without modification to fit national circumstances. The ISCO–68 publication did include more detailed occupational (group) descriptions than the ISCO–88 publication does. And various countries have used the ISCO–68 virtually without modification because they lacked the necessary resources and expertise to make appropriate adjustments.

Applying ISCO–88 in the Pacific

There is no problem in principle in extending the coverage of ISCO–88 to "job" covered by a broader concept of "work" than the SNA and ILO concept of "economic activity" (cf. Friesen 1990:18, col. 1). However, some practical work may be needed to determine whether the additional activities can be classified under any of the existing ISCO–88 groups or whether some new groups will need to be created at the lowest level in the classification.

The work started by the South Pacific Commission (SPC) to adapt ISCO–88 major group 6, "skilled agricultural and fishery workers," and in particular submajor group 62, "subsistence agricultural and fishery workers," to the circumstances of the Pacific (SPC 1990) is welcome. It would be best, however, if this could be done in a way that makes it possible to create, from the most detailed groups, alternative aggregate structures—either that of the ISCO–88 or one focusing on "broad agricultural system types" if that is seen as the major distinction to be made.

The problem raised by Friesen (1990:18, col. 2) with respect to "tasks that are performed by groups" refers to a "job" concept different from the one used by ISCO–88. To classify by occupation the members of the group, one must shift the focus from the group to the tasks of its members. If all members of a group (e.g., all crew members of a fishing boat) carry out the same tasks, then they all should be given the same code. If there is a division of labor between the group members, however, this may mean that their tasks are sufficiently different to warrant that they be given different codes. The correct code to be given to the group as a unit is that of *industry*, as the group must be considered to be a type of establishment.

With reference to the point made by Friesen (1990:18, col. 3) about persons undertaking different types of activities and the example in Table 3, it should be emphasized that the person who during the reference week works 40 hours as a cocoa producer and one hour as a builder should be considered as having *two* jobs, both of which can be given an occupational code. The *main* job should be selected on the basis of numbers of hours worked or size of income generated. The priority rules specified for ISCO–88 coding do not apply to these situations; they apply only when the combination of tasks *in the same job* is such that they cut across the dividing lines of the classification. The point that "a great deal of significant information will be lost if only a single job description is applied to each person" (Friesen 1990:29) is important, and all jobs of a person should be recorded and coded if resources permit.

The ILO has recommended asking about "main tasks and duties" in addition to occupational title because such information gives the best basis for the coding of occupation. The idea that all tasks could be coded and the computer asked to apply priority rules to them to derive an occupation code (Friesen 1990:29, col. 1) may be feasible, but this approach has not been tested or implemented in any of the existing computer-assisted coding systems that we know about.

It is slightly misleading to state that "the new ISCO standard has been adopted by . . . Australia and New Zealand" (Friesen 1990:11) inasmuch as during the last 10 years Australia, in particular, has been the world's pioneering country in its work on occupational classifications, both with regard to clarifying underlying principles and with regard to statistical implementation and computer-assisted coding. The development of ISCO–88 benefited from the Australian work more than the Australians have benefited from ISCO–88. One can say, however, that the main principles of ISCO–88

have been adopted already, not only by Australia and New Zealand, but also by a large number of countries in Africa, Asia, the Caribbean, and Europe. It should also be mentioned that the ILO instruments have been discussed not only at the SPC 1989 Working Group's meeting, but also at two workshops sponsored by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) in 1989 and 1990, in which officials from the statistical organizations of the Pacific Island countries participated.

Within the limits set by the resources available the ILO can provide advice and guidance on both the measurement of the economically active population, employment, unemployment, and underemployment, and on the development and use of occupational classifications. For further information, interested persons should contact the ILO Area Office in Suva, Fiji (P.O. Box 14500); the ILO Regional Advisor on Labour Statistics and Surveys (ILO Regional Office for Asia and the Pacific, P.O. Box 1759, Bangkok, Thailand); or the ILO Bureau of Statistics (CH-1211 Geneva 22, Switzerland).

Friesen replies

I welcome Eivind Hoffmann's comments on my article "Economic activity and occupation in the Pacific Islands." When I wrote the article the two ILO manuals mentioned by Hoffmann (Hussmanns et al. 1990; ILO 1990) were not available to me. Some of the ideas I presented were based therefore on work in progress rather than on the final recommended version of ISCO-88. That explains some of the differences between us he mentions. Others are due to our different perspectives on the issues discussed.

In response to Hoffmann's comments on market versus subsistence production (in the section "Who is 'economically active'?"), it is true that the SNA convention of including women who cook something for the market and for their own households in the category of "economically active" but of excluding those who cook only for their own households has no effect on the head counts of economically active persons.

As Hoffmann mentions, however, these conventions are also used in some cases to estimate the number of hours worked and the value of "economic" production. It seems misleading to attribute economic value to production for one's own use in the one case but not in the other. It is not clear to me whether this convention has been adopted for ease of enumeration, coding, and analysis or for an underlying theoretical reason. It will be interesting to see how the revised SNA treats this and similar issues.

As for the underlying concepts versus census practices, I agree with Hoffmann that many of the problems of defining economic activity result from inadequate census practices and resources rather than from the underlying concepts used. The problems of enumerator training are very real, and they emphasize the need for a clear and consistent standard that can be used in questionnaire design. Of course, even when there is one, national adaptations of this standard often are not adequately developed and hence lead to underenumeration, ambiguity, etc. The original article dealt mainly with the ISCO-88 classification structure, and Hoffmann's description of the components of that structure and elaboration about ISCO-88 ("What is ISCO-88?") are useful additions to that discussion.

Hoffmann's comments on a broader concept of "work" ("Applying ISCO-88 in the Pacific"): It seems to me that if the concept of work were expanded beyond the current SNA and ILO concept of "economic activity," one or more new groups might have to be created. But as Hoffmann suggests, this would involve a considerable amount of development work. The great difficulty in devising meaningful classifications for "subsistence agricultural and fishery workers" illustrates this fact. I agree that it would be useful if any modifications made within the detailed levels of this group in the Pacific Islands were designed to allow aggregation to an alternative international system.

As for group work, it was not intended that work done by groups of people should be incorporated within ISCO-88, since it is clear that the ISCO standard should deal with individuals. My intention was to point out that some problems remain in applying the job concept in all cases. That is, there are circumstances in which a "set of tasks" is *not* "performed or designed to be performed by one individual." In the Pacific these activities tend to be sporadic and occupy a small proportion of most individuals' time, so that most individuals have other jobs that can be identified under the ISCO-88 rules.

The issues of main and secondary jobs and priority rules for classify-

(continued on page 27)

News and Announcements

Indonesian Census Records Decline in Population Growth Rate

Soetjipto Wirosardjono, vice director general of Indonesia's Central Bureau of Statistics (CBS), reports that the population of Indonesia grew more slowly during the 1981–90 decade, at 1.97 percent annually, than during the previous decade, when the average annual growth rate was 2.32 percent. This is one of the preliminary results of the 1990 census, which took place on 31 October and recorded a total population of 179,321,641. The sex ratio recorded by the census was 99.53 males per 100 females. Indonesian population and family planning officials are pleased by the slower growth rate and view it as evidence of their programs' success in managing population growth.

For the 1990 census the 27 provinces of Indonesia were divided into 191,004 enumeration areas consisting of 200–300 households each. The general enumeration involved 254,688 enumerators and supervisors, and a more detailed sample enumeration of 2,157,000 households employed 47,933 enumerators and supervisors.

Mapping work for the census took place in 1988 and 1989, and information collected at that stage was used to determine the general and sample enumeration areas. The general enumeration was conducted for the most part on a de jure basis, recording the name, sex, and age of every person at the place where he or she normally lived. The sample enumeration recorded more detailed demographic information and also social and economic characteristics of household members.

For a small fraction of the population a de facto approach was used, enumerating homeless people in urban areas and boat crews where they happened to be at the time of the census. Although local government officials, including police and harbor authorities, coordinated their efforts to maximize coverage of these mobile population segments, a few misunderstandings about their objectives complicated the task.

Some homeless people in several cities thought that the census teams planned to remove them from their shelters. When the enumerators arrived at the sites where the homeless normally stayed, they found the sites empty and had to track down the residents. In one instance a marketplace known to be the home base of a group of homeless people was empty when the enumerator arrived, not because the homeless were afraid to be found there but because local authorities had placed them in jail.

Boat crews were generally cooperative with the enumerators as long as their ship captains were present and gave them permission to answer the enumerators' questions. One crew from an East Asian country, however, was reluctant to answer the enumerator's questions even though a harbor authority was present. Upon further questioning, census officials learned the reason: a few days earlier men wearing harbor authority uniforms had robbed them.

In general, however, the census operation went smoothly. This was the fourth census conducted by Indonesia since independence in 1945.

Hong Kong's First Self-enumeration Produced a Good Response

Joseph Lee of the Hong Kong Census and Statistics Department reports that the field operation of the 1991 Population Census was completed during 15–24 March. For the six-sevenths of Hong Kong's population enumerated by means of a short questionnaire, a self-enumeration method was adopted for the first time. The questionnaire was posted to householders about seven days before the census, and completed forms were collected by enumerators. About 60–70 percent of householders completed the forms prior to collection, a good response rate for the new method.

The short form contained questions about age, sex, and relationship of household members to the household head. A detailed questionnaire covering a wide range of demographic, social, and economic characteristics was administered to the remaining one-seventh of the population by enumerators in face-to-face interviews.

To encourage full participation in the census, extensive publicity was provided through the mass media and special promotional efforts. A classroom education program was designed to promote the census to families through secondary-school students. The students were shown

a video about the census, which was followed by classroom discussion under a teacher's guidance. They were encouraged to support the census among their relatives and friends. A telephone hotline was established to answer enquiries, enable householders to check the identity of enumerators, and make appointments for home visits.

The 1991 census has also relied extensively on computerization, not only in the data-processing stage but also in the preparation of assignments, deployment of enumerators, and control of field work. Hong Kong maintains a computerized frame of living quarters, which was updated before the census to provide the sampling frame for the operation. From the living-quarters frame an assignment data base was created, taking into consideration geographic variations in workload, travel time, and interviewing time for individual enumerators. An enumerator data base was also created for automating much of the work involved in recruitment, training, and deployment of 15,000 temporary staff who were employed for the field work.

During the census operation a field work control system linked to 52 field centers facilitated the monitoring of progress and the selection of sample returns for quality checks. Progress data from individual enumerators were entered daily into the field-center workstations. The data were then consolidated for review by the various levels of supervisors.

Most of the temporary staff were secondary school seniors, university students and students of post-secondary institutions, and primary and secondary school teachers. So that the teachers and students could participate in the census, most Hong Kong schools declared census holidays during the 14–26 March census period. Selected school premises were used as field centers for the census.

Processing of the completed questionnaires is now in high gear. Short forms are being scanned by optical character recognition devices and the data from them input into the Census and Statistics Department's computer. Data from the detailed questionnaires are being input by the conventional key-to-disk method. Data editing and validation will be computerized by means of an on-line editing system.

A preliminary count of the population by broad area is being compiled for release at the end of April 1991. The census reports will be produced in several phases during the next two years. Summary results will be published in October 1991. Detailed district tabulations will follow in March 1992, and the main report will be released at the end of 1992.

Philippine Census Counted Nearly 60.7 Million

Tomas P. Africa, administrator of the National Statistics Office of the Philippines, reports that the 1990 Census of Population and Housing, conducted on 1 May, recorded a total population of 60,684,887. This figure was announced by Philippine President Corazon Aquino on 12 February 1991. Population totals by *barangay* (village) are available both on diskette, from which they may be copied without charge, and in printed form for a nominal fee.

The government plans to publish for each province a census volume containing detailed population and housing characteristics. The first of these volumes will be released in the latter half of 1991. Special reports on the homeless population, Filipinos in diplomatic missions abroad, the urban population, and the institutionalized population are also in preparation.

In June 1990 a Census Evaluation Survey (CES) was undertaken in sample areas throughout the country. To ensure the independence of the postenumeration survey, data gathering and processing for the CES was subcontracted to the Philippine Social Science Council, a nongovernmental entity. The results are being processed now (March 1991).

1990 U.S. Census Reveals Slower Population Growth Overall but Rapid Growth in West and South

In an address at the annual meeting of the Population Association of America on 22 March 1991 in Washington, D.C., Barbara Everitt Bryant, director of the U.S. Bureau of the Census, reported that the 1990 U.S. census had enumerated a total population of 249,632,692 and a resident population of 248,709,873 as of 1 April 1990. The Department of Commerce is considering whether a statistical adjustment would improve the accuracy of these figures and, if so, will publish corrected counts by 15 July 1991. The Census Bureau is conducting evaluations of a 167,000 housing unit Post-Enumeration Survey, as well as demographic analysis, to aid that decision.

According to Dr. Bryant, the census recorded the second lowest resident population growth rate in U.S. history: 9.8 percent, or an average annual rate of just 0.98 percent. Only during the decade of the Great Depression in the 1930s was the growth rate lower (7.3 percent). Globally, the U.S. decadal growth rate ranks above the 7 percent average for the more developed regions but well below the 19 percent average for the less developed regions. Numerically, however, the 1980s were the fourth largest decade of U.S. population growth, exceeded only by the 1950s, the 1960s, and the 1970s.

The most dramatic change recorded by the 1990 census is the disproportionate growth during the past decade in the West (22 percent) and South (13 percent), compared with the Northeast (3 percent) and the Midwest (1 percent). More than half of the growth during the past decade occurred in just three states—California, Texas, and Florida. Those states also accounted for more than 40 percent of the population growth between 1970 and 1980 and one-third of the growth in the three prior decades. California, which grew by 6 million persons, now has a population of 29.7 million, more than the 21 least populous states combined.

Because the census count determines the apportionment of representatives to the U.S. House of Representatives, one implication of the disproportionate growth is that the West and South are gaining 15 seats in the House whereas the Northeast and Midwest are losing 15. California (+7), Florida (+4), and Texas (+3) are the biggest gainers; New York (−3), Illinois, Michigan, and Ohio (all −2) are the main losers.

Half of the U.S. population now lives in 39 metropolitan areas with populations of more than 1 million. The number of cities with 1 million or more population increased from six to eight in the decade, San Diego and Dallas having achieved that size since 1980. Los Angeles experienced the greatest growth, 17.4 percent. The largest city, New York, grew by a modest 3.5 percent. Three of the country's large cities—Chicago, Philadelphia, and Detroit—declined in size.

Differential growth of racial and ethnic groups is another of the big stories of the 1990 census, Dr. Bryant stated. The white population grew by 6.0 percent, African Americans by 13.2 percent, Asian/Pacific Islanders by 107.8 percent, Hispanics by 53.0 percent, and Indian/Eskimos/Aleuts by 37.9 percent.

The dramatic growth of Asian/Pacific Islanders and Hispanics outstripped Census Bureau projections. Although Asians and Pacific Islanders together represent a small proportion of the total population, that proportion nearly doubled, growing to nearly 3 percent. Hispanics increased from slightly more than 6 percent to 9 percent of the total population.

The growth of the American Indian/Eskimo/Aleut population is larger than can be accounted for by better census counting and natural increase. Clearly, more persons are identifying themselves as American Indians.

Half of the Asians and Pacific Islanders live in California and New York, and two-thirds live in those states and in Hawaii, Texas, and Illinois. Three-quarters of Hispanics are concentrated in California, Texas, New York, Florida, and Illinois.

Preliminary analysis of census data and current survey figures indicate that the U.S. population is aging. The median age is now 33. The largest population segment, the Baby Boom generation, is approaching middle age. Moreover, Americans are living longer. Whereas the total population was growing at about 1 percent per year during the past decade, the age group 65 and older grew at about 2.1 percent per year and those 85 and older at about 3.3 percent per year.

Average household size is now the lowest in U.S. history, 2.6 persons. Only 26 percent of households consist of married couples with children under age 18—once considered the typical family. Another 26 percent of households consist of one person, more likely elderly than young. Twenty-eight percent of all family groups with children are maintained by one parent, usually the mother.

Three out of four people 25 years of age or older are high school graduates, and about one in five is a college graduate, reflecting a steady rise in educational levels since data on educational attainment were first collected in the 1940 census. The difference in proportions of whites and African Americans who are high school graduates has decreased, but the proportion of whites who were college graduates in 1988 was twice that of African Americans (21 versus 11 percent).

College enrollment has grown over the decade, from 11.4 million in 1980 to 13.1 million in 1988. Interestingly, most of the growth was

(continued on page 20)

Reviews and Publication Notes

Differential Mortality: Methodological Issues and Biosocial Factors edited by Lado Ruzicka, Guillaume Wunsch, and Penny Kane. Oxford: Clarendon Press, 1989. x, 259 pp. ISBN 0-19-828651-1 (cloth), US $59.00. Available from Oxford University Press, Walton Street, Oxford OX2 6DP, United Kingdom.

This book contains a selection of papers originally presented at a joint seminar of the Scientific Committee on Biological and Social Correlates of Mortality of the International Union for the Scientific Study of Population and the National Institute for Research Advancement in Tokyo, held during November 1984 in Tokyo. It is divided into four parts and begins with an introduction by Lado Ruzicka that presents the general problems and issues related to the study of differential mortality and an excellent summary of the papers included in the volume.

Part II consists of four papers on methodological aspects of the study of mortality differentials.

Josianne Duchêne and Guillaume Wunsch explore the passage from a conceptual framework to the analysis of empirical data. Although they use the example of the impact of education on child mortality, after Caldwell, the discussion is largely abstract.

Ronald H. Gray considers issues of mortality and morbidity within the framework for analyzing child survival developed by Mosley and Chen, reviews approaches to field studies of health in developing countries, and suggests alternative study strategies. He offers algorithms for identifying diseases, especially in surveys, that may be used to indicate the proximate determinants of mortality and discusses the measurement of risk factors by odds ratios.

Concurrent structural changes in the population, Shiro Horiuchi points out, can distort the results of analysis of time trends and mortality differentials. Using post–World War II regional data on life expectation at birth and the infant mortality rate, he discusses six factors that may lead to an underestimation of mortality decline. They are: interrelationships among fertility, mortality, and population growth; population heterogeneity in frailty; differential changes in the age structure of subpopulations; incomplete registration and retrospective reporting of deaths; inaccuracy of age reporting; and the characteristics of mortality measures themselves.

To measure the potential for mortality reduction, Stan D'Souza attempts to develop an index of "preventable deaths," which is a function of the level of infant mortality, its cause-of-death structure, and the cost-feasibility of preventing disease. The index is then applied to several countries.

Part III contains six papers on biological and social factors in mortality, analyzing empirical data. This part occupies nearly half of the volume.

Using a new methodology for estimating the contribution of mortality change by age and cause of death to life expectation, Eduardo E. Arriaga examines changing trends in mortality decline. He finds diversity in the mortality transition of 11 developing countries and the United States.

Jose Miguel Guzman uses an indirect method to estimate infant mortality based on the proportion of children who died in relation to the total number of children ever born of mothers classified by quinquennial age groups. His analysis reveals that the decline in infant mortality in five Latin American countries is a general phenomenon cutting across socioeconomic subgroups.

Two country reports follow, focusing on infant and child mortality in Indonesia (Budi Utomo and Meiwita Budiharsana Iskandar) and in Turkey (Nusret H. Fisek). Both are reviews of past work based on large-scale surveys. The Indonesian study emphasizes temporal changes and geographic and educational differentials. It also presents principal causes of death by age at death. The Turkish study suggests that differences in the use of health services between urban and rural residents is an important factor in the mortality differential.

The effect of short birth intervals on infant and child mortality is pursued by Alberto Palloni, using data from World Fertility Surveys in 12 Latin American and Caribbean countries. His paper is a significant work, conceptually, methodologically, and substantively. Palloni doubts the role of breastfeeding in childhood mortality; he posits that the birth interval effect probably operates through the breastfeeding mechanism.

George C. Myers discusses the im-

plications of the mortality decline and increased survival for the future. He examines changes in mortality patterns at older ages, drawing upon evidence from developed countries.

Part IV, dealing with crisis mortality resulting from disasters, consists of two papers. Although this topic is important, as seen, for example, in the current Kurdish refugee situation, it is somewhat tangential to the theme of the book, differential mortality.

Andre Bouckaert provides a theoretical framework for the study of disasters in human populations, distinguishing man-made from natural origins. Penny Kane presents a careful case study of the effect of China's famine of 1959–61, discussing demographic and social responses to the famine.

The title of *Differential Mortality: Methodological Issues and Biosocial Factors* suggests a comprehensive treatment of differential mortality, but the book's emphasis is on infant and child mortality in the developing world. Most of the factors discussed are socioeconomic.

"Mortality changes simply do not occur in a mechanistic way, they are the product of complex interplay between biological factors and the environment, mediated by social forces" (Myers, p. 190). Unfortunately, most of the substantive papers in the volume are descriptive, although there are important exceptions, such as the work of Palloni.

Of course, modeling a conceptual framework for mortality is much more complicated than modeling one for fertility. As Ruzicka indicates (p. 17), the task could not be accomplished in the course of a short meeting or in a score of papers. The papers included in the current volume were selected in "an attempt to promote further investigations of determinants of mortality differentials and to invite discussion about more effective ways of doing so" (Ruzicka, pp. 15–16). In this sense the book is a success: it should stimulate further study of differential mortality, integrating biological and social factors.

—Chai Bin Park
East-West Population Institute and University of Hawaii

Advances in Regional Demography: Information, Forecasts, Models edited by Peter Congdon and Peter Batey. London and New York: Belhaven Press, 1989. xi, 285 pp. ISBN 1-85293-046-2 (cloth), US $45.00. Available from Belhaven Press, 25 Floral Street, London WC2E 9DS, United Kingdom.

During the past two decades regional demography has emerged as a new discipline concerned with the structure and evolution of human populations within a broad spatial framework. According to the book's editors, regional demography "goes beyond closed and open single-region models by allowing for gross migration flows both internal to the system and externally (through foreign emigration and immigration), and by including their contribution to the past evolution and future projections of the growth of regional populations" (p. 1).

Advances in Regional Demography investigates recent issues in spatial demography and explores new directions for research. Its purpose, as described by the editors, is to place regional demography in the broader context of regional science, for example by exploring economic–demographic interactions and their implications for spatial population redistribution. A related purpose is to assess the contribution of demographic research to the formulation of spatial policy.

In their introduction, Peter Congdon and Peter Batey summarize scholarly work done in the field of regional demography in the last 10 years. The organization of the book is intended to represent a "conceptual progression from regional demographic systems, which set the basic parameters for demographic analysis and policy formulation; through sub-national forecasts and projections, which while recognising regional interdependencies, are of necessity goal-orientated and require standardised methods for several regions or localities; to a consideration of a range of models of trends and structure, that provide a broader consideration of underlying processes and assumptions, and thereby provide guidance as to the validity of data on forecast-orientated methods" (p. 5).

Fourteen chapters by mostly British and American authors follow, arranged in four parts focusing on demographic information for spatial planning, demographic forecasts and projections at the subnational level, models for settlement and redistribution, and models for migration in the labor market.

This book is intended for readers having a thorough grounding in demography or regional planning, and some of the chapters require knowledge of model construction. The chapters are well documented, however, and I found all of them

interesting. The book includes a subject index. *Advances in Regional Demography* would be a useful purchase for libraries with collections in the fields of population, economics, and regional science.

—Alice D. Harris
Palm City, Florida

Population Matters: People, Resources, Environment and Immigration by Julian L. Simon. New Brunswick, N.J., and London: Transaction Publishers, 1990. xiv, 577 pp. ISBN 0-88738-300-9 (cloth), US $34.95. Available from Transaction Publishers, Rutgers—The State University, New Brunswick, NJ 08903, U.S.A.

This collection of previously published articles and reviews by economist Julian L. Simon, like his earlier works—*The Economics of Population Growth* (1977), *The Ultimate Resource* (1981), *The Resourceful Earth* with Herman Kahn (1983), *Theory of Population and Economic Growth* (1986), and *The Economic Consequences of Immigration* (1989)—expounds his views that population growth is a positive phenomenon, that people can invent new resources to replace those running out, and that immigration is good for a country. His unqualified positions on these issues are not shared by mainstream demographers and environmentalists, whom he labels "doomsayers."

The articles, almost all of which have been written since 1981, have two aims: "to disseminate to the widest possible audience the broad fundamental ideas developed earlier, by writing in as lively a style as possible and using vivid illustrations, and to introduce some new ideas" (p. 2). His two main themes are, first, that the economic and social structure of a country is the central factor in its economic development and, second, that population growth has a positive effect on the overall development of civilization in the long run.

Simon believes that Malthusian ideas are sustained by intellectual weakness, doomsaying by groups with parochial interests, the propensity of many to regard any kind of change as unwelcome, a closed rather than an open vision of the world, people's fascination with disasters, and finally our difficulty with breaking long-held beliefs. Yet he argues that such beliefs can and should be changing.

As evidence that they are, he cites the reversal of U.S. policy toward curbing population growth articulated by U.S. delegates to the 1984 World Population Conference in Mexico City, who asserted that population growth is neutral rather than negative in its effect on economic development. Another sign of change was a report by the National Research Council in 1986 reversing an earlier (1971) report in which it had argued that population growth prevents economic growth.

Part 1 presents an overview, explaining why Simon believes the world situation is improving. In the nine selections in Part 2 he shows why food supplies are increasing and how human ingenuity can overcome the scarcity of natural resources. The next five sections respectively present his view of population growth as a positive phenomenon (Part 3), challenge the governments and nongovernmental groups who advocate population control (Part 4), advance reasons for allowing more immigration to the United States (Part 5), decry the "prophets of doom" and criticize the *Global 2000 Report* prepared for President Carter by the Council on Environmental Quality and the Department of State (Part 6), and discredit long-term forecasts of raw material availability (Part 7). Finally, in Part 8, "Publication, Funding, and the Population Establishment," Simon takes aim at the *Population and Development Review* and other advocates of fertility reduction.

The articles contain numerous examples supporting Simon's views and are written in a lively style for a popular audience. It is unfortunate, however, that Simon is so critical of others' work, as he himself admits in the introduction. He protests too much, and his extreme positions weaken his arguments about the relationship between population growth and economic development.

He is better represented in his optimistic mood: "The ultimate resource is people—especially skilled, spirited, and hopeful young people—who will exert their wills and imaginations for their own benefit, and so, inevitably, for the benefit of us all" (p. 12).

The book is provocative and will be challenged by many demographers and environmentalists. Some of its statistics are out of date, and most of the articles lack bibliographical references. Nevertheless, libraries specializing in demography or economics should acquire *Population Matters* so that all sides of the population debate can be represented.

—Alice D. Harris
Palm City, Florida

ALSO NOTED

Census of India 1991. Series-1 India. Paper 1 of 1991, Provisional Population Totals by Amulya Ratna Nanda. New Delhi: Registrar General and Census Commissioner, India. iv, 102 pp. Paper. Available from Registrar General and Census Commissioner, India, Ministry of Home Affairs, 2A, Mansingh Road, New Delhi-110011, India.

The 1991 Census of India, the enumeration portion of which was completed on 5 March 1991, was the thirteenth since 1872 and India's eleventh complete and synchronous decennial census since 1881. This is the first of a series of planned publications that will report on the census results.

The volume contains provisional population totals, describes the planning for the census, briefly analyzes major demographic variables (population size, distribution, and growth rate; population projections; population density; sex composition; literacy), and presents six provisional population tables: (1) distribution of population, sex ratio, density, and population growth rate; (2) population and number of literates in 1991 and literacy rates for 1981 and 1991 by sex; (3) percentage decadal variation in population, 1901–11 to 1981–91; (4) states and union territories arranged in descending order of growth rate of population, 1951–61 to 1981–91; (5) sex ratio, 1901–91; and (6) states and union territories arranged in descending order of sex ratio, 1951–91.

Appendix materials include a list of the tables to be generated from the census data, schedules used in the census, eight colored maps (including a large foldout map of administrative divisions), and nine graphs and charts illustrating India's population size and growth, sex ratios, and literacy rates.

The 1991 census enumerated 843,930,861 persons (437,597,929 males and 406,332,932 females), representing 16 percent of the world's population and an absolute population increase of 160,606,864 since the 1981 census. Average annual growth during the decade was 2.35 percent, compared with 2.47 percent during the 1971–81 decade and 2.48 percent during 1961–71, when India's growth rate reached a historic peak. Among the states and union territories, Uttar Pradesh, with 16.4 percent of the nation's population, and Bihar, with 10.2 percent, are the most populous.

The sex ratio (number of females per 1,000 males) continued a decline, observed since the beginning of the century, in favor of males. At the time of the 1991 census there were only 929 females for every 1,000 males. Kerala is the only state with a sex ratio favoring females, and there it rose slightly over the past decade to 1,040 females per 1,000 males. The sharpest sex ratio decline occurred in Bihar State (912 females per 1,000 males in 1991). Several social and demographic explanations for India's low sex ratio have been advanced, and the author suggests that a combination of factors may be responsible.

Literacy increased over the decade, rising from 43.56 percent of persons 7 years old and older in 1981 to 52.11 percent in 1991. The literacy gap between males (63.86 percent literate) and females (39.42 percent) had narrowed slightly.

World Population Projections, 1989–90 Edition: Short- and Long-Term Estimates by Rodolfo A. Bulatao, Eduard Bos, Patience W. Stephens, and My T. Vu. Baltimore and London: Johns Hopkins University Press for The World Bank, 1990. lxxiv, 421 pp. ISBN 0-8018-4094-5 (paper), US $34.95. Available from Publications Sales Unit, Department F, The World Bank, 1818 H Street, N.W., Washington, D.C. 20433, U.S.A., or from Publications, The World Bank, 66 avenue d'Iéna, 75116 Paris, France.

The fourth in a series of population projections for all countries prepared annually by the Population and Human Resources Department of The World Bank, this volume contains detailed tables for countries, regions, and income groups. An introductory section describes the projection methodology and summarizes and interprets the projection results. The projections for the entire world span nearly two centuries, from 1985 to 2150. Separate projections were prepared for 187 countries, economies, territories, and small-country groups with data available as of mid-1989. The length of the projection period was chosen to allow all populations to approach stability. Instead of offering several projections for each country or group, the authors have chosen to present their best estimate of the likely demographic future.

The projections cover total population size and age-sex composition, mortality level and trend, fertility level and trend, and migration level and trend. The authors note that the tables on age structure cover broad age groups (0–14, 15–64, and 65 and over), providing a more convenient summary than in previous editions.

World Population Growth and Aging: Demographic Trends in the Late Twentieth Century by Nathan Keyfitz and Wilhelm Flieger. Chicago and London: University of Chicago Press, 1990. viii, 608 pp. ISBN 0-226-43237-8 (cloth), US $65.00. Available from The University of Chicago Press, 11030 S. Langley Avenue, Chicago, IL 60637, U.S.A.

This volume is a sequel to *World Population: An Analysis of Vital Data* by the same authors, published in 1968. It incorporates data and estimates from official sources for countries with populations of 300,000 or more in 1985 and regions recognized by the United Nations. The data cover the period from 1950 to 1985, especially the 1970s and early 1980s. United Nations Population Division estimates and projections based on its 1988 round of global demographic assessments are included for 152 countries and for 30 groupings of countries, presented at five-year intervals from 1950 to 2020.

An introductory text is followed by a summary table presenting frequently used demographic indicators for nearly all countries (40 pages), tabulations based on UN data and estimates (190 pages), and detailed country tabulations (292 pages). The data, estimates, and projections are presented in a comparative format for easy reference. More than 800 charts have been included to help the reader visualize demographic trends.

Health and Vital Statistics Abstract, July 1990 published by the Ministry of Health Services, Republic of the Marshall Islands. Majuro, 1990. xii, 44 pp. (paper). Available from The Ministry of Health Services, Planning and Statistics Department, P.O. Box 16, Majuro, MH 96960, Republic of the Marshall Islands.

The Marshall Islands began computerizing its health and vital statistics records in 1988. This publication contains tabulations for births and deaths based on birth and death certificates, Majuro Hospital admissions and out-patient data, national syphilis data, national census data, and special reports on diabetes mellitus, malnutrition, and suicide.

Registered births for the entire country are tabulated for the period 1953–89; more detailed tabulations are for shorter periods. The text notes that, because vital events, particularly births, may not be registered until a family requires proof of an event (to enroll a child in school, for example), and at least 20 percent of birth certificates are issued as "delayed" certificates, tabulations for the three most recent years are considered to be incomplete.

The 1988 census enumerated a total population of 43,380, representing a remarkably high (40.5 percent) increase over the 1980 census population of 30,873. The average annual growth rate during the intercensal period was 4.25 percent. Nearly half (45.3 percent) of the population is on Majuro Atoll, the country's political and economic center.

The Marshall Islands comprises 1,225 islands and islets and a total land area of 179 sq km stretching over 1.28 million sq km in the Pacific Ocean.

Health Care of Women and Children in Developing Countries edited by Helen M. Wallace and Kanti Giri. Oakland, Calif.: Third Party Publishing Company, 1990. xxii, 598 pp. ISBN 0-89914-031-9 (paper), US $32.95 ($36.95 for orders originating outside the United States). Available from Third Party Publishing Company, P.O. Box 13306, Montclair Station E, Oakland, CA 94661-0306, U.S.A.

This volume contains 48 papers on topics related to the health care of women and children in the developing world. Contributors are health and medical practitioners and academics from a dozen countries who represent international, national, and nongovernmental organizations and universities. Their aim in this book is to improve the health care of women, infants, children, and youth in developing countries by informing those in leadership positions at all levels of government and community activity about the issues discussed.

The papers are organized into five sections: an introductory section containing 15 papers, maternal health (seven papers), infant and child health (16 papers), adolescent health (four papers), and the delivery of care to women and children (six papers). The volume includes author and subject indexes and an appendix containing definitions used in the text.

Unmet Need and Future Needs for Contraceptives in Sri Lanka by Soma De Silva. Population Information Centre Research Paper Series, No. 4. Colombo: Population Information Centre: July 1990. iv, 32 pp. Available from Population Information Centre, Population Division, Ministry of Health and Women's Affairs, 231 De Saram Place, Colombo 10, Sri Lanka.

In the last two to three decades Sri Lanka's fertility level has declined considerably. The total fertility rate

(continued on page 28)

News and Announcements

(continued from page 14)

due to the enrollment of persons 25 years old and older, whose numbers rose from 3.9 to 5.1 million.

Two technological changes are expected to revolutionize user access to U.S. census data. The first is the availability of data on CD-ROMs, laser discs that can be used on personal computers. Anyone with a personal computer (PC) who is willing to spend $500 for a CD-ROM reader and about $150 per disc will be able to access the data. For $500 more the PC owner can acquire menu-driven software making it possible to manipulate the data. This "democratization of the data," Dr. Bryant stated, will permit many new groups to use census results. "If knowledge is power, then a lot more people are going to be empowered," she said.

The second technological breakthrough is the digital, coast-to-coast geographic data base known as TIGER (Topologically Integrated Geographic Encoding and Referencing system). Developed by the Census Bureau and the U.S. Geological Survey, TIGER is a seamless system that maps geographic features and political boundaries for every level at which the census collects data in the United States. It is being used to produce all the maps for data collection, tabulation, and dissemination needs of the 1990 census.

Anyone can purchase TIGER-generated statistical data or TIGER/Line files on tape or CD-ROM at the cost of reproduction. These files can be combined with other files, such as mailing lists, for individual needs. A new technology called GIS (geographic information system) allows PC users to connect their own files with the TIGER files. The Census Bureau's Data User Services Division (telephone 301 763–1580) can provide those interested with a list of vendors who sell the GIS software.

Korean Central Statistical Agency Is Upgraded from Bureau to Office Status

From Seung-Kon Lim, director of the Statistical Standards Division, National Statistical Office of the Republic of Korea, comes word that The National Bureau of Statistics was reorganized and upgraded to the level of office on 1 January 1991. Now called the National Statistical Office (NSO), it has three bureaus, 14 divisions, and 16 local branch offices.

The reorganization produced several personnel changes. Tai-Hyung Min was inaugurated as the first administrator of NSO. Kang-Woo Lee, former director-general of the National Bureau of Statistics, is now chief secretary for both the deputy prime minister and the minister of the Economic Planning Board. Il-Hyun Kim, former director of the Population Statistics Division, was appointed director-general of the Planning Bureau. Byung-Hak Kim and Hak-Hyung Kim became director-general of the Census and Survey Bureau and director-general of the Data Processing Bureau, respectively.

Preliminary Report on Korea's 1990 Census Available in April

A preliminary report on the 1990 Population and Housing Census of the Republic of Korea is to be issued on 12 April 1991. Based on control forms completed by enumerators, the report contains provisional counts of the population, households, and housing units classified by local administrative units. The census took place on 1 November 1990.

An advance report based on a 2 percent sample tabulation will be released in June 1991. It will contain tabulations on the main characteristics of the population, including its size and structure, commuting status, migration, fertility, economic activity, households, and housing units.

A report based on a 10 percent sample of the population and the final report will follow. The final report, to be based upon tabulations of basic characteristics for the entire population, will actually consist of several reports—a report for the whole country and separate reports for the 15 provinces and special cities. They and the 10 percent sample report are to be released by December 1991. Three volumes providing information on migration, fertility, and economic activity will be published by February 1993.

Cheung Named to Head Department of Statistics, Singapore

Paul Cheung, former director of the Population Planning Unit, Ministry of Health, Singapore, was appointed chief statistician of Singapore's Department of Statistics, Ministry of Trade and Industry, on 1 March 1991. He succeeds Khoo Chian Kim, who retired from the post. □

THE AIDS PREVENTION DILEMMA . . .

(continued from page 8)

percent being teenagers. The heterosexual transmission is of particular concern because few brothel patrons use condoms every time they have intercourse with a prostitute.

The high rate of HIV infection among teenage girls in the North may be unique. In the United States, although the prevalence of infection among females in that age group is substantially higher in New York City than in other U.S. cities and heterosexual transmission is thought to be a significant factor in that pattern, even in New York City HIV infection is more prevalent among teenage boys than teenage giris (Nicholas et al. 1989:299). Another difference between the Thai and U.S. situations is that in the United States, female prostitutes who are not intravenous drug users have low HIV infection rates (Cohen et al. 1988; Rosenberg and Weiner 1988).

Evidence of HIV diffusion into the general population. The escalation of HIV prevalence rates among Thai prostitutes presages the diffusion of the virus into the general population. Data are beginning to appear that indicate diffusion has already occurred.

A recent national survey of 26,000 men between ages 20 and 22 and eligible for Thai military service found that 2 percent of these young males nationwide, and up to 11.5 percent in Chiang Mai, were HIV positive (*Bangkok Post* 31 August 1990).[3] Other studies report that 3 to 10 percent of 20–24 year-old males in the lower and tourist-destination Northern provinces who have been tested are HIV positive (Usher and Ross 1990).

Researchers at Chiang Mai University Hospital found 1 percent of pregnant women in Chiang Mai Province to be HIV positive (Vicharn 1990). In 1990 there were unofficial reports from reliable sources that over 4 percent of pregnant women seen at certain Bangkok hospitals were found to be HIV positive. But statistics on pediatric AIDS are tentative: it takes up to 18 months to determine whether a newborn's antibodies to HIV are to the virus in its own body (signifying HIV infection), or residual from a response to HIV in its mother (signifying noninfection in the infant).

■ Thailand's response to the evidence

The threat that AIDS poses to societies is not only economic and demographic, involving huge medical costs and the loss of adults in the most productive ages. Because AIDS is transmitted by human behavior, its occurrence also implicates social mores and the institutions that sustain them. In its response to the emerging AIDS epidemic, the Thai government has tended to focus on a medical interpretation of the epidemic rather than grappling with its social aspects.

A National Advisory Committee was established in 1985, and was reorganized in 1987 (Thailand, Dept. of CDC, 1988:13); it has played a minor role. More important was the Cabinet's approval, in August 1987, of a National Medium Term Programme for the Prevention and Control of AIDS for the period 1988–91 (Thailand, Dept. of CDC, 1988). It created within the Department of CDC a Center for Prevention and Control of AIDS, which serves as the nation's center for AIDS information and programming. In 1990 the name of the center was changed to the AIDS Division.

HIV testing and AIDS education. Major funding for CPCA has come from WHO, the U.S. Agency for International Development (USAID), and the United Nations Development Program (UNDP). Between June 1988 and September 1990, total funding for AIDS control in Thailand from all sources was over $10.8 million. These funds have been committed largely to HIV testing. They have enabled the government to conduct a national HIV surveillance survey in 14 sentinel areas twice a year since 1988, and in 31 since December 1989. (See also box on page 22.)

There are signs that governmental agencies are beginning to move toward intersectoral collaboration in mounting a defense against the epidemic. Other ministries, such as the Ministry of Education and the large and powerful Ministry of Interior, have begun externally funded AIDS-

3. The 2 percent for young Thai males is considerably higher than the corresponding rate for military recruit applicants in the United States, where several studies report a cumulative seropositive prevalence for ages 17–24 of 1.4 per 1,000, although the monthly rates have progressively dropped to less than 1.0 per 1,000—a phenomenon that researchers suspect reflects self-referral by applicants who believe they may be seropositive (Kelley et al. 1990:405).

Thai and U.S. Researchers Collaborate on Study of HIV's Spread in Thailand

A Thai Working Group on HIV/AIDS Projection was established in March 1991 to work with the U.S. Department of State's Interagency Working Group (IWG) on creating a detailed model for the spread of HIV and AIDS in Thailand. The U.S. team, comprising demographers, mathematicians, and computer programmers, has developed a sophisticated and flexible computer model of the epidemic based on specific behavioral inputs. The Thai team's first task has been to compile and review available data on the demography, sexual behavior, intravenous drug use, and epidemiology of the Thai population, and also blood bank procedures used in Thailand. Thailand is the first country to use input data reflecting the actual AIDS epidemic to run the model, which is referred to as the iwgAIDS model. An initial review of the data indicates that there were between 150,000 and 175,000 HIV infected individuals in Thailand as of mid-1990.

Output from the model will be updated regularly and presented to the Thai Cabinet and health policymakers so that national policies on AIDS can be responsive to the current and future dynamics of the epidemic. The model will also allow AIDS program managers to test the impacts of various interventions. It is flexible enough to incorporate the effects of increased condom use, changing levels of sexually transmitted diseases, and increased blood screening on the epidemic's spread.

The U.S. team is headed by Peter Way of the U.S. Bureau of the Census, who went to Thailand in March at the invitation of the Thai Working Group to install the software, train staff, and review the available data. Besides Dr. Way, the U.S. team includes P. West, E. A. Stanley, and S. T. Seitz.

Copies of the software have now been installed at the Population and Community Development Association (PDA), which functions as the administrative base for the Thai Working Group, and at the Ministry of Public Health.

Werasit Sittitrai of the Thai Red Cross Society and Chulalongkorn University and Stasia Obremskey of PDA are the coordinators of the Thai Working Group. Other members are Praphan Phanuphak, Suphachai Rerk-Ngarm, Vichai Chokevivat, Sombat Thanprasertsuk, John Knodel, George Loth, and Tim Brown. Mechai Viravaidya is the adviser to the Thai Working Group.

The Thai Working Group will produce a preliminary report on the results of the model in May 1991. As a consequence of the collaboration, several research studies have been planned to improve the quality of the input data. The results will be incorporated into the model to refine it. Because the model uses data on heterosexual and homosexual behavior and on intravenous drug use as modes of epidemic transmission, the Thai team expects that other countries where the AIDS epidemic is unfolding can use the model and the data-gathering methodology as a valuable tool.

Copies of the preliminary report on the model, which is to be published by the Thai Working Group under the Prime Minister's Office, can be requested from:

Ms. Benjamat Terramatvanit
Population and Development Association
8 Sukhumvit soi 12
Bangkok 10110, Thailand

—by Stasia Obremskey and Werasit Sittitrai

related activities, including AIDS-prevention education.

Supported activities include the AIDS training of health workers, provincial governors, and district officers; efforts to incorporate AIDS information into the secondary school curriculum; screening of donated blood; and AIDS education spots on Armed Forces radio stations and commercial television channels. Government television channels began carrying AIDS information in early 1991.

USAID has also provided funding to other Thai programs for AIDS-prevention activities. In 1989 it donated 43 million condoms to the Ministry of Public Health for distribution. Since 1988 it has awarded several small grants to the Program

for Appropriate Technology in Health (PATH) directed toward conveying AIDS-prevention messages to intravenous drug users, their sex partners, and low-priced prostitutes. USAID funds the AIDSTECH and AIDSCOM projects for technological and communications assistance activities related to AIDS, and it supports activities of the CPCA.

The emphasis of the CPCA has been surveillance through blood testing, particularly of high-risk groups, intravenous drug users, and STD clinic clients.

The interest of the two royal princesses in the problem of AIDS has helped to legitimate AIDS-related programs, and private organizations are becoming increasingly involved in AIDS-prevention activities, especially education and training (Table 6). Her Royal Highness (HRH) Maha Chakri Sirindhorn is director of the Thai Red Cross Society, which will begin the first anonymous HIV counseling and testing program in April 1991. The Red Cross is also producing materials for AIDS information, education, and communication. Until December 1990 HRH Chulabhorn was a special ambassador for the WHO, and in that capacity supported its AIDS-control mission. She continues to head the Chulabhorn Research Institute, which supports AIDS education programs.

Table 6. **AIDS-prevention activities of nongovernmental organizations in Thailand**

Organization	Activities
EMPOWER	Provides AIDS education to the 5,000 female bar workers of Patpong (a district of Bangkok), and through them, to their clients and employers
Family Health International	Conducts small-scale studies of AIDS transmission; administers the USAID-funded AIDSTECH program, which supports the Ministry of Public Health's CPCA, and the USAID-funded AIDSCOM program, which supports the ministry's activities in AIDS education and counseling training
Planned Parenthood Association of Thailand (PPAT)	Provides AIDS education to prison officials
Population and Community Development Association (PDA)	Since 1987, has developed a large arsenal of AIDS education materials for schools, businesses, factories, and the general public; has the largest AIDS-prevention education program in the nation
Program for Appropriate Technology in Health (PATH)	Offers training for AIDS counselors working primarily in detoxification and rehabilitation centers, and AIDS education for government officials; produces high-quality condoms; develops and tests AIDS-education materials
Purple String Dancers	Provides AIDS education in Bangkok's gay bars and on television
Thai Red Cross Society	Conducts HIV testing and offers AIDS education
Thai Volunteer Service (TVS)	Trains AIDS program personnel

Proposed legal controls over suspected HIV carriers. In 1990 the government's AIDS-containment strategies included the introduction of a bill to monitor and control HIV carriers or suspected carriers. Persons targeted were drug addicts, prostitutes, and "promiscuous persons" (including homosexuals). The bill provided for householders to report persons with AIDS to authorities, and for the arrest with up to one year's detention of prostitutes and intravenous drug users if they did not report for regular medical checkups and HIV testing, or if they became HIV positive and did not stop their high-risk practices.

There are several difficulties with the bill. First, the term "promiscuous" fails to capture the dilemmas of persons who resort to prostitution for their livelihood (Farmer and Kleinman 1989:150) or who feel that they are innately homosexual. Second, it would criminalize only selected persons, those of the lowest socioeconomic sector, while overlooking others who are HIV carriers. Third, a negative HIV test result means only that the person tested has not developed antibodies to the virus; it does not necessarily mean that the person is uninfected with the HIV and cannot transmit it to a sex or drug partner. Most medical AIDS experts believe there is a latency period of up to six months between receipt of the virus and

seroconversion, that is, between having the virus and developing the antibodies to it that can be identified through blood tests.

It is therefore wrong to use HIV test results as a basis for identifying risk-free groups who are "safe" for promiscuity. A coalition of 18 nongovernmental organizations protested and halted passage of the bill (Wasant 1990), but as of early January 1991 the bill remained alive.

It is wrong to use HIV test results as a basis for identifying risk-free groups who are "safe" for promiscuity.

Also in 1990 the Ministry of Public Health declared that all (female) prostitutes working in brothels would be required to carry a "health card" (Ampa and Suvit 1990). The requirement targets the lowest-paid prostitutes and excludes those working in nightclubs, bars, private escort services, massage parlors, etc. The health card would include the woman's name, photograph, a code denoting her home district and province, and the date she was last tested for HIV.

Prostitutes testing HIV positive would have their cards seized and be barred from the sex industry; those testing negative could continue to ply their trade. By September the futility of this scheme became clear to the ministry, which announced that the health card program had not succeeded in curtailing the spread of AIDS and could be discontinued (Prakobpong 1990).

In mid-1990 the government announced a plan to establish a rehabilitation center for HIV carriers and AIDS patients. It stressed that the site was to be "far from water sources, populated communities and tourist spots." Unfortunately, these site-selection criteria pandered to the irrational fears of the uninformed public because they implied that HIV can be transmitted through the water supply or carried by wind (Ungphakorn 1990b). Designating rehabilitation centers as a primary strategy for dealing with the AIDS epidemic also reinforced the public's belief that people can be protected from AIDS merely by quarantining its victims.

Thailand's use of coercion and legal controls are less stringent than those of some other countries—e.g., Cuba, Czechoslovakia, and the Soviet Union (Bayer and Gostin 1990). It has targeted selected high-risk groups for special restrictive policies. Targeting only high-risk groups overlooks the vulnerability of the general public. It also has the disadvantage of penalizing people instead of promoting changes in social norms that sanction high-risk sexual behavior and drug use.

Such discriminatory public health policies promote intolerance toward the stigmatized groups rather than protect the public's health (Brandt 1988; Sontag 1989). The history of public response to other epidemics indicates that the greater the perceived threat of an epidemic, the greater the attitudes of intolerance (Bateson and Goldsby 1988; Blendon and Donelan 1988). Other, nonstigmatizing policies of informing the public are therefore needed.

■ Discussion and recommendations

The Thai government faces a dilemma of trying to meet incompatible needs: a need to maintain the stability of the economy and a need to contain the spread of HIV infection. Tourism and export labor are major components of the successful economy, yet both are major contributors to the AIDS epidemic. As in most countries, the government has responded to the AIDS threat with a variety of strategies: testing, denial, targeted prevention education, and coercion. The strategies do not add up to a comprehensive attack on the problem, and some are even counterproductive.

In the absence of an HIV vaccine or cure, the only way to prevent its devastating a society is to restrict its interpersonal transmission. Except for maternal transmission (from a mother to her fetus or newborn), all modes of HIV transmission involve voluntary human behaviors, which can be modified by those engaging in them. Therefore, informing the populace about AIDS—its deadliness, the means of transmission, and ways to minimize the risk of getting it—is prerequisite to behavioral change.

AIDS thrives on ignorance. "You cannot make something safe if you pretend it isn't there" (Bateson and Goldsby 1988:128). Programs to prevent the spread of AIDS can be stalemated by policies that prevent it from being mentioned in the mass media, and by government officials' refusal to recognize that casual sex is a regular diversion for a large segment of Thai society, regardless of marital status and laws about monogamy and prostitution.

Currently Thai sexual ideology denies the existence of casual sex. In 1990, for example, an assistant professor at Khon Kaen University

was suspended from her post because her master's degree thesis (Sawangjit 1988) documented sexual activities of students at her university, such as premarital liaisons and the hiring of prostitutes for freshmen hazing.[4] A 1990 newspaper report that the Army Medical Department had found 512 Army soldiers to be HIV positive and that four of them had developed AIDS was retracted by the Army the next day (*Bangkok Post* 1 June 1990, 2 June 1990.)

The epidemic cannot be stopped in Thailand unless all sexually active Thais, including monogamous women, understand they need to protect themselves from HIV transmission during sexual intercourse (Ungphakorn 1990a). Men especially must take precautions because they generally have more sex partners than women do, and consequently more opportunities to contract HIV and transmit it to their wives, lovers, and recreational sex partners, and through them to their children.

The Ministry of Pubic Health advocates the use of condoms by (female) prostitutes as an AIDS preventive measure. Condom use is important, even vital, but the emphasis on prostitutes is one-sided. It targets women with responsibility for condom use even though it is men who have control over such use. Programs supporting the use of condoms must also be directed to boys and men (Ngugi et al. 1988; WHO 1989).

To ignore male participation in prostitution—as clients and as male or transvestite prostitutes—is to render ineffective other efforts to contain HIV transmission through prostitution. Unless conception is intended, condom use should be recommended for all sexual activity in which there is a potential for exchange of semen or vaginal fluid between partners. Men who hold positions of leadership in society, the government, the military, and religious organizations could help make condom use respectable by advocating its use.

But advocating condom use is not enough. Condoms must be used correctly in order to be effective barriers to HIV transmission. And people need to understand that some sex practices are safer than others, and to avoid highest-risk sex acts, such as anal intercourse, sex with multiple partners, and sex with persons infected with STDs.

The current illegal status of prostitution in Thailand prevents the government from regulating that industry. If it were legalized, the government could require condoms to be provided in all places of prostitution, and could protect prostitutes from abusive customers and those refusing to use condoms.

Condom use is negatively associated with the use of drugs and alcohol (Stall et al. 1986; Valdiserri et al. 1988). Among the lowland Thai, prostitute visiting is often associated with male drinking parties. Therefore the effectiveness of a condom policy for prostitutes depends upon prostitutes' ability to refuse inebriated clients who resist using condoms.

To reduce the risk of HIV transmission through needle sharing, the heroin-substitute methadon should continue to be given to all intravenous drug users who test HIV positive.

Perhaps the greatest challenge in AIDS prevention the world over is to reduce the stigma of AIDS. It is particularly difficult to do so in a society where AIDS is equated with moral degradation and stigmatized groups are blamed for its spread (Sontag 1989), and where a double standard exists for male and female sexual behavior (Muecke 1989). AIDS touches on sensitive nerves that only a humane and realistic national policy and an effective mass education program can heal (Bateson and Goldsby 1988).

Perhaps the greatest challenge in AIDS prevention the world over is to reduce the stigma of AIDS.

Denying the sexual mores of the populace and denying the vulnerability of the elite lets AIDS spread from person to person, from intravenous drug user to prostitute to male client to monogamous wife to unborn child. Informing the populace about ways to minimize the risk of contracting AIDS allows choice and retards the epidemic's diffusion.

On 9 January 1991 then Prime Minister Chatichai Choonhaven announced in a statement of health policy to Parliament that official campaigns to control and prevent AIDS would be regarded as national policy. It is to be hoped that the new government will endorse that policy expeditiously.

4. Excerpts from the thesis were published in the respected newspaper *Matichon* and prompted a protest demonstration by some 2,000 Khon Kaen University students. The university administration filed a defamation suit against the researcher and her thesis advisor.

ACKNOWLEDGMENTS

My sincere appreciation goes to my esteemed former colleague, Dr. Vicharn Vithayasay, for his gracious explanations of the epidemiology of HIV transmission, particularly in the Northern Region, the site of my own long-term research. Numerous other officials of the Ministry of Public Health and of nongovernmental organizations in Thailand have also helped shape my understanding of the AIDS threat and dilemma in Thai society. Although I do not mention each by name here, I hold them all in deep respect and take this opportunity to express my gratitude to them. Nevertheless, any failings of this article are solely my own responsibility.

REFERENCES

[Note: In conformity with Thai custom, Thai authors are listed by their given names, rather than by their surnames.]

Altman, Lawrence K. 1988. AIDS reported rising in Thai drug users. *New York Times* 19 April, sec. 3, p. 12.

Ampa Santimatanedol and Suvit Suvit-Sawasdi. 1990. AIDS danger lurks in paradise island. *Bangkok Post* 5 August 1990, pp. 1–4.

Ampa Santimatanedol and Veera Prateepchaikul. 1990. AIDS: The menace we can no longer ignore. *Bangkok Post* 11 August.

Bangkok Post. 28 November 1987. Experts question Asia's AIDS reports. p. 6.

_____. 1 June 1990. 512 AIDS cases, four full-blown, in Army.

_____. 2 June 1990. Army AIDS figures wrong.

_____. 17 June 1990. 17,328 AIDS patients here as of May.

_____. 31 August 1990. Mechai warns govt to stop spread of Aids [sic].

Bateson, Mary Catherine, and Richard Goldsby. 1988. *Thinking AIDS*. New York: Addison-Wesley.

Bayer, Ronald, and Larry Gostin. 1990. Legal and ethical issues relating to AIDS. *Bulletin of PAHO* [Pan American Health Organization] 24(4):454–468.

Blendon, Robert, and Karen Donelan. 1988. Discrimination against people with AIDS. *New England Journal of Medicine* 319(15):1022–1026.

Brandt, Allan. 1988. AIDS in historical perspective: Four lessons from the history of sexually transmitted diseases. *American Journal of Public Health* 78(4):367–371.

Camus, Albert. 1948. *The Plague*. New York: Knopf.

Cates, W., Jr. 1990. Acquired immunodeficiency syndrome, sexually transmitted diseases, and epidemiology: Past lessons, present knowledge, and future research. *American Journal of Epidemiology* 131(5):749–758.

Cohen, Judith, Priscilla Alexander, and Constance Wofsy. 1988. Prostitutes and AIDS: Public policy issues. *AIDS and Public Policy Journal* 3:16–22.

Curran, James, Harold Jaffe, Ann Hardy, W. Mead Morgan, Richard Selik, and Timothy Dondero. 1988. Epidemiology of HIV infection and AIDS in the United States. *Science* 239(February 5):610–616.

Farmer, Paul, and Arthur Kleinman. 1989. AIDS as human suffering. *Daedalus* 188(2):135–162.

Fink, A. J. 1989. Newborn circumcision: A long-term strategy for AIDS prevention. *Journal of the Royal Society of Medicine* 82(11):695.

Kampol Khodsaengma. 1990. Chiang Mai service girls wary of AIDS risks. *The Nation* 5 July.

Karel, Stephen G., and Bryant Robey. 1988. AIDS in Asia and the Pacific. *Asian and Pacific Population Forum* 2(1–2):1 ff.

Kelley, Patrick, Richard Miller, Robin Pomerantz, Frank Wann, John Brundage, and Donald Surke. 1990. Human Immunodeficiency Virus seropositivity among members of the active duty US Army 1985–90. *American Journal of Public Health* 80(4):405–410.

Latif, A. S., D. A. Katzenstein, M. T. Bassett, S. Houston, J. C. Emmanuel, and E. Marowa. 1989. Genital ulcers and transmission of HIV among couples in Zimbabwe. *AIDS* 3(8):519–523.

Mattani Rutnin. 1984. The role of Thai women in dramatic arts and social development: Problems concerning child prostitution in Thailand: A case study accompanied by a videotape on the lives of child prostitutes. In *Customs and Tradition: The Role of Thai Women*. Bangkok: Chulalongkorn University.

May, Robert, Roy Anderson, and Sally Blower. The epidemiology and transmission dynamics of HIV-AIDS. *Daedalus* 118(2):163–201.

Mayuree Rattanawanathip. 1990. When children are sold as sex slaves. *Bangkok Post* (Focus), 27 December.

Muecke, Marjorie A. 1989. Mother sold food, daughter sells her body: Cultural continuity in the Thai context of "progress." Paper presented at the Annual Meeting of the American Anthropological Association, Phoenix, Arizona.

The Nation. 9 November 1990. Survey on Aids [sic] spread.

_____. 29 November 1990. Wattana: Aids [sic] spreading rapidly among prisoners.

Ngugi, E. E., F. A. Plummer, J. N. Simonsen, et al. 1988. Prevention of transmission of human immunodeficiency virus in Africa: Effectiveness of condom promotion and health education among prostitutes. *Lancet*, vol. 2 for 1988(8616):887–890.

Nicholas, S. W., D. L. Sondheimer, A. D. Willoughby, S. J. Yaffe, and S. L. Katz. 1989. Human immunodeficiency virus infection in childhood, adolescence, and pregnancy: A status report and national research agenda. *Pediatrics* 83(2):293–308.

Prakobpong Panapool. 1990. Aids [sic] victim is detained without trial. *The Nation* 7 September.

Quinn, T. C. J. M. Mann, J. W. Curran, and P. Piot. 1989. AIDS in Africa: An epidemiological paradigm. *Science* 234:955–963.

Rosenberg, Charles E. 1989. What is an epidemic? AIDS in historical perspective. *Daedalus* 118(2):1–17.

Rosenberg, Michael J., and Jodie M. Weiner. 1988. Prostitutes and AIDS: A health department priority? *American Journal of Public Health* 78(4):418–423.

Sawangjit Srirasa. 1988. Khon Kaen University students' lives. M.A. thesis, Faculty of Humanities, Chulalongkorn University, Bangkok.

Smith, Diana G. 1990. Thailand: AIDS crisis looms. *The Lancet* 335(March):781–782.

Sombat Thaenpraseritthasuk. 1990. Editorial. *Weekly Epidemiological Surveillance Report* (in Thai), 2 November:535. Bangkok: Ministry of Public Health.

Somchai Durongdej. 1990. Survey of knowledge, attitudes and practices in relation to AIDS among Bangkok residents. Bangkok:

Faculty of Public Health, Mahidol University.

Somchai Hareuthaihansa. 1986. They trade in "flesh goods" in Koh Sai. *The Nation* 27 May, p. 5.

Sontag, Susan. 1989. *AIDS and Its Metaphors.* New York: Farrar, Straus and Giroux.

Stall, R., L. McKusick, J. Wiley, T. J. Coates, and D. G. Ostrow. 1986. Alcohol and drug use during sexual activity and compliance with Safe Sex Guidelines for AIDS: The AIDS Behavioral Research Project. *Health Education Quarterly* 13(4):359–371.

Thailand, Department of Communicable Diseases Control (CDC). 1988. *National Medium Term Programme for the Prevention and Control of AIDS in Thailand 1989–1991.* Bangkok: Ministry of Public Health.

Thailand, Department of Epidemiology. 1990a. *Weekly Epidemiological Surveillance Report* (in Thai), 26 October. Bangkok: Ministry of Public Health.

_____. 1990b. *Weekly Epidemiological Surveillance Report* (in Thai), 9 November. Bangkok: Ministry of Public Health.

Thitsa, Khin. 1980. *Providence and Prostitution: Image and Reality for Women in Buddhist Thailand.* London: CHANGE International Report.

_____. 1983. Nuns, mediums and prostitutes in Chiengmai: A study of some marginal categories of women. In *Women and Development in Southeast Asia,* C. W. Watsonp (ed.). Canterbury, England: Centre for Southeast Asian Studies, University of Kent.

Truong, Thanh-Dam 1990. *Sex, Money and Morality: Prostitution and Tourism in Southeast Asia.* Atlantic Highlands, N.J.: Zed Books.

Ungphakorn, Jon. 1990a. The impact of AIDS on women in Thailand: Repression in the health arena. *Bangkok Post,* 29 August, sec. 3. Adapted from a paper presented to the AIDS in Asia and the Pacific Conference, organized by the World Health Organization and the Australian Government, Canberra, 5–8 August 1990.

_____. 1990b. Letter to the editor. *Bangkok Post,* 8 September.

Usher, Ann, and Martha Ross. 1990. Aids [sic] study: 10% of Northern men infected. *The Nation* 18 December.

Valdiserri, Ronald O. 1989. *Preventing AIDS: The Design of Effective Programs.* New Brunswick, N. J.: Rutgers University Press.

Valdiserri, R. O., D. W. Lyter, L. C. Leviton, C. M. Callahan, L. A. Kingsley, and C. R. Rinaldo. 1988. Variables influencing condom use in gay and bisexual men. *American Journal of Public Health* 78:801–805.

Vicharn Vithayasai. 1990/2533. *Khwaam ruu ruang rook AIDS samrap prachaachon* (Knowledge about AIDS for the people). Chiang Mai: Faculty of Medicine, Chiang Mai University.

Wasant Techawongtham. 1990. Anti-AIDS organizations oppose decree plan. *Bangkok Post* 17 July, pp. 1,3.

Waugh, M. A., and R. D. Spicer. 1990. Newborn circumcision: A long-term strategy for AIDS prevention. *Journal of the Royal Society of Medicine* 83(4):278.

Werasit Sittitrai. 1990. Survey of partner relations and risk of HIV infection in Thailand. Paper presented at the Chulabhorn Research Institute's International Congress on AIDS, Bangkok, 17–21 December.

World Health Organization (WHO). 1989. *Consensus Statement from the Consultation on HIV Epidemiology and Prostitution.* Geneva. WHO/GPA/INF/89.11. □

COMMENTS . . .

(continued from page 11)

ing a job epitomize the difficulty of classification within a mixed cash-subsistence economy. Deciding which set of tasks comprises a discrete job is difficult. Hoffmann points out that priority rules are used when there is a combination of tasks within the same job, a point that was not made clear in my article.

Still, the issue of defining job boundaries remains. Should food gardening, copra production, fishing, and house building be considered as separate jobs, or only as the set of tasks within a job done by a typical Pacific Islands villager? Complicating the problem of definition is the fact that there is usually no formal institution of employment to assist in delineating job boundaries, unless a household can be considered in this way.

Although I was aware of the considerable work done on developing ISCO–88 and computer-assisted coding (CAC) in Australia, I was not aware that that country was "the world's pioneering country in its work on occupational classifications."

The idea in the original article that each task a person did could be coded and that, where necessary, priority rules could be applied with CAC to derive a single occupational code derived mainly from the considerable flexibility displayed by the Australian system (see Embury 1988).

REFERENCES

Embury, Brian L. 1988. The ASCO Computer Assisted Coding System. Canberra: Social and Labour Division, Australian Bureau of Statistics, November.

Friesen, Wardlow. 1990. Economic activity and occupation in the Pacific Islands: Issues of census classification and analysis. *Asian and Pacific Population Forum* 4(2):11 ff.

Hussmanns, R., F. Mehran, and V. Verma. 1990. *Surveys of Economically Active Population, Employment, Unemployment and Underemployment: An ILO Manual on Concepts and Methods.* Geneva: International Lahour Office.

International Labour Office (ILO). 1990. *International Standard Classification of Occupations—ISCO–88.* Geneva.

South Pacific Commission (SPC). 1990. *SPC/ESCAP Expert Working Group on Census Design. Noumea, New Caledonia, 24–26 April 1989. Report.* Noumea. □

Reviews and Publication Notes

(continued from page 19)

dropped from a high of 5 to around 2.7 children per woman during the period 1963–87. Overall contraceptive prevalence increased to an impressive high of 62 percent of currently married women. A characteristic feature of contraceptive use, however, has been a heavy dependence on traditional methods and on female sterilization.

This publication provides two alternative estimates of the current unmet need for contraceptives: a low estimate of 6 percent counting users of traditional methods as having their contraceptive needs met, and a high estimate of 19 percent counting traditional users as those having need of an efficient method. It also presents a set of estimates for the prevalence of future contraceptive use required to reduce Sri Lanka's total fertility rate to replacement level by the year 2001. Contraceptive prevalence would have to rise to 71 percent, a level implying an increase in the number of users from an estimated 1.2 million in 1981 to 2.26 million by 2001.

If one takes into consideration the heavy discontinuation for some methods and replacement for aging, the annual number of new users required is about 74,000 for all methods initially; this figure would gradually decline to 38,000. If a method mixture less weighted toward traditional methods is to be achieved, however, users of all modern methods must continue to increase steadily. User increases required from the year 1981 until 2001 are 60 percent for tubectomy, 200 percent for vasectomy, 50 percent for the IUD (intrauterine device), 100 percent for oral contraceptives, and 400 percent for injectables.

Labour Force and Socio-economic Survey—1985/86, Sri Lanka: Preliminary Report published by the Department of Census and Statistics, Ministry of Plan Implementation, Sri Lanka. Colombo: 1987. viii, 312 pp. (paper). Available from Department of Census and Statistics, Ministry of Plan Implementation, Colombo 7, Sri Lanka.

This report provides preliminary data from the third in a series of surveys conducted by the Department of Census and Statistics under the National Household Survey Capability Programme of the United Nations for the purpose of gathering information on living levels in Sri Lanka. The information is intended for use by economic policymakers, researchers, and the pubic.

Approximately 25,000 housing units were covered in 12 monthly subrounds beginning in April 1985. A sample of this magnitude was used to permit reasonably accurate estimates at the district level.

The report is based on data collected in the first six months of the survey and contains results of data analysis of some key indicators at the sector and national levels. Subsequent reports based on all 12 rounds of the survey will provide more detailed information and estimates at the district level.

This report is organized into three sections, the first two describing the survey methodology and the results, and the third containing tabulations. Sixteen appendixes document the survey methodology.

Lactation Education for Health Professionals edited by Rosalia Rodriguez-Garcia, Lois A Schaefer, and Joao Yunes. Washington, D.C.: Georgetown University, U.S. Agency for International Development, and Pan American Health Organization, 1990. xii, 213 pp. ISBN 92–75–12024–2 (paper). Available from Institute for International Studies in Natural Family Planning, Georgetown University, Washington, D.C. 20007, U.S.A. (Attention Ms. Lois A. Schaefer, FAX 202 687–6846).

This book is the product of a collaborative effort by nurses, physicians, nutritionists, and other health professionals worldwide to develop a curriculum for teaching students of medical, nursing, and nutrition schools the basic skills necessary to teach and promote breastfeeding. The curriculum is targeted to a mid-level audience: students of basic nursing programs.

The volume includes a teaching module and scientific and support articles. The teaching module consists of breastfeeding curriculum and a teacher's guide. The curriculum includes the core content areas for lactation and breastfeeding education, and includes a unit on the Lactational Amenorrhea Method (LAM) for child spacing. The teacher's guide follows the format of the module, which has been designed to identify easily the objectives, methodologies, and evaluation questions for each topic.

A Spanish-language edition with the title *Educacion en Lactancia para los Profesionales de la Salud* is also available. □

Asia-Pacific
POPULATION & POLICY

March 1991 No. 16 Population Institute ⁂ East-West Center Honolulu, Hawaii

Economic Development and Fertility Decline: Lessons from Asia's Newly Industrialized Countries

DURING the past 25 years, Asia's newly industrialized countries, Hong Kong, Korea, Singapore, and Taiwan, have experienced rapid economic growth and achieved dramatic reductions in fertility. That these accomplishments have occurred over the same time period has raised a critical question for policymakers: Have the fertility declines of the past 25 years been the result of rapid economic development, or have effective family planning programs played the key role?

The evidence is strong that investments in economic and social development have combined with effective family planning programs to reduce fertility rates. Several recent studies conclude that, in the words of demographers John Bongaarts, W. Parker Mauldin, and James F. Phillips, "investments in socioeconomic development and family planning programs operate synergistically, with one reinforcing the other."

In Hong Kong, Korea, Singapore, and Taiwan, rapid economic growth rates have allowed more investment in social development, including family planning, education, and health care. Lower fertility has helped stimulate the economy by reducing the number of dependents relative to the productive population, lightening the burden on educational facilities, and encouraging women's labor force participation.

In developing countries, reports demographer Ronald Freedman, "On balance, the evidence is that family planning programs can have an effect that is interdependent with, but not merely reflective of, social and economic development." Demographer Andrew Kantner observes, "A consensus appears to have emerged: Family planning effort can greatly accelerate the pace of fertility change, especially in environments undergoing rapid socioeconomic change."

Population and Development

THE experience of Asia's newly industrialized countries, Hong Kong, Korea, Singapore, and Taiwan, is of great interest to policymakers because these countries have been successful in reducing fertility rates, implementing effective family planning programs, and achieving rapid economic growth.

If their experience demonstrates that fertility rates inevitably fall as a result of economic growth, then policies to stimulate the economy should also help achieve fertility reduction goals. If effective family planning programs have been an essential element in achieving fertility reduction, then other countries should maintain their investments in family planning and strengthen these programs, rather than relying on economic and social development to reduce fertility.

The policies of Hong Kong, Korea, Singapore, and Taiwan governments reflect the recognition that rapid population growth drains resources that could go to stimulating economic growth and achieving social development. In the mid-1960s, when their national family planning programs were launched, fertility was high in these countries. The total fertility rate of each country was nearly five children per woman. By 1988 the total fertility rate had dropped to under two children per woman, a level as low as in the developed world. If sustained over several generations, such a low level would bring an eventual halt to population growth.

By the mid-1980s at least 70 percent of married couples were using contraception, primarily modern methods. These levels are similar to those found in Western Europe or the United States. Age at marriage also rose dramatically, in part because contraception became more widely available, and also because opportunities for education and employment increased.

Over the same period, the economies of Hong Kong, Korea, Singapore, and Taiwan grew at an astonishing pace, and the countries made rapid gains in such economic indicators as gross national product, capital formation, and per capita consumption. During the 1980s their economic growth rates averaged 6 to 10 percent annually, exceeding those in many developed nations.

Economic growth has been centered in the manufacturing and service sectors and has been largely export driven. While their economic policies have been different from each other, the governments generally have worked closely with the private sector, a pattern quite different from the experience of Western economies.

Rapid economic growth, combined with lower fertility, allowed governments to invest heavily in social development programs. Education has been a high priority and a key to a more productive economy and better living standards. Investments in health care and nutrition have also increased well being and productivity and lengthened life expectancy.

William Waterfall

Asia's newly industrialized countries have been successful in family planning and economic growth. The lesson is that development planning and family planning can work closely together to reduce fertility.

Achieving Lower Fertility

MANY studies recognize the important role of economic and social development in reducing fertility, through improving health and living conditions, increasing educational opportunities, and raising women's status. Studies also find that effective family planning programs have a direct effect, by encouraging awareness and use of contraceptive methods.

Demographer Ronald Freedman notes that fertility probably would have fallen anyway in such countries as Korea and Taiwan, even

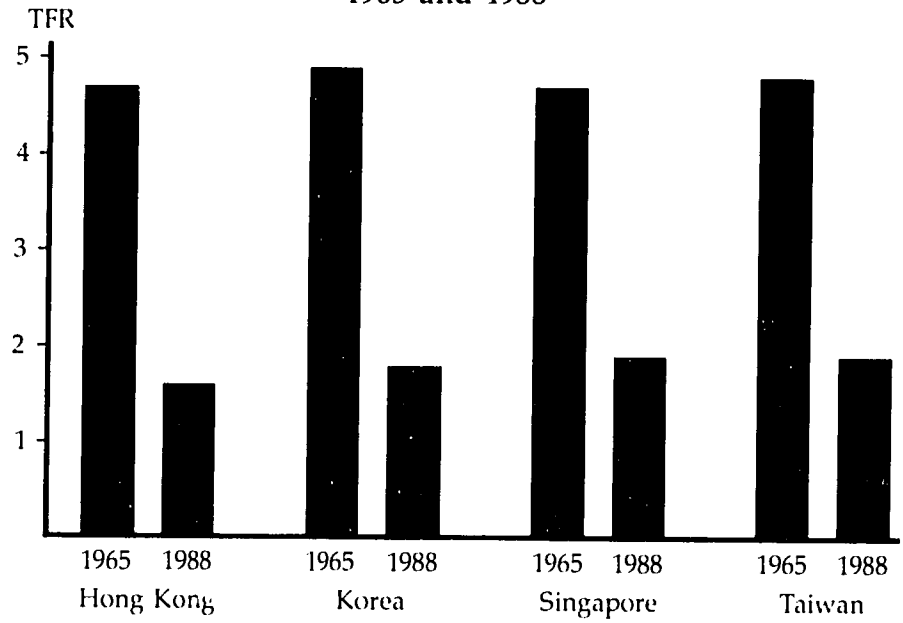
without family planning programs, but that "it is doubtful that the decline would have been as rapid without the family planning programs, especially among the disadvantaged masses—the poor, the uneducated, and the rural."

Had modern contraceptives been available during the demographic transition in Europe and the United States before World War II, Freedman believes fertility might have fallen more rapidly, more equally among social groups, and with less suffering from unwanted births and abortions.

Less developed economies face many more obstacles to achieving family planning success than do rapidly developing economies, but the Matlab program in Bangladesh demonstrates that even in the absence of a growing economy, an effective family planning effort can reduce fertility rates. (See Asia-Pacific Population & Policy, No. 13.) "One is hard-pressed to identify any developing country that has experienced major reductions in fertility without the presence of an effective family planning program," writes demographer Andrew Kantner.

According to one major study, without family planning programs the world's population would be over 400 million higher than it actually is. The fertility rate in developing countries would have been 5.4 births per woman, instead of 4.2 for the period 1980-85.

Total Fertility Rate (TFR)*
1965 and 1988



Source: Kantner (1991).

* Number of children the average woman would bear in a lifetime at the current fertility rates of the time.

Demographic and Economic Indicators

	Population (millions) mid-1989	Average annual growth rate of population (%) 1980-88	Gross domestic product (GDP) per capita ($) 1989	Average annual real GDP growth rate (%) 1986-89
Hong Kong	5.8	1.5	10,924	8.9
Korea	42.4	1.2	4,940	10.5
Singapore	2.7	1.1	10,853	7.9
Taiwan	20.0	1.4	9,810	9.8

Source: Kantner (1991).

Measuring Relative Importance

ALTHOUGH a number of studies have tried to specify the relative importance of development versus family planning in achieving lower fertility rates, the results have been inconclusive. One general finding is that countries with more effective family planning and health delivery systems are also more highly developed, an observation that suggests a strong interaction between economic growth and family planning in reducing fertility.

Demographers Robert Retherford and James Palmore believe the impact and importance of a family planning program change as a country's fertility transition progresses. As modernization occurs, such factors as child survivorship rates, the costs of children, and alternative uses of family resources combine to reduce fertility. If the government introduces a

family planning program, making it less costly and more acceptable for couples to practice contraception, fertility can fall rapidly. By the time low fertility levels and a developed economy have been achieved, the national family planning program no longer plays such an important role in fertility reduction.

Demographers Andrew Mason and Lee-Jay Cho observe that in Korea, as a consequence of economic development, education has risen, child mortality has fallen, cities have grown, and incomes have increased, causing fertility to decline. Socioeconomic development in itself, however, accounts for less than half of Korea's total fertility decline. The national family planning program has been responsible for a large share of the decline. According to Mason and Cho, "Korea's population policy has facilitated the family planning impact of development by providing contraceptive services to millions of women who have chosen to limit their childbearing over the last 25 years."

Policy Implications

HONG Kong, Korea, Singapore, and Taiwan all represent "success stories" in family planning, as well as examples of success in economic growth. The lesson of their success is that development planning and family planning can work closely together to reduce fertility rates. Over the long run, the modernization process will bring down fertility. Countries with rapidly growing populations, however, cannot afford to wait for the long run. As many developing countries recognize, rapid population growth threatens economic and social development.

An effectively managed family planning program appears essential to success in achieving rapid fertility decline. Concludes Andrew Kantner, "Asia's newly industrialized countries might not have implemented effective family planning programs without having achieved their current pace of development. On the other hand, development would not likely have occurred as quickly without strong family planning efforts to reduce the rate of population growth."

Asia-Pacific
POPULATION & POLICY

Asia-Pacific Population & Policy reports research of interest to policymakers and other professionals concerned with population and family planning.

Support for this publication is provided by the Office of Population, U.S. Agency for International Development, under a cooperative agreement with the East-West Population Institute, East-West Center.

Editor: Bryant Robey

Correspondence Address:
Population Institute
East-West Center
1777 East-West Road
Honolulu, Hawaii 96848 USA

ISSN 0891-6683

This bulletin is based on the following studies:

Bongaarts, John, W. Parker Mauldin, and James F. Phillips (1990) The demographic impact of family planning programs. *Studies in Family Planning*, Volume 21, No. 6.

Freedman, Ronald (1990) Family planning programs in the third world. *The Annals of the American Academy of Science*, July.

Kantner, Andrew (1991) Fertility Decline in the Newly Industrialized Countries of East and Southeast Asia. Report prepared for the U. S. Agency for International Development. Honolulu: East-West Population Institute, East-West Center.

Mason, Andrew, and Lee-Jay Cho (1991) Population policy. In *Economic Development in the Republic of Korea: A Policy Perspective*, edited by Lee-Jay Cho and Yoon Hyung Kim. Honolulu: East-West Center.

Retherford, Robert D., and James A. Palmore (1983) Diffusion processes affecting fertility regulation. In *Determinants of Fertility in Developing Countries*, edited by Rodolfo A. Bulatao and Ronald D. Lee. New York: Academic Press, Inc.

Previous issues of Asia-Pacific Population & Policy are available upon request:

- No. 9, June 1989 "Policies for Fertility Reduction: Focus on Asia"
- No. 10, September 1989 "Adolescent Sexuality in Asia: New Focus for Population Policy"
- No. 11, December 1989 "Falling Fertility in Indonesia: Success in National Family Planning"
- No. 12, March 1990 "Family Size and Well-Being: Evidence from Thailand"
- No. 13, June 1990 "The Matlab Project: Family Planning Success in Bangladesh"
- No. 14, September 1990 "Asia's Demographic Future: The Next 20 Years"
- No. 15, December 1990 "How Female Literacy Affects Fertility: The Case of India"

Asia-Pacific
POPULATION & POLICY

June 1991 No. 17 Population Institute East-West Center Honolulu, Hawaii

Pakistan's Population Growth: The Need for Action

WITH one of the world's highest population growth rates, Pakistan faces great challenges to achieving fertility reduction. Policymakers in Pakistan have recognized the problem of population growth for years, but fertility remains high. Despite a national family planning program, contraceptive use remains very low. Most couples desire large families, and there are many cultural and religious objections to contraception.

At the current growth rate of about 3 percent annually, Pakistan's population will exceed 150 million by the year 2000, up from about 120 million at present. The population will be more than 280 million by the year 2020 if rates remain at today's levels.

Pakistan is one of the world's poorest countries. Per capita income is under $400 per year, and the economy is growing very slowly. Rapid population growth puts great pressure on agricultural land and hinders prospects for economic and social development.

A strong commitment to fertility reduction, and the national will to carry out an effective family planning program, including changing social attitudes and improving the status of women, are essential to raising living standards and avoiding increasingly serious problems of rapid population growth in the future.

FAO/W. Williams

Improving women's status is one of the keys to reducing fertility in Pakistan.

Pakistan's Population Problem

DESPITE successive development plans that point to the importance of slowing population growth, and despite a family planning program that began in 1965, Pakistan continues to have one of the highest fertility rates in the world. While a number of other developing nations have achieved fertility reductions over the past two decades, Pakistan has not. The average woman in Pakistan still has more than six children, the same as two decades ago.

Because Pakistan already has a large, rapidly growing population, continuing high fertility means that the country faces dramatic increases in population size over the coming decades. Even if each woman were to reduce her fertility to just two children, starting immediately, the country's population still would rise to over 160 million before leveling off. But at the current high fertility rates, the population will rise to over 280 million in only another 30 years and continue growing.

Behind Pakistan's rapid population growth lies the people's strong desire for large families, preference for sons instead of daughters, lack of knowledge of contraceptive methods, and women's low status. "Ignorance, conservatism, fatalism, and religious influence are additional factors exacerbating high fertility rates," according to researchers at the National Institute of Population Studies (NIPS), Islamabad, and the East-West Population Institute (EWPI), Honolulu.

While infant mortality has declined, due to improved public health measures, it remains high in comparison with other countries. In Pakistan, about 100 infants per 1,000 live births die before their first birthday. Half of all deaths in the country occur to infants and children under the age of five. High infant and child mortality means that women must have more births in order to achieve desired family size. Because the death rate is declining faster than the birth rate, the net effect is to speed population growth.

Clearly, Pakistan's birth rate must be rapidly reduced in order to slow the population growth rate. However, only 12 percent of Pakistani couples currently practice contraception, according to the 1985 Contraceptive Prevalence Survey (CPS), about the same percentage as in 1972. Such low contraceptive prevalence implies an enormous task for the national family planning program.

An evaluation of Pakistan's family planning program concluded that administrative and management weaknesses limited success, including "overambitious and unrealistic targets, poor organizational structure, ill-defined communication strategy, lack of commitment and motivation and lack of appropriate research and evaluation." Beyond these deficiencies, "it is possible that the huge effort in Pakistan was, in a socioeconomic development sense, premature," wrote researchers Warren C. Robinson, Makhdoom A. Shah, and Nasra M. Shah in 1981.

A decade later, still, "the environment in Pakistan is not conducive to the successful implementation of a family planning program," according to the NIPS-EWPI report.

A View from Pakistan's Press

"Although it is generally conceded in official quarters in Islamabad that our population growth rate of 3.1 percent is exorbitantly high and has grave implications for the country's socio-economic development and political stability, nothing effective is being done about popularising the small-family norm in our society. . . .

"The key issue is the political will which is sadly missing. . . . No serious effort has been made to create the socio-economic milieu and the condition for women in which family planning can make headway. Literacy continues to be low, the status of women deplorable and poverty rampant. . . . The government has failed to chalk out an efficient strategy, to motivate the people to change their traditional notions and opt for the small-family norm, and to provide sufficient contraceptive services. . . .

"If the government is really concerned about the population problem, it is time it spruced up its contraceptive services. The overly hush-hush approach must be discarded and family planning must be discussed in public forums and its message conveyed more forthrightly to make the people more aware of its significance for the family, the nation and its economic future."

From: Editorial, *Dawn*, Karachi, December 14, 1990

Obstacles to Lower Fertility

A MAJOR impediment to fertility decline in Pakistan is the low status of women in society. "Pakistani women's basic role is to act as good mothers and wives and to derive their status from male kin," according to Shahnaz Kazi and Zeba A. Sathar of the Pakistan Institute of Development

Economics. In Pakistan, as in other countries, women who work in professional jobs have lower fertility than other women. Women with higher status are more likely to be aware of contraceptive methods. In Pakistan, two-thirds of women with at least nine years of education, and those in professional occupations, have some knowledge of contraception, versus only about one-fourth of those with no education, or who are not working. Few women in Pakistan, however, have advanced education or professional roles.

To achieve fertility reduction, more needs to be done to improve access to education and employment for women and to provide women with the means to limit their family size if they wish to do so. One reason Indonesia and Malaysia have higher contraceptive prevalence rates than Pakistan, for example, may be that women have higher status in those societies. Some positive signs for women's status in Pakistan are a rise in the age at marriage and a reduction in the difference between female and male life expectancy. Women's literacy is also improving.

Family Size and Son Preference. On average, women in Pakistan desire five children, a family size that is little changed from two decades ago. The fact that women have more than five births indicates unmet need for contraception. A widespread and powerful preference for sons contributes to high fertility in Pakistan. "The preference for sons is associated with certain social, cultural and economic considerations such as keeping the family name alive and ensuring social and economic security for parents in times of illness, unemployment and old age," according to the NIPS-EWPI report. The costs of rearing additional male children are considered small and the benefits great, especially among poor parents.

Research by demographer Fred Arnold has shown that son preference does not pose a huge barrier to success in family planning programs, because biological chance assures that most couples will bear their desired minimum number of sons and daughters at a relatively low parity. (See *Asia-Pacific Population & Policy* No. 2.) Nevertheless, when son preference is pervasive in society, and couples desire large families, the effect is to elevate fertility rates and increase family size.

Son preference can be overcome when women participate more fully in education and occupational opportunities, and as the economic value of sons versus daughters declines. Other countries, such as Korea and China, have been able to overcome son preference as an obstacle to lower fertility. The NIPS-EWPI report recommends that in Pakistan "the family planning program should combat son preference through motivational and mass educational efforts and campaigns."

Mark Edwards/Still Pictures

Overcoming high fertility requires improvements in maternal and child health and changes in traditional attitudes toward large families and son preference.

Pakistan Total Fertility Rate (TFR) 1975–88

Year	TFR
1988	6.5
1987	6.9
1986	6.9
1985	7.0
1984	6.9
1975	6.3

Source: Pakistan Federal Bureau of Statistics, 1990.

Religious Attitudes. The opposition of Islamic leaders to limiting population growth is a powerful force in some societies, with the notable exception of Indonesia. Pakistan's family planning program was once suspended for two years because of religious opposition. However, other Islamic leaders have supported use of contraception. "Religion-based inhibitions arise out of ignorance of the Islamic position on family planning," according to Zeba Sathar. "Following the example of Bangladesh and Indonesia, Pakistan should induce religious leaders to dispel widespread misconceptions and to support population control as a component of welfare of the Islamic community."

Policy Implications

OVERCOMING the obstacles to fertility reduction will require a commitment from national political, religious, and community leders. Efforts to raise the status of women, improve maternal and child health and living conditions, and change traditional attitudes toward large families and preference for sons are needed. Family planning programs can motivate couples to practice family planning and provide contraceptive methods and services.

Accurate information is essential to an effective fertility reduction strategy. The Pakistan Demographic and Health Survey, which is currently in progress, should offer policymakers a new source of valuable data. This survey is conducted by the NIPS, in collaboration with Pakistan's Federal Bureau of Statistics and the Institute for Resource Development in Columbia, Maryland.

The objective is to provide data on fertility, family planning, child survival, breastfeeding, and maternal and child health to planners and policymakers in Pakistan for use in designing and evaluating programs. Publication of the survey results provides policymakers with a new opportunity to revitalize the family planning program and strengthen efforts to slow the rate of population growth.

Asia-Pacific
POPULATION & POLICY

Asia-Pacific Population & Policy reports research of interest to policymakers and other professionals concerned with population and family planning.

Support for this publication is provided by the Office of Population, U.S. Agency for International Development, under a cooperative agreement with the East-West Population Institute, East-West Center.

Editor: Bryant Robey

Correspondence Address:
Population Institute
East-West Center
1777 East-West Road
Honolulu, Hawaii 96848 USA

ISSN 0891-6683

This bulletin is based on the following studies:

Rukanuddin, Abdul Razzaque, Chai-Bin Park, Minja Kim Choe, and John C. Wilson (1990) Sex Preference, Sex Composition, Fertility and Family Planning in Pakistan. Report prepared for U.S. Agency for International Development. East-West Population Institute, East-West Center, Honolulu.

Dawn, "Taking It Seriously" (1990) Newspaper editorial, December 14, Karachi.

Effects of Rapid Population Growth on Social and Economic Development in Pakistan (1989) RAPID-Pakistan presentation, National Institute of Population Studies and Population Welfare Division, Islamabad.

Kazi, Shahnaz and Zeba A. Sathar (1989) Women's Roles: Health and Reproductive Behaviour. *South Asia Study of Population Policy and Programmes: Pakistan*. United Nations Population Fund, Islamabad.

Sathar, Zeba A. (1989) Demand for Children and Family Planning. *South Asia Study of Population Policy and Programmes: Pakistan*. United Nations Population Fund, Islamabad.

Jillani, M. S. (1987) The Population Policy Imperatives—The Pakistan Experience. National Institute of Population Studies, Islamabad.

Robinson, Warren C., Makhdoom A. Shah, and Nasra M. Shah (1981) The Family Planning Program in Pakistan: What Went Wrong? *International Family Planning Perspectives*, Vol. 7, No. 3.

Previous issues of *Asia-Pacific Population & Policy* are available upon request:

- No. 11, December 1989 "Falling Fertility in Indonesia: Success in National Family Planning"
- No. 12, March 1990 "Family Size and Well-Being: Evidence from Thailand"
- No. 13, June 1990 "The Matlab Project: Family Planning Success in Bangladesh"
- No. 14, September 1990 "Asia's Demographic Future: The Next 20 Years"
- No. 15, December 1990 "How Female Literacy Affects Fertility: The Case of India"
- No. 16, March 1991 "Economic Development and Fertility Decline: Lessons from Asia's Newly Industrialized Countries"