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## squatter settlements in kuala lumpur surveyed

by Peter Pirie

*Editor's Note: Dr. Peter Pirie is Assistant Director for Graduate Study of the East-West Population Institute and Professor of Geography at the University of Hawaii. He spent 1975-77 in Kuala Lumpur as Visiting Professor at the Faculty of Economics and Administration, University of Malaya, establishing the Population Studies Program, supported by the U.N. Fund for Population Activities. During his stay, he organized the survey described in the following article. The interns who carried out the fieldwork while they were third-year students of the Faculty of Economics and Administration, University of Malaya, are Ms. Laila Wati Judin, Mr. Magesprant Sinivasan, Mr. Mohammad Kamal Hariri, Ms. Ng Lee-Kiang, and Ms. Wong Lee-Lan. Pirie compiled the results of the survey and, as a participant in a panel on squatters, presented them at the Third Malaysian Economic Convention held in Penang in August 1976. This condensed version of his paper appears in the newsletter with the permission of the Malaysian Economic Association.*

The proportion of squatter settlers to the total urban population in Kuala Lumpur-Petaling Jaya, currently about 20 percent,<sup>1</sup> has been the cause of increasing concern to the Malaysian authorities burdened with the orderly development of the nation's capital and largest urban center. The very definition of squatters, in terms of illegal occupation of land, implies conflict with the agents of urban government. For any agency to extend services which imply de facto official recognition has been awkward. The attitude of individual civil servants toward working with squatters is usually one of diffidence and apprehension. But the need of squatters for services exceeds that of any other urban group, and in this connection the National Family Planning Board, intending to extend its services to squatter families, requested some assistance from the Faculty of Economics and Administration, University of Malaya, in making a preliminary

sociodemographic survey of a sample of squatter households.

### Research design

The possibility of using the University of Malaya graduation exercise provision as a medium for achieving some immediate results of a pilot-survey nature was considered. As part of the Population Studies Program within the Faculty of Economics and Administration, five students were awarded internships for the months of March-May 1976 to do a survey of one urban squatter settlement each. The five were to coordinate their fieldwork and to use a common series of instruments, in the form of three question schedules. They were also asked to spend most of the three months living in the chosen squatter settlement, so that they would be able to acquire some insight into how it is to be a town-dweller whose lot seems to be forever poverty and insecurity.

Each intern made a choice of a squatter settlement on his own, taking into account linguistic affinity, existing connections or prior knowledge, availability of good entrée, or accessibility. In one case, two interns decided to cooperate and survey together one rather large and difficult settlement, Chan Sow Lin. The other settlements selected were Kampong Haji Abdullah Hukum, Kampong Muniandy, and



*In Kampong Muniandy water supplies for bathing, laundry, drinking, and cooking come from standpipes like this one.*

<sup>1</sup> Wehbring, K., *Squatters in the Federal Territory: Analysis and Program Recommendations*. Report to Urban Development Authority 1976. This report estimated that 153,500 squatters were living in 22,700 housing units in the Federal Territory (Kuala Lumpur), 45 percent of whom were Chinese, 41 percent Malay, and 4 percent Indian, with 10 percent mixed (i.e. not separable given the method of survey employed). One of our settlements, Kampong Muniandy, is outside the Federal Territory in Petaling Jaya.

Kampong Pandan,<sup>2</sup> Although it was found that none of these *kampong* were composed entirely of one communal group, for fieldwork purposes the interns were encouraged to confine themselves to the survey of households speaking their own language or dialect. The surveyed populations therefore are Chinese-speaking (mainly Cantonese and Hakka, but with some Hokkien, Hainanese, and Teochew) in Chan Sow Lin, predominantly Malay in Kampong Haji Abdullah Hukum and Kampong Pandan, and Tamil in Kampong Muniandy. Each intern was asked to include about 100 households, and it was anticipated that the survey would cover 500–600 persons in each *kampong*. A total of about 2,670 persons were actually enumerated.

The selection of the *kampong* and the prescription of 100 households per intern were not made on the basis of any sampling procedure but were based on convenience as far as the intern was concerned and on what seemed like a reasonable workload for one person interviewing full time for approximately two months. While the results are believed to be representative of squatter settlements in the Kuala-Lumpur-Petaling Jaya area, there was no attempt to assess the degree to which this is so.

Assistance in introducing the students to their selected *kampong* was obtained from the National Family Planning Board. In some cases the interns used their own prior connections to obtain the necessary introductions. In each case local political organizations were used to obtain acceptance for the idea of doing a survey and for support for the intern while doing the fieldwork. Contrary to early expectations, little difficulty was encountered in obtaining cooperation from the local leaders, and the students were found accommodation and provided with moral and practical support at an adequate level.

Response from householders was also reasonably good in almost all cases, although the interns reported that lengthy explanations were often necessary to gain the confidence of the persons being interviewed. Anxiety that the interviewers were representatives of the government was particularly

<sup>2</sup> *Kampong* is the Malay word for village or community.

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Mr. P. Padmanabha, Census Commissioner of India (center), confers with correspondent K.K. Chakravorty (left) and East-West Population Institute Director Dr. Lee-Jay Cho (right). See news from India on page 3.

noticeable. Considering the length and complexity of the schedule used, the response must be classed as unexpectedly good. The use of university students—young, eager, obviously sympathetic, and nonthreatening—is a great advantage in doing fieldwork among groups who tend to be understandably suspicious and uncertain. The requirement that the interns live among the squatters also served to reduce anxieties over time about the aims of the survey.

There was some variation in the response according to the communal group being interviewed. The Malays were noted to be the least suspicious and most cooperative. The interns had some anxiety in the early stages about the possibility of being interfered with by lawless elements which reportedly inhabit and sometimes control squatter settlements. In fact one young man who came to visit an intern in the *kampong* was shaken down for a small sum as the price of invading the "territory," but in general fieldwork was not hampered by criminal interference.

The first phase of the survey was concerned with training, the acquisition of background on previous work among the urban poor in Malaysia and elsewhere, and developing the schedules of questions to be asked. The personnel of the National Family Planning Board were particularly helpful in this phase of the work.

The next phase was the delimitation of boundaries of each *kampong* and the plotting and numbering of each separate household on a map. A household was defined as a group of persons usually living together and sharing the same eating arrangements. In some instances a single building was found to be inhabited by more than one household. The survey was essentially a de jure type, in which all persons normally resident were included and visitors omitted. After the *kampong* households were located and numbered, one hundred were randomly selected as subjects for the survey.

An individual, a household, and an adult schedule were developed for the survey. The individual schedule, completed for each member of a household, covered questions on age, sex, relationship to head of household, ethnic group, duration of residence, place of birth, marital status, place of birth of own father, place of birth of own mother, places of previous residences, religion, education type and level attained, employment status, and fertility (for women 15 years old and over). The household schedule, completed for each household unit, included questions on age of building; floor area; number of rooms; improvements or additions to original building; type of construction; furnishing; distance

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# enumerations . . .

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## FIJI

- Correspondent Ratilal N. Lodhia, Government Statistician and Census Commissioner of Fiji, writes that the first volume of the report on the 1976 Census of Fiji, containing definitions and tables, will be available by the end of February. The second volume, which will include a preliminary analysis of the data from the census, is scheduled to be published by June 1978.

During 1977, a nationwide sample Household Income and Expenditure Survey was undertaken by the Bureau of Statistics. The 1976 Census frame was used for the survey, and households were listed independently in the sample enumeration areas so that the survey could be used as a postenumeration check for the census.

## HONG KONG

- Mr. Joseph M.K. Lee writes from Hong Kong that the main report of the 1976 By-Census is currently being prepared and will be published this summer. It will contain detailed analysis and interpretation of the By-Census results in the following areas: basic demographic characteristics, marriage and fertility, educational characteristics, economic characteristics, labor utilization, marine population, household characteristics, housing characteristics, and internal movements. Already available are *Basic Tables: 1976 By-Census* and *A Graphic Guide: 1976 By-Census*.

New population projections, based on results from the By-Census, more up-to-date birth and death statistics, and information on migration, will be published in April of this year.

## AUSTRALIA

- Mr. Brian Doyle, correspondent from Australia, sent a progress report on the processing of the 1976 Census of Australia. The sample selection was completed in December 1977. Initial tabulations on family and internal migration, educational institutions and qualifications, occupation status and occupation, and industry and destination zone have also been completed. Document marking, editing and balancing, and evaluation are still in progress. By the end of February the first release of summary tapes covering the Northern Territory, the Australian Capital Territory, and Tasmania is expected.

## INDIA

- Indian correspondent Mr. K.K. Chakravorty sent some biographical data on Mr. Shri P. Padmanabha, who was appointed to the position of Registrar General and Census Commissioner of India in October. Mr. Padmanabha is an honors graduate in science, with a diploma in economic and social administration from the London School of Economics and Political Science. He has held various senior positions in the government of Karnataka State, one of the major states of the Indian Union, including Director of Plan Evaluation and Manpower, Director of the Bureau of Economics and Statistics, Additional Secretary for Education, Food Commissioner, and Financial Commissioner. Mr. Padmanabha conducted the 1971 Census in Karnataka State and served concurrently as Director of Census Operations in that state from 1968 to 1971.

## AFGHANISTAN

- Correspondent Mohammad Akbar Kargar reports that preparatory work for the first national census ever to be conducted in Afghanistan is progressing according to schedule. Two pretests and a pilot census have been carried out. The pilot, in which 75,000 people were enumerated in nine different parts of the country in October 1977, is being used to test all procedures, particularly those related to data processing and tabulation. The actual enumeration is scheduled for September 1978.

## JAPAN

- According to Mr. Shotaro Yanagawa, Deputy Chief of the Population Census Section of Japan's Bureau of Statistics, the latest report on the 1975 Population Census of Japan, released in January 1978, is Vol. 4, No. 1: *Commutation*, which contains detailed results of the commuting population. Scheduled to be published by the end of March 1978 is Vol. 5: *Detailed Tabulation (Twenty-Percent Sample Tabulation): Prefectures*. Volume 5 will contain the detailed results of major subjects of the census inquiries for 26 prefectures. The results for the rest of the prefectures and finally for whole Japan are expected to be available by September 1978.

## REPUBLIC OF KOREA

- Correspondent Heun Jeh Bang, formerly Deputy Director for Statistical Coordination in the Korean Bureau of Statistics, is now with the Korean Embassy in Switzerland. His replacement as newsletter correspondent is Mr. Young-Kwon Kim, Director of the Population Statistics Division of the Bureau of Statistics. Mr. Kim sent a progress report on the tabulation and publication of data from Korea's 1975 Census. *A Preliminary Count of the 1975 Population and Housing Census*, showing the number of persons and housing units by minor administrative divisions, and *Advance Report of the 1975 Population and Housing Census*, based on a 5 percent sample tabulation, were released in 1976. The final report on primary characteristics of the population based on all enumeration items has also been published in 12 volumes: a volume for the whole country, containing nine population and eight housing tables, and one volume for each of the 11 provinces, containing 12 tables on population and housing characteristics with more detailed classification of administrative divisions. The final report on sample enumeration items is expected to be released by June 1978.

## MALAYSIA

- Mrs. Jean Pala of Malaysia's Department of Statistics writes that the *General Report on the 1970 Population Census of Malaysia* has been released. The report, in two volumes, provides some analysis of population trends, community groups, education and literacy, fertility, migration, labor force, and other socioeconomic characteristics. Volume 2 contains tables at the total country level. This report follows earlier reports containing general housing tables by state and for towns, villages, and local council areas and basic population tables by state. The cost of the two volumes in the general report is M\$20.

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from nearest and furthest neighbor; provision of amenities such as electricity, water, waste disposal, and deliveries; characteristics of the site; environmental problems; occupation status of land and ownership of house, including costs involved; and level of possessions. The adult schedule, asked of the heads of households, wives, and other responsible adults 18 and over, concerned the individual life styles and problems of squatters. It covered such topics as organizations belonged to, ascription of leadership, availability of assistance in times of need, types of transportation used, distances from household to workplace and to relatives, perception of well-being, possibility for improvement, propensity to move under specified conditions, knowledge of family planning, and relationship with the government.

### Characteristics of the squatter household

The description of the *kampung* as squatter settlements was verified by the replies to a question on form of land tenure. In all four the land occupied nominally belongs to the government.

Chan Sow Lin was exceptional in its antiquity. Nearly 60 percent of the houses were over 20 years old, and many were over 30. Some are now scheduled for removal and the area is to be redeveloped, but the occupants are to be paid some compensation. Payments to illegal occupants forced to move will strike some as the tacit bestowal by the authorities of belated land rights.<sup>3</sup> Houses in Kampong Muniandy had an average age of about eight years, Kampong Pandan ten years, and Kampong Haji Abdullah Hukum 12 years. In general fewer than 10 percent of the houses were under two years old.

The acquisition of a house in a squatter area may be achieved in several ways. In the more recently established, the majority have either built the house themselves or commissioned its construction by an entrepreneur. Another method is to buy an existing house and the implied "right" to the land it occupies; about a fifth of all the houses surveyed were acquired used. Another alternative is to rent from the owner. Again an entrepreneurial element is involved here. Some landlords make a regular business of this and own several houses in these areas. Renting was most prevalent in the older Chan Sow Lin area.

3 In this connection it should perhaps be noted that under some legal systems covering land tenure, but not that in Malaysia, unchallenged occupation for periods such as 20 years, or even less, gives the occupant permanent rights to ownership.



Most of the houses in the squatter settlements are only a few feet apart. This street scene of Kampong Muniandy is typical of all four settlements.

Where purchase costs could be established, the average seemed to be about M\$600,<sup>4</sup> with about M\$2,000 being the maximum price. It was difficult to find anything for under M\$200. Rental payments, where these were made, were about M\$18 on the average in Chan Sow Lin, M\$24 in Kampong Muniandy, M\$29 in Kampong Haji Abdullah Hukum, and M\$31 in Kampong Pandan. Buying a house usually involves cash, and no case was found where mortgages or regular payments on loans using the house as security were made. Professional money-lending is sometimes involved, but more often relatives are called upon for informal loans.

The average squatter house was found to be about 450 sq. ft. (42 sq. meters). It is quite common for householders to make additions or substantial improvements to their houses, with half of those in Kampong Pandan and 40 percent in Kampong Muniandy claiming to have done this.

While the provision made by the squatters themselves is often adequate in terms of living space, external services, particularly of the municipal kind, are almost entirely lacking. Water main supplies are extremely rare but sometimes occur if the houses are located along a main road. Everyone else depends on carrying water from public standpipes or wells. Municipal electricity is also unusual, with only about 5 percent so supplied, but an additional 8 percent have installed their own generators. The rest have no electric power. Modern waste disposal is similarly lacking. Postal deliveries are erratic. Some households in Chan Sow Lin (6 percent) and Kampong Haji Abdullah Hukum (19 percent) have regular deliveries. In Chan Sow Lin an additional 27 percent get letters only if they are from an official source! Telephones are almost entirely absent.

Provision of services by the private sector is much superior to that from the government. Bread, meat, fish, vegetables, cooked foods, ice cream, groceries, and other sundries are all available to most households on a regular basis or at least frequently by itinerant hawkers. Lack of demand seems to be the only limitation, as in the case of newspaper deliveries for instance.

The absence of basic public utilities affects access to several modern amenities. Refrigerators, for instance, are very rare, with only 3 percent of the households surveyed owning them. This is partly related to the lack of electricity, although the possibility of using the kerosene variety would indicate that inability to pay is the more important limitation. Pressure lamps as a substitute for electric light are owned by about 80 percent of all households. Most households have some form of radio. Not unexpectedly, television is much rarer, but about 10 percent of all households have it.

Access to modern transportation is fairly prevalent. In Chan Sow Lin, 16 percent of the households have a car, 45 percent have a motorcycle or scooter, and 74 percent have a bicycle. In the other settlements, car ownership is not so widespread, but 8 percent of households in Kampong Pandan and 3 percent in Kampong Muniandy have a car. Motorcycles or scooters are found in 41 percent of the Kampong Pandan households and in 30 percent of those in Kampong Muniandy. The inhabitants of Kampong Haji Abdullah Hukum and Kampong Muniandy are noticeably worse off for motorized transport than the other two.

A characteristic of squatter settlements in general has been crowding and congestion, and those in the Kuala

4 One dollar U.S. is about 2.4 Malaysian dollars.

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## SINGLE-YEAR COMPUTATIONAL PROCEDURES USED IN THE OWN-CHILDREN METHOD OF FERTILITY ESTIMATION

by Robert D. Retherford

### Introduction

The own-children method is a census- or survey-based reverse-survival technique for estimating age-specific fertility for years previous to enumeration. Enumerated children are first matched to mothers within households from answers to questions on relation to head of household, age, sex, marital status, and number of children surviving (or ever born, if the latter question is lacking). These matched (i.e., own) children, classified by own age and mother's age, are reverse-survived to estimate births by age of mother in previous years. Reverse-survival is similarly used to estimate women by age in previous years. After adjustments are made for incorrect enumeration and unmatched (non-own) children, age-specific birth rates are calculated by dividing the first figure by the second. Typically the technique is applied to census data, and estimates are calculated for each of the previous ten to fifteen years. The technique and its application to the United States, Korea, Malaysia, Indonesia, and the Philippines have been elaborated in a series of publications dating back to 1965 (Grabill and Cho 1965; Cho 1968; Cho, Palmore, and Saunders 1968; Cho and Hahm 1968; Cho 1969; Cho, Grabill, and Bogue 1970; Cho 1970, 1971a, 1971b, 1971c, 1973, 1975; Cho et al. 1976; Engracia et al. 1977; Retherford and Bennett 1977; Retherford and Cho 1978).

Basic computations are all done by single years of age and time; i.e., reverse-survived births and women are computed by single years of age for each calendar year previous to the census. Single-year age-specific birth rates are obtained as quotients of these two quantities. Age-specific birth rates in five-year age groups over one or more calendar years are easily obtained by dividing the appropriate sum of births by single years of age and time by the appropriate sum of women by single years of age and time.

Since own-children analysis normally begins with a household record tape, there is no particular difficulty in obtaining tabulations of women by age in single years and children by own age and mother's age in single years. A problem usually arises, however, in obtaining life tables by single years of age for each of the ten to fifteen years previous to the census for use in reverse-survival. Normally life tables are available only in conventional abridged life table age groups 0, 1-4, 5-9, . . . , 80-84, and 85+ for selected years in the precensal period. In such cases it is necessary to interpolate a set of abridged life tables for intermediate calendar years and then to interpolate these abridged life tables to single years of age. The procedures by which these interpolations are accomplished form the focus of this note.

### Interpolation of abridged life tables for intermediate years

Linear interpolation of abridged life tables for intermediate calendar years is carried out on the life table  ${}_nq_x$  (life table probabilities of dying between ages  $x$  and  $x+n$ ). Values of  $l_x$  (survivors) at abridged ages are then computed for each intermediate calendar year as  $l_{x+n} = l_x (1 - {}_nq_x)$ .

Values of  $L_0$  and  $L_{85+}$  (person-years lived in the first year of life and at ages 85 and over) are also linearly interpo-

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lated for intermediate calendar years. Values of  $L_x$  in single years of age for ages 1-84 are determined by procedures described later in this note.

### Interpolation of abridged life tables to single years of age

To interpolate the  $l_x$  values in each abridged life table to single years of age, a regression approach is used for ages 1-4 and a matrix approach to polynomial interpolation (Feeney 1974) for subsequent five-year age groups. Single-year values of  $L_x$  for ages 1-84 are obtained from the single-year values of  $l_x$ .

### Interpolation of ages 1-4

In this case we are given  $l_1$  and  $l_5$  and would like interpolated values of  $l_2$ ,  $l_3$ , and  $l_4$ . Polynomial interpolation (e.g., by means of a cubic) is unsatisfactory because it does not adequately capture the unusual curvature of the  $l_x$  curve owing to rapidly declining  $l_x$  in the second year of life followed by much more slowly declining  $l_x$  at subsequent ages. We therefore make recourse to a regression procedure developed by Coale and Demeny (1966:23).

According to this method, weights  $a_2$ ,  $a_3$ , and  $a_4$  are determined so that  $l_x = a_x l_1 + (1 - a_x) l_5$ . Values of  $a_x$  are given by Coale and Demeny for each of the four model life table families (West, North, East, and South), but we use only the West values. When  $q_0 \geq 0.100$ , constant values of  $a_2$ ,  $a_3$ , and  $a_4$  are used, 0.489, 0.260, and 0.112 for females and 0.484, 0.258, and 0.110 for males. When  $q_0 < 0.100$ , variable weights  $a_x^*$  are used, of the form  $a_x^* = a_x + b_x (0.100 - q_0)$ . The values of  $b_2$ ,  $b_3$ , and  $b_4$  are 0.656, 0.601, and 0.370 for females and 1.353, 1.089, and 0.571 for males.

### Interpolation of ages 6-9

A matrix approach to polynomial interpolation is used for this age group (Feeney 1974). The basic idea of the procedure is to fit a cubic through the abridged  $l_x$  values  $l_4$ ,  $l_5$ ,  $l_{10}$ , and  $l_{15}$  and then to read values of  $l_6$ ,  $l_7$ ,  $l_8$ , and  $l_9$  from the fitted curve. (The value of  $l_4$  is determined by the procedure described in the previous section.) The form of the curve is

$$l(x) = a_0 + a_1 x + a_2 x^2 + a_3 x^3 \quad (1)$$

(Although the same notation is used, the coefficients  $a_x$  in this equation are unrelated to the weights  $a_x$  of the previous section.)

To simplify the problem we first translate ages by subtracting five from all ages. Age five then becomes age zero. This coordinate transformation has no effect on the ultimate result; indeed, any number could be subtracted from each age without affecting the final outcome. We shall, however, retain the original untranslated ages as subscripts of the  $l$ 's.

$$\left. \begin{aligned} l_4 &= a_0 + a_1(-1) + a_2(-1)^2 + a_3(-1)^3 \\ l_5 &= a_0 \\ l_{10} &= a_0 + a_1(5) + a_2(5)^2 + a_3(5)^3 \\ l_{15} &= a_0 + a_1(10) + a_2(10)^2 + a_3(10)^3 \end{aligned} \right\} \quad (2)$$

In matrix notation, equations (2) may be written

$$l_G = C_0 A \quad (3)$$

where  $l_G$  (subscript G denoting given) is the column vector

$$l_G = \begin{pmatrix} l_4 \\ l_5 \\ l_{10} \\ l_{15} \end{pmatrix} \quad (4)$$

$C_0$  is the matrix of coefficients

$$C_0 = \begin{pmatrix} 1 & -1 & 1 & -1 \\ 1 & 0 & 0 & 0 \\ 1 & 5 & 25 & 125 \\ 1 & 10 & 100 & 1000 \end{pmatrix} \quad (5)$$

and  $A$  is the column vector

$$A = \begin{pmatrix} a_0 \\ a_1 \\ a_2 \\ a_3 \end{pmatrix} \quad (6)$$

If the value of  $A$  is known, we may obtain interpolated single-year values of  $l_x$  from equation (1) as follows:

$$\left. \begin{aligned} l_6 &= a_0 + a_1(1) + a_2(1)^2 + a_3(1)^3 \\ l_7 &= a_0 + a_1(2) + a_2(2)^2 + a_3(2)^3 \\ l_8 &= a_0 + a_1(3) + a_2(3)^2 + a_3(3)^3 \\ l_9 &= a_0 + a_1(4) + a_2(4)^2 + a_3(4)^3 \end{aligned} \right\} \quad (7)$$

which can be written in matrix form as

$$l_I = C_1 A \quad (8)$$

(subscript I denoting interpolated), where the three quantities in this equation are defined in a way parallel to equations (4) through (6).

If we denote the matrix inverse of  $C_0$  as  $C_0^{-1}$ , we may combine equations (3) and (8) to give

$$l_I = (C_1 C_0^{-1}) l_G \quad (9)$$

If we denote the matrix of multipliers ( $C_1 C_0^{-1}$ ) simply as  $M$ , then equation (9) can be written even more simply as

$$l_I = M l_G \quad (10)$$

The matrix  $M$  of multipliers is easily calculated, since  $C_0$  is of a simple numerical form given by equation (5) and  $C_1$  of an equally simple form given as the matrix of numerical coefficients of equations (7). It is unnecessary to compute the vector  $A$ .

#### Interpolation of ages 11–79

In this case we fit the cubic in equation (1) through  $l_{x-5}$ ,

$l_x$ ,  $l_{x+5}$ , and  $l_{x+10}$ , for  $x = 5, 10, \dots, 75$ , and we obtain interpolated values of  $l_{x+1}$ ,  $l_{x+2}$ ,  $l_{x+3}$ , and  $l_{x+4}$  from the fitted curve.

To simplify computations we first translate ages by subtracting  $x$  from all ages, so that age  $x$  becomes age zero. As before, the translation has no effect on the result. We again retain the original untranslated ages as subscripts of the  $l$ 's.

$$\left. \begin{aligned} \text{It then follows from equation (1) that} \\ l_{x-5} &= a_0 + a_1(-5) + a_2(-5)^2 + a_3(-5)^3 \\ l_x &= a_0 \\ l_{x+5} &= a_0 + a_1(5) + a_2(5)^2 + a_3(5)^3 \\ l_{x+10} &= a_0 + a_1(10) + a_2(10)^2 + a_3(10)^3 \end{aligned} \right\} \quad (11)$$

which can again be written in matrix notation as

$$l_G = C_0 A \quad (12)$$

We have also

$$\left. \begin{aligned} l_{x+1} &= a_0 + a_1(1) + a_2(1)^2 + a_3(1)^3 \\ l_{x+2} &= a_0 + a_1(2) + a_2(2)^2 + a_3(2)^3 \\ l_{x+3} &= a_0 + a_1(3) + a_2(3)^2 + a_3(3)^3 \\ l_{x+4} &= a_0 + a_1(4) + a_2(4)^2 + a_3(4)^3 \end{aligned} \right\} \quad (13)$$

which can again be written in matrix notation as

$$l_I = C_1 A \quad (14)$$

Equations (12) and (14) can be combined as before to give equation (10).

Although the same notation is used in equations (12) and (14) as in equations (3) and (8), the quantities symbolized in the two cases are of course different and should not be confused. Identical notation is used both to highlight similarities in underlying logic and to achieve economy in presentation.

#### Interpolation of ages 81–84

In this case we fit the cubic in equation (1) through  $l_{70}$ ,  $l_{75}$ ,  $l_{80}$ , and  $l_{85}$  and obtain interpolated values of  $l_{81}$ ,  $l_{82}$ ,  $l_{83}$ , and  $l_{84}$  from the fitted curve. Age 80 is translated to age 0. We have

$$\left. \begin{aligned} l_{70} &= a_0 + a_1(-10) + a_2(-10)^2 + a_3(-10)^3 \\ l_{75} &= a_0 + a_1(-5) + a_2(-5)^2 + a_3(-5)^3 \\ l_{80} &= a_0 \\ l_{85} &= a_0 + a_1(5) + a_2(5)^2 + a_3(5)^3 \end{aligned} \right\} \quad (15)$$

and

$$\left. \begin{aligned} l_{81} &= a_0 + a_1(1) + a_2(1)^2 + a_3(1)^3 \\ l_{82} &= a_0 + a_1(2) + a_2(2)^2 + a_3(2)^3 \\ l_{83} &= a_0 + a_1(3) + a_2(3)^2 + a_3(3)^3 \\ l_{84} &= a_0 + a_1(4) + a_2(4)^2 + a_3(4)^3 \end{aligned} \right\} \quad (16)$$

Again these two sets of equations may be reduced to the form of equation (10) by the logic described in the previous two sections. Note that the end panel of multipliers obtained by this procedure is the same even if the life table ends at an age other than 85. This is true because the matrices  $C_0$  and  $C_1$  are unaffected by the age at which the abridged life table is terminated.

It is evident that the matrix formulation of polynomial interpolation simplifies formulae, making the procedure easier to grasp, and simplifies computations by allowing the use of general electronic computing routines for matrix algebra.

*Calculation of single-year  $L_x$  from single-year  $l_x$*

For all single-year age groups except zero, we have

$$L_x = \frac{1}{2} (l_x + l_{x+1}) \quad (17)$$

Values of  $L_0$  and  $L_{85+}$  are given from the abridged life tables.

Once values of  $l_x$  and  $L_x$  are obtained by single years of age, the calculation of the remainder of the single-year life tables is straightforward (e.g., see Barclay 1958:Ch. 4).

**Table 1 Multiplier matrices for interpolation of abridged life tables to single years of age**

|             |           |           |          |           |
|-------------|-----------|-----------|----------|-----------|
| First panel | -0.545455 | 1.440000  | 0.120000 | -0.014545 |
|             | -0.727273 | 1.440000  | 0.320000 | -0.032727 |
|             | -0.636364 | 1.120000  | 0.560000 | -0.043636 |
|             | -0.363636 | 0.600000  | 0.800000 | -0.036364 |
| Mid-panel   | -0.048000 | 0.864000  | 0.216000 | -0.032000 |
|             | -0.064000 | 0.672000  | 0.448000 | -0.056000 |
|             | -0.056000 | 0.448000  | 0.672000 | -0.064000 |
|             | -0.032000 | 0.216000  | 0.864000 | -0.048000 |
| End panel   | 0.032000  | -0.176000 | 1.056000 | 0.088000  |
|             | 0.056000  | -0.288000 | 1.008000 | 0.224000  |
|             | 0.064000  | -0.312000 | 0.832000 | 0.416000  |
|             | 0.048000  | -0.224000 | 0.504000 | 0.672000  |

NOTE: The first panel of multipliers is used to compute interpolated values of  $l_x$  for ages 6-9, the mid-panel for ages 11-69, and the end panel for ages 71-74. Although in the present application to Thailand the given abridged life table terminates at 75, we may note in general that the multiplier matrices are unaffected by the age at which the abridged life table terminates. See text for elaboration of this point.

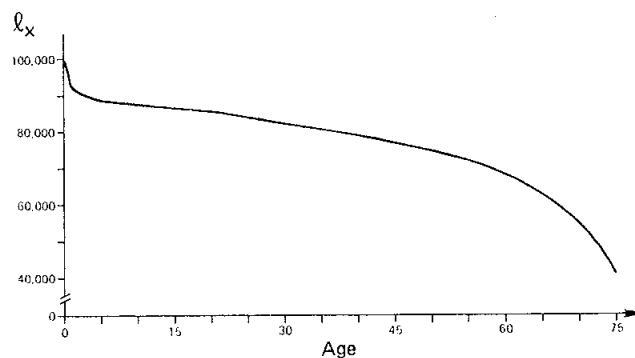
**Application**

The above methodology is applied to interpolate the abridged life table for females from the 1964-65 Survey of

Population Change in Thailand, as revised by the Thailand National Statistical Office in 1974. This life table terminates at age 75 instead of 85. The ten-year difference in termination age, however, has no effect on the multiplier matrices, which are shown in Table 1. In this case, the first panel provides interpolated values of  $l_x$  for ages 6-9, the mid-panel for ages 11-69, and the end panel for ages 71-74.

We observe that in the hypothetical case where all  $l_x$  values are identically equal to one, all the interpolated values must equal one too. This fact implies a convenient check on the computation of multiplier matrices, namely, that entries in each row must sum to unity. This is readily verified for each of the three matrices in Table 1.

Figure 1 shows single-year values of  $l_x$  interpolated from the abridged life table in Table 2. The last column of Table 2 shows the ratio  ${}_nL_x^*/{}_nL_x$ , where  ${}_nL_x^*$  is summed from the derived single-year values of  $L_x$  over the period  $x$  to  $x+n$ . These ratios are very close to unity, except for ages



**Figure 1 Single-year values of  $l_x$  interpolated from the abridged life table for females in Thailand: 1964-65**

**Table 2 Abridged life table for females in Thailand: Survey of Population Change, 1964-65**

| Age   | $q_x$   | $l_x$   | $d_x$  | ${}_nL_x$ | $T_x$     | $e_x$ | ${}_nL_x^*/{}_nL_x$ |
|-------|---------|---------|--------|-----------|-----------|-------|---------------------|
| 0     | .07534  | 100,000 | 7,534  | 94,726    | 6,203,892 | 62.0  | 1.00000             |
| 1-4   | .03975  | 92,466  | 3,676  | 347,448   | 6,109,166 | 66.1  | 1.03702             |
| 5-9   | .01490  | 88,790  | 1,323  | 441,000   | 5,761,718 | 64.9  | 0.99736             |
| 10-14 | .01337  | 87,467  | 1,169  | 434,573   | 5,320,718 | 60.8  | 0.99939             |
| 15-19 | .00931  | 86,298  | 803    | 429,412   | 4,886,145 | 56.6  | 1.00041             |
| 20-24 | .01991  | 85,495  | 1,702  | 423,631   | 4,456,733 | 52.1  | 0.99935             |
| 25-29 | .01805  | 83,792  | 1,512  | 415,385   | 4,033,102 | 48.1  | 0.99954             |
| 30-34 | .02163  | 82,280  | 1,780  | 407,323   | 3,617,717 | 44.0  | 0.99902             |
| 35-39 | .01716  | 80,500  | 1,381  | 399,133   | 3,210,394 | 39.9  | 1.00003             |
| 40-44 | .02871  | 79,119  | 2,272  | 390,378   | 2,811,261 | 35.5  | 0.99938             |
| 45-49 | .03245  | 76,847  | 2,494  | 378,452   | 2,420,883 | 31.5  | 0.99883             |
| 50-54 | .03109  | 74,353  | 2,312  | 366,403   | 2,042,431 | 27.5  | 0.99979             |
| 55-59 | .05813  | 72,041  | 4,188  | 350,460   | 1,676,028 | 23.3  | 0.99966             |
| 60-64 | .07842  | 67,853  | 5,321  | 326,843   | 1,325,568 | 19.5  | 0.99944             |
| 65-69 | .12246  | 62,532  | 7,658  | 294,652   | 998,725   | 16.0  | 1.00143             |
| 70-74 | .23893  | 54,874  | 13,111 | 242,706   | 704,073   | 12.8  | 1.00697             |
| 75    | 1.00000 | 41,763  | 41,763 | 461,367   | 461,367   | 11.0  | 1.00000             |

NOTE: In the last column  ${}_nL_x^*$  denotes values aggregated from derived single-year values of  $L_x$  that are not shown.

SOURCE: Revised by Thailand National Statistical Office, October 2, 1974. Mimeographed.

1--4, where the discrepancy is about 4 percent. It is difficult to assess the cause of this discrepancy without more information about the original method of estimating  $dL_1$ . Since the effect on the ultimate own-children fertility estimates is considerably less than 4 percent, however, the question is of little importance in the present context. □

### ACKNOWLEDGMENTS

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(continued from page 4)

Lumpur-Petaling Jaya area follow this trend but are not excessive in this respect. For the most part the houses are built close together, but the density of persons to land area is not very high. The nearest neighbors are less than a yard (.91 meters) away on the average in Kampong Muniandy, and in 36 percent of all cases, no distance at all, the houses being built right against one another. The fire hazard in such situations is acute. In Kampong Pandan the situation is slightly better; it is very unusual for houses to be built one against the other, but 93 percent have less than six feet (1.8 meters) separating them from their nearest neighbor. The dispersal in Chan Sow Lin is slightly greater but the average is still quite low at about two yards (1.8 meters). Other environmental problems mentioned frequently included proneness to flooding, drainage in general, mud, dust, noise, and inaccessibility by car.

Distance from major amenities was not seen as a problem by most of the households surveyed. Few children had to go more than one and a half miles to school. Marketing facilities were also close at hand, never more than one and a half miles from any household. In Chan Sow Lin and Kampong Muniandy however, the distance to clinics or other forms of medical assistance was more than three miles.

One alleged advantage of squatting is that the distance to workplace can be minimized, while one of the objections to relocation is often that the distance to existing employment is excessively increased. This situation was not very well borne out by the survey. While the persons who travel to work from Chan Sow Lin, which is itself located in a heavily industrialized area, were mostly (64 percent) within a mile of their workplace, those in the other three *kampong* were on the average considerably further away. In Kampong Pandan 21 percent traveled more than five miles a day to work.

The structure of squatter households is predominantly of the nuclear type—that is, with the head of household (in this case normally the husband), wife, and own children; the proportion is similar in all *kampong*. Extended families, including parents of the head or spouse, were also found to be quite common, as were households in which other miscellaneous relatives were included. Living alone or with only a spouse was very unusual. Households containing children but only one parent, a frequent feature of squatter settlements in some locations, were not usual either, although 11 percent of all households in Chan Sow Lin were this type.

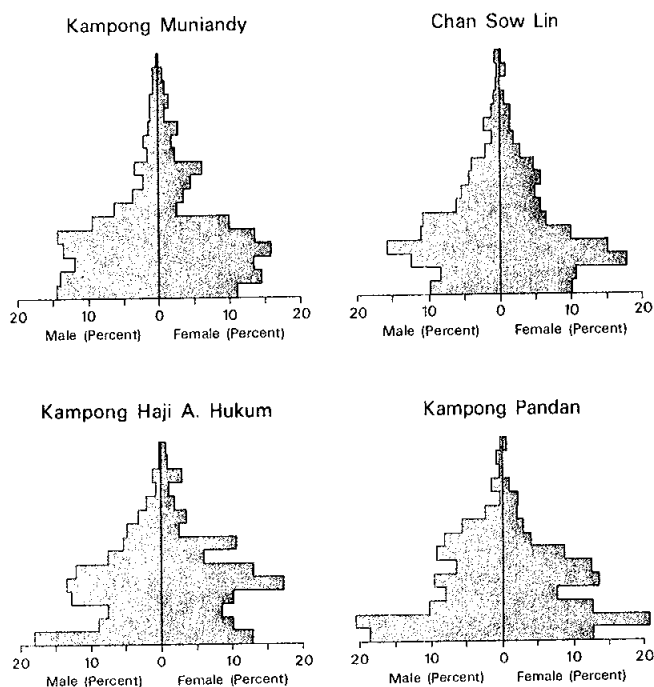
### Characteristics of the population

The origin of the squatter population in these *kampong* is surprisingly urban, given the common assumption that the whole phenomenon is principally a result of rural to urban drift. The urban origins are particularly noticeable among the inhabitants of Chan Sow Lin (76 percent). Even in Kampong Pandan 30 percent were born in Kuala Lumpur. Less than 1 percent of those classified as Malays claimed to have been born in Indonesia, but the number of Tamils and Chinese born in the parent country was appreciable. Responses to questions on previous places of residence showed a similar urban stress except for the inhabitants of Kampong Pandan; in this settlement, 55 percent of those who had moved in came directly from a rural *kampong*, but even in this village the single largest source of persons was elsewhere in Kuala Lumpur. In the case of Kampong Muniandy, the largest proportion of incoming persons had come from another urban situation (52 percent), but this was the only *kampong* to draw a considerable proportion of its inward migrants from rural estates (31 percent).

The squatter population did not prove to be very mobile. Approximately half of those living in Chan Sow Lin had *never* lived anywhere else. The relative stability of the settlements is also emphasized by the data on length of stay in the community. Although Kampong Pandan shows some evidence of short-term residence (15 percent less than one year), possibly evidence of circular migration, the duration of residence in each *kampong* is well over five years on the average, with Chan Sow Lin again showing most evidence of very durable residence (13 percent over 25 years).

The age structure of the *kampong* reflected this variation in duration of stay, with Chan Sow Lin showing a more mature population in terms of age than the others, the mean age for males for instance being nearly 25. The population of Kampong Pandan is considerably younger in structure.

Although the numbers enumerated in each *kampong* are so small that random variations for which no processual explanations can be offered will be characteristic, the age and sex structures shown are interesting and instructive (Figure 1). In no case, for instance, does the structure follow the classic pyramidal pattern. Instead, marked contraction is obvious at some of the lower age groups, least obvious but present in the case of Kampong Pandan, and most obvious in Chan Sow Lin.



**Figure 1** Age and sex profiles in five-year age groups: squatter areas in Kuala Lumpur-Petaling Jaya, 1976

There are several possible explanations for this phenomenon. One is the likelihood of underenumeration. This has been noted in past enumerations in Malaysia, particularly at age 0, and there is evidence, from the direction of the discrepancies between responses to the question on age where the answer was 0 years and questions asked of mothers about births in the preceding 12 months, of some underenumeration in this count. However, the combination of underenumeration and possibly some misstatement of age is insufficient to account for the smaller than expected numbers in the youngest age group in Chan Sow Lin, Kampong Muniandy, and to a lesser extent in the two predominantly Malay *kampong*. Another possibility is that the

age and sex structure is deficient in females of reproductive age, so that in turn the number of children produced is reduced. This is not reflected in the small differences in proportion of women in the 15-49 age range observed nor in the direction of their variation (Table 1).

**Table 1** Child-woman ratio: squatter areas in Kuala Lumpur-Petaling Jaya, 1976

| Kampong      | Number of children 0-4 | Proportion of children 0-4 in total population (%) | Number of women 15-49 | Proportion of women 15-49 in total population (%) | CWR* |
|--------------|------------------------|--|-----------------------|---|------|
| Muniandy     | 79                     | 12.3   | 169                   | 26.4  | 467  |
| Chan Sow Lin | 106                    | 9.6  | 285                   | 25.7  | 372  |
| Hj. A. Hukum | 64                     | 15.8   | 106                   | 26.2  | 604  |
| Pandan       | 81                     | 15.7   | 125                   | 24.2  | 648  |

$$* \text{CWR} = \frac{\text{Number of children 0-4}}{\text{Number of women 15-49}} \times 1000.$$

NOTE: The CWR for Peninsular Malaysia in 1970 was 681.

The other possibility is that fertility is declining in these settlements. That this is likely to be so is reflected in the child-woman ratio (CWR). There are large differences among the ratios for the *kampong*. All are below the average for Peninsular Malaysia (1970) as a whole, that for Chan Sow Lin dramatically so. While this ratio is an indirect reflection of recent fertility, it has been found to correlate highly with more precise measures. The size of the populations involved here is too small to permit this measure to be accepted as an indicator of actual fertility of the population from which the samples were taken, but the low levels observed, particularly in Chan Sow Lin, are of the order found in countries of established low fertility.<sup>5</sup> The variations among the *kampong* are also suggestive. Information on fertility was gathered from women over 15, who were asked the number of children they had ever borne. The results, in Table 2, although affected by the same problems of small

**Table 2** Number of children ever born by age of mother in five-year age groups: squatter areas in Kuala Lumpur-Petaling Jaya, 1976

| Kampong      | Age of mother |       |       |       |       |       |       |
|--------------|---------------|-------|-------|-------|-------|-------|-------|
|              | 15-19         | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 |
| Muniandy     | 0.10          | 0.8   | 3.3   | 3.9   | 5.5   | 6.8   | 7.7   |
| Chan Sow Lin | 0.05          | 0.4   | 2.1   | 2.8   | 4.2   | 4.7   | 5.8   |
| Hj. A. Hukum | 0.06          | 0.9   | 2.2   | 3.3   | 5.2   | na    | na    |
| Pandan       | 0.00          | 1.2   | 2.7   | 3.4   | 4.7   | 5.7   | 4.2   |

na—not available.

sample size, are also instructive. The performance of women of recently completed fertility reflects the levels applying one to two decades ago, with the Malay component showing fairly modest fertility (average 4-5 children) and the Chinese and Indian component showing high fertility (average 6-8 children). The more modern levels are indicated by the age group that recently began childbearing (20-24), which shows a very different pattern, with the Chinese component having low fertility, the Indian component somewhat higher, and the Malay component the highest. The data suggest, albeit insecurely, that within the span of childbearing life represented in this table, a transition of some magnitude has taken place; the relatively high fertility levels

5 The CWR for Norway in 1960 was 378, for the U.S. in 1960, 488.

achieved by the women about to pass out of this group will not be characteristic of the younger women in the first stages, who are not only marrying later but in many cases significantly limiting the number of children born to them within marriage. This is most clearly apparent in the case of Chan Sow Lin, but movement is also apparent in Kampong Muniandy and to a lesser extent in Kampong Haji Abdullah Hukum and Kampong Pandan as well.

The products of the past high levels of fertility must be of some concern however. Young persons in the age groups about to enter the workforce in the near future or at those ages in which unemployment occurs most frequently (10–24) are a very high proportion of the population in all four *kampong*. In both Chan Sow Lin and Kampong Muniandy this group was 41 percent of the total population, and although the proportions were lower in Kampong Haji Abdullah Hukum (35 percent) and Kampong Pandan (30 percent), they must still be classed as high. Some indication of the problems is shown in Table 3.

**Table 3 Percentage of persons classified as unemployed by age group: squatter areas in Kuala Lumpur–Petaling Jaya, 1976**

| Kampong      | Age of males |       |       |       |       |       |
|--------------|--------------|-------|-------|-------|-------|-------|
|              | 15–19        | 20–24 | 25–29 | 30–34 | 35–39 | 40–44 |
| Muniandy     | 10.0         | 13.3  | 6.6   | —     | —     | —     |
| Chan Sow Lin | 13.6         | 8.0   | 3.4   | 2.9   | —     | —     |
| Hj. A. Hukum | 23.3         | 9.7   | 3.6   | —     | —     | 8.3   |
| Pandan       | 23.8         | 4.2   | 5.6   | —     | —     | 6.3   |

The estimated mean monthly earnings of those in paid employment or having other sources of income vary over only a narrow range, from Kampong Muniandy, the lowest, at M\$186 per month to Kampong Pandan at M\$241. When these mean incomes are adjusted, taking into account the number of persons dependent upon each income, the range narrows considerably and Chan Sow Lin emerges with the highest per capita estimated income (M\$88), with Kampong Muniandy retaining its position as the lowest of the four (M\$69).

### Conclusions

None of the mean incomes estimated for the squatter settlements studied can be described as offering much above a barely subsistence level, given the cost of living in Malaysia. Squatter settlements have been universally characterized by poverty, and certainly the four examined here conform to this expectation. From these income levels arise all other problems. But by building makeshift houses on land to which all but a few have no legal rights, the squatters have been able to minimize their housing costs. In economic terms the institution is almost sensationally successful.

The so-called low-cost housing which the government has in mind exceeds in cost the squatter unit by five times and up. In squatter eyes all these schemes are distinctly middle class. Wehbring has established that the cost of the cheapest of the units proposed is beyond the financial reach of 80 percent of the squatting community.<sup>6</sup>

Apart from the impossible cost levels, the squatters perceive many other disadvantages to the type of public housing they have been offered in the past; these include small floor areas with no possibility of extension or addition of extra rooms, excessive density of population, frequently in-

<sup>6</sup> Wehbring, p. 28.

creased distance from places of employment, and disruption of existing social patterns which in many communities the inhabitants find very satisfying. One advantage of informal housing not often appreciated by city officials is its impermanence. When the time comes to replan and rebuild, there is great built-in flexibility to squatter settlements compared with housing more formally organized and solidly built. The only advantages of public housing all respondents agree on are the availability of piped water and electricity and improved waste disposal and drainage. The aesthetics of the existing examples of alternatives compared with squatter settlements are of course a matter of taste, but there are many who find the more formal settlements no useful improvement. On the income levels available to squatters, any form of housing within reach is not likely to be pretty.

Recent studies on squatters have usually arrived at the recommendation that some way be found to accept and formalize the de facto arrangements and to use this process as a basis for providing services and amenities such as water, sanitation, and electric power; and for giving some security of tenure, if only short-term leases for instance; but of preserving the individual enterprise and self-help characteristics which squatter settlements show. This survey found nothing which could be used as an argument against such recommendations and much evidence to support them.

The survey also suggests that the squatter communities are already sharing, to an unanticipated extent, in the demographic transition which is on the move in Malaysia. While perhaps more investigation should be carried out to further test the suggestion that the Chinese component is already planning fertility quite efficiently, the National Family Planning Board should find a fairly receptive and willing audience for its services in all the settlements surveyed.

The Third Malaysia Plan, begun in 1976, is dedicated to the improvement and preferably the elimination of communities of the type examined here. Although it is possible to say that conditions among squatter settlements are "not unfavorable"<sup>7</sup> in Malaysia, it should also be said that little in these communities justifies their being perpetuated. But their ultimate removal must await a very substantial increase in the wages paid to poorly educated workers with meager skills and presumably low productivity. Until these increases occur, squatting must continue because families on M\$150–300 per month truly have no alternative. Urban squatters can be said to have solved the problem of low-cost housing. It is the rest of the urban population which will not accept their solution. The question is, will the Malaysian government be willing to bear the enormous costs involved in restructuring this segment of society? □

<sup>7</sup> Wehbring, p. 17.



*Dr. Peter Pirie, left, a native of New Zealand, received his Ph.D. in geography from Australian National University. He is currently working with Pacific Island censuses. Pirie helped coordinate the planning for the 1974 Census of American Samoa reported on in the November 1974 (vol. 1, no. 2) issue of the newsletter.*

# publications that count . . .

by Alice D. Harris

## New census volume from Bangladesh

The final results of the 1974 Population Census of Bangladesh are now available in the national volume. Preliminary figures were released earlier in three census bulletins and 19 district reports on village population statistics. The new volume on the 1974 Census contains 24 tables which present the main population characteristics by cross-classification for localities down to the district level. The first two tables give population by sex for 1961 and 1974 with the percent increase since 1961 and the population by sex, density, and urban-rural residence for divisions, districts, and subdivisions for 1974. These two tables have been derived from the second census bulletin, which provided the final count based on a 100 percent enumeration. The remaining 22 tables, covering such demographic characteristics as age groups, language, literacy, economic activity and employment, and ever-married women and live births, are taken from a 5 percent rural sample and a 20 percent urban sample of enumeration blocks selected systematically.

A postenumeration check on the census was carried out in April 1974; it is estimated that there was a 19.3 percent underenumeration for the four major cities and a 6.5 percent underenumeration for the rest of the country. Unfortunately, the check had to be abandoned after only 59 blocks were matched, so the results are of limited value. The national volume contains the background and analytical reports on the 1974 Census of Bangladesh. Still to be published are 19 district reports and the administrative report on census operations. The national volume is available from the Bureau of Statistics, Ministry of Planning, Government of the People's Republic of Bangladesh, Dacca.

## Six WFS country reports out

By the end of 1977, the first country reports summarizing the results of surveys taken in Fiji, Pakistan, Nepal, Thailand, Malaysia, and the Dominican Republic as a part of the World Fertility Survey (WFS) program had been released. The goals of the program, undertaken by the International Statistical Institute and the International Union for the Scientific Study of Population, are to gather information on fertility behavior in as many countries as possible and to ensure the international comparability of this information through the use of standardized questionnaires and methodology. The first of the country reports to be published was the *Fiji Fertility Survey—1974*, which was reviewed in an earlier issue (May 1977, vol. 3, no. 4).

The *Pakistan Fertility Survey: First Report* came out in the fall of 1976. It contains the results of a single round survey taken in Pakistan in 1975 of a national random sample of 6,000 ever-married women, aged 10–50. The WFS questionnaires were modified to meet local sociocultural

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conditions and translated into six languages. The sample included 40 percent urban and 60 percent rural households allocated to the provinces according to population size. Information on the background and methodology of the survey is contained in this first report along with the preliminary findings on fertility, infant and child mortality, and family planning attitudes and practices. Tables are included in the appendices. More detailed analyses of fertility and its relation to other socioeconomic factors will be made in future reports. Copies of the *Pakistan Fertility Survey* in English can be obtained from the Population Planning Division, Government of Pakistan, Islamabad, free of charge.

Nepal was able to get its first country report out within the target date of one year after the completion of the field survey. This is a remarkable achievement for a country whose mountainous terrain and inadequate transportation and communication facilities might have hindered the completion of the survey. Sir Maurice Kendall, World Fertility Survey Project Director, in his foreword to the *Nepal Fertility Survey 1976: First Report* credits Dr. B. R. Pande and the staff of the Family Planning and Maternal Child Health Project of His Majesty's Government of Nepal with the prompt completion of the report. The sample design of the 1976 survey included 5,000 households with ever-married women between 15 and 49 years of age. The sample sizes in the three main regions of Nepal—terai (marshy lowland areas), hills, and mountains—were made proportionate to their population sizes. The first report is organized according to World Fertility Survey guidelines; it contains the background and methodological information and a summary of the findings on nuptiality, fertility, infant mortality, and family planning. Tables containing the results of the survey in computer print-out format are included in the appendices. The report is in English but includes a list of key terms in French and Spanish. It is bound in an attractive red cover and is available from His Majesty's Government, Ministry of Health, Nepal Family Planning and MCH Project, Central Office, Ramshah Path, Kathmandu, Nepal, at no charge.

*The Survey of Fertility in Thailand: Country Report* is a joint project of the Institute of Population Studies at Chulalongkorn University and the Population Survey Division of the National Statistical Office, Thailand. The survey was conducted in 1975 using four of the WFS schedules—the core questionnaire on fertility and the modules for husband, household, and community. The sample survey covered 4,465 households selected from 267 clusters based on a subsample of household listings prepared for the Survey of Population Change. The sample clusters were weighted to compensate for small deviations from equal probability and for differential nonresponse. A full analysis of the data gathered in the survey will take several years and result in a number of specialized studies (see the article by Anuri Wanglee on economic factors in family size decisions in this issue). This first report includes the basic findings and the methodology of the survey in Volume I and over 400 pages of tables in Volume II. The fertility decline in Thailand which began in the 1960s and was recorded in earlier censuses and surveys has continued according to the fertility survey data. The two-volume report in English is being distributed by the Institute of Population Studies, Chulalongkorn University, Bangkok 5, Thailand.

*The Malaysia Fertility and Family Survey, 1974: First*

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## REPORT ON ECONOMIC FACTORS IN FAMILY SIZE DECISIONS IN THAILAND

by Anuri Wanglee

*Economic Factors in Family Size Decisions in Thailand*, the second in a series of reports on the Survey of Fertility in Thailand (SOFT), has been released as a joint publication of the East-West Population Institute, the National Statistical Office, and the Institute of Population Studies, Chulalongkorn University. Dr. Fred Arnold, research associate at the East-West Population Institute, and Chintana Pejarononda of the Population Survey Division of the National Statistical Office prepared the report. The SOFT Survey indicates that economic factors do have an important influence on family size and family planning decisions of married men in Thailand.

The SOFT Survey was conducted in 1975 as part of the World Fertility Survey with a sample of 4,465 households. The project consisted of a Household Survey, a Husband's Economic Survey, a Fertility Survey, and a Community Level Survey in rural areas. The Fertility Survey and the Community Survey were conducted by the Institute of Population Studies, Chulalongkorn University. The Household Survey and the Husband's Economic Survey were conducted by the National Statistical Office. In the Fertility Survey, eligible women (ever-married women aged under 50) were interviewed on a variety of topics including child-bearing, pregnancy history, marriage history, family planning, and work history. Using the same sample households, the National Statistical Office conducted a household interview to obtain data on household members, family income, household and business assets, and housing characteristics. The household questionnaires were then used to select eligible men (an eligible man was a usual resident of the household who had a wife under 50 who was also a usual resident of the household). When the interviewing was completed, wives from the Fertility Survey were matched with husbands from the Husband's Economic Survey and information from their interviews was combined. All of the data in the report come from the Household Survey and the Husband's Economic Survey and are based only on matched cases where both the wife and husband were interviewed.

The report focuses on the perceived economic benefits and costs of children in Thailand and the impact of these economic factors on family size decisions. The results showed that husbands in the SOFT Survey expressed considerable ambivalence about large and small families but were generally more oriented toward small families. Open-ended questions about the advantages and disadvantages of having a large number and a small number of children elicited responses of an economic nature in the vast majority of cases. Children were particularly valued for their help on the family farm or in the family business. Husbands with lower levels of education viewed children as a source of income as well as a source of help. Expectations of reliance on children for old age support were nearly universal. Eighty-eight percent of the respondents expected to rely on their children for support in old age. The traditional economic values of children were found to be less important in cities and among higher income and educated husbands. Husbands in the SOFT Survey also proved to be extremely conscious of the economic costs of children. While no attempt was made to measure the actual cost of children, more than half of all respondents said it would be a heavy economic burden for them to raise four children and nearly all respondents said that raising six children would be a heavy economic burden. The general financial costs of rais-

ing children were particularly important in rural areas, while the costs of education were more a matter of concern in urban areas.

Multiple classification analysis was used to examine factors associated with the perceived economic benefits and costs of children and to relate these economic variables to family size and family planning decisions. High perceived utility of children was found to be associated with farming families of low education and low income. High perceived cost of children, on the other hand, was about equally common in all population groups studied. The multivariate analysis confirms that high fertility desires and low contraceptive use are related to husbands' perceptions of the high economic utility and low costs of children.

The report also suggests possible government policy of an economic nature which would be favorable to fertility reduction.

Those interested in obtaining copies of this report may write to the East-West Population Institute or to the Institute of Population Studies, Chulalongkorn University, Bangkok, Thailand. □

*Anuri Wanglee is Director of the Population Survey Division in Bangkok's National Statistical Office.*

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*Country Report* is now available, but I have not seen it yet. It may be purchased in English from the Department of Statistics, Jalan Young, Kuala Lumpur, Malaysia, for M\$10.00. Although the *Encuesta Nacional de Fecundidad: Informe General* is for the Dominican Republic and out of the Asian and Pacific region, some population libraries might want to include it in their collections. It is available in Spanish, with a list of table headings in English and French, from the Consejo Nacional de Población, Apartado Postal 1803, Santo Domingo, Dominican Republic. It is free to libraries; others pay postal charges. □

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**THE EAST-WEST CENTER** is a national educational institution established in Hawaii by the U.S. Congress in 1960 to promote better relations and understanding between the United States and the nations of Asia and the Pacific through cooperative study, training, and research. Each year more than 1,500 men and women from many nations and cultures work together in problem-oriented institutes or on "open" grants as they seek solutions to problems of mutual consequence to East and West. For each Center participant from the United States, two participants are sought from the Asian and Pacific area. The U.S. Congress provides basic funding for programs and a variety of awards, and the Center is administered by a public, nonprofit corporation with an international Board of Governors.

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