The 1980 Baseline Round of the East Java (Indonesia) Population Survey: A Summary of Results

The International Program of Laboratories for Population Statistics (POPLAB) of the University of North Carolina at Chapel Hill is involved in a project entitled "Birth and Death Data Collection" sponsored by the United States Agency for International Development. The basic objective of this project is to assist developing countries in collecting and analyzing data on levels and trends in fertility and mortality through the use of sample surveys. These surveys are of three types: (1) add-on, adding fertility/mortality questions to existing household surveys, (2) new, initiating new fertility/mortality surveys, and (3) broad surveys, new or add-on, which include collection and analysis of data on variables such as socioeconomic status, labor force participation, migration, use of family planning, as well as basic fertility/mortality questions. POPLAB provides technical and financial assistance in the design, organization, implementation, and analysis of all three types of surveys.

El Programa Internacional de Laboratorios para Estadísticas de Población (POPLAB) de la Universidad de Carolina del Norte en Chapel Hill, está involucrado en un proyecto titulado 'Colección de Datos sobre Muertes y Nacimientos' financiado por la Agencia Internacional para el Desarrollo. El objetivo principal de este proyecto es el de prestar asistencia a los países en desarrollo en la colección y análisis de datos sobre niveles y tendencias de fecundidad y mortalidad por medio del uso de encuestas de muestreo. Tales encuestas son de tres tipos: (1) aumentadas, es decir agregando preguntas sobre fecundidad/mortalidad a encuestas e hogares existentes, (2) nuevas encuestas de fecundidad/mortalidad, y (3) extensas, nuevas o aumentadas, las cuales incluyen colección y análisis de datos de variables tales como nivel socioeconómico, participación en el fuerza de trabajo, migración, uso de planificación familiar, ademas de preguntas básicas sobre fecundidad/mortalidad. El POPLAB provee asistencia técnica y financiera para el diseño, organización, implementación, y análisis de estos tres tipos de encuestas.

This report is the fifth in a series containing the major findings of demographic surveys in countries participating in the POPLAB program. The full report of the 1980 Baseline Round of the East Java (Indonesia) Population Survey was published by the Central Bureau of Statistics, Government of Indonesia in fall 1981. POPLAB gratefully acknowledges the cooperation of the Central Bureau of Statistics in publishing this summary.

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The 1980 Baseline Round of the East Java (Indonesia) Population Survey: A Summary of Results

by POPLAB Staff

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THE 1980 BASELINE ROUND OF THE EAST JAVA (INDONESIA) POPULATION SURVEY: A SUMMARY OF RESULTS

POPLAB Staff

BACKGROUND

Indonesia is a country of more than 13,000 islands lying along the equator in Southeast Asia between the Malay Peninsula and Australia. The population of Indonesia was approximately 147.5 million persons in 1980. (Central Bureau of Statistics, 1981). Java, the principal island, is among the most densely populated areas of the world, with a density of around 1,800 persons per square mile.

The decade of the 1970s witnessed an increase in the pace of economic development and in the importance of population and development policy in Indonesia. Continuous information on the demographic situation in the country is crucial to national planning. Information collected in recent censuses and surveys has provided estimates of levels and trends of fertility, mortality, and population growth in the country. Most notable among the sources of demographic data were the 1961 and 1971 Population Censuses, the 1976 Intercensal Survey and the Indonesia Fertility Survey of 1976. The 1980-82 East Java Population Survey was designed to continue the flow of demographic information for a major area of the country. The 1980 baseline round of that survey is the subject of this summary.

THE SURVEY

The East Java Population Survey (EJPS) is a longitudinal survey designed to estimate demographic parameters of the East Java population with special emphasis on estimation of fertility and mortality rates. The survey consists of three rounds of fieldwork, each round separated by a period of approximately one year. In each round, persons living in a sample of some 20,000 households are interviewed. Basically, the same households are involved in each round of the survey.

The sample of households was selected in such a way as to be representative of the population of East Java, excluding the population who were homeless, living on boats, or residing in institutions. The sample design was a three-stage area sample with stratification in the first selection stage. The first two stages of the sample design were the first two stages of the 1980 National Socioeconomic Survey (SUSENAS) sample developed by the Central Bureau of Statistics (CBS). In the first stage of the design, CBS selected 1,238 villages from a stratified listing of all villages in East Java. In the second stage, one census block was selected from each

TABLE 1. Percentage Distribution of Population by Age Group and Sex, Urban and Rural, East Java, 1980

Age Group	East Java		Urban		Rural	
	Males	Females	Males	Females	Males	Females
0-4	5.8	5.5	6.0	5.7	5.8	5.5
5-9	6.7	6.6	6.4	6.1	6.7	6.8
10-14	6.1	5.8	5.8	5.9	6.2	5.8
15-19	5.2	5.2	5.6	5.9	5.0	5.0
20-24	3.7	4.6	4.5	5.0	3.5	4.5
25-29	3.8	4.0	3.8	4.4	3.8	3.9
30-34	2.8	3.1	2.8	3.1	2.8	3.0
35-39	3.1	3.4	3.0	3.1	3.1	3.4
40-44	2.8	3.1	2.6	2.9	2.9	3.2
45-49	2.6	2.7	2.2	2.5	2.7	2.8
50-54	2.2	2.1	2.0	2.1	2.3	2.1
55-59	1.5	1.4	1.6	1.5	1.5	1.4
60-64	1.1	1.4	1.0	1.3	1.1	1.4
65-69	0.6	0.8	0.6	0.6	0.6	0.8
70-74	0.5	0.7	0.5	0.6	0.5	0.7
75+	0.4	0.7	0.3	0.6	0.5	0.7
Total	48.9	51.1	48.7	51.3	49.0	51.0
Persons in Sample	44,174	46,142	8,795	9,262	35,379	36,880

village. In the third stage, households were selected within each census block.

The sample design was not self-weighting. All substantive results shown in this report are, therefore, based on weighted data.

Round I of the EJPS collected data on characteristics of the survey population, including age, sex, and marital status. In addition, for women, data were collected on marital history, selected aspects of childbearing history, and on their knowledge and use of contraceptives. Data were also collected on mortality of children ever born and survivorship status of respondent's mothers.

The Central Bureau of Statistics was responsible for the planning and execution of the survey, analysis and publication of results. Within CBS, responsibility for conducting the survey was shared between the central office in Jakarta and the East Java Statistical Office in Surabaya. Technical and financial assistance was provided at all stages of the survey by the International Program of Laboratories for Population Statistics (POPLAB) of the University of North Carolina at Chapel Hill.

FINDINGS

Age and Sex Distribution

A total of 90,317 persons lived in the sample households, 80 percent of which lived in rural areas. The percentage distribution of the sample population by age and sex is presented in Table 1, separately for urban and rural residence.

Overall, East Java has a relatively young population with about 37 percent under age 15 and less than 4 percent over 65 years of age. The urban-rural distributions do not differ significantly from the distribution for East Java.

With regard to sex composition of the population, sex ratios (i.e. the ratio of males to females) are shown in Table 2 by age group for urban and rural areas, and for East Java. The ratios indicate that for East Java and for urban and rural areas, there are about 95 or 96 males for every 100 females. The sex ratios vary by age, of course. Males are predominant at ages under 20, while females are predominant from the twenties through the older ages, except for the fifties.

TABLE 2. Sex Ratios by Age Group, Urban and Rural, East Java, 1980

Age Group	East Java	Urban	Rural
0-4	105	105	105
5-9	100	104	99
10-14	105	98	107
15-19	100	96	101
20-24	81	90	78
25-29	94	85	97
30-34	93	91	93
35-39	93	99	91
40-44	89	89	90
45-49	94	90	95
50-54	103	95	106
55-59	104	109	103
60-64	79	81	79
65+	74	73	74
TOTAL	96	95	96

Marital Status

Data on the current marital status of females are presented in Table 3 for urban and rural areas and for East Java.

The data in Table 3 indicate that marriage is virtually universal in East Java, with less than one percent of the female population single by age 55. The proportion of the population divorced is relatively low, but appears higher among rural than urban residents. Rural women tend to marry at younger ages than do urban women.

In a population where almost all childbearing occurs within marriage (such as East Java), the age at which women first marry can have an important impact on the age pattern and level of fertility. In such populations, an increase in age at first marriage contributes to the lowering of fertility levels. A convenient summary measure of the age at first marriage is the

TABLE 3. Percentage Distribution of Female Population by Age Group and Marital Status, Urban and Rural, East Java, 1980

Age Group	Single	Married	Divorced	Widowed
		EAST JAVA		
10-14	99.3	0.7	0.1	0.0
15-19	68.1	31.7	3.3	0.4
20-24	21.2	74.6	6.7	1.3
25-29	6.5	87.6	6.5	2.0
30-34	2.6	89.2	5.6	3.2
35-39	1.2	86.4	5.9	6.8
40-44	1.2	81.2	5.8	12.0
45-49	0.7	75.0	5.5	18.6
50-54	0.6	58.2	6.8	34.1
		URBAN		
10-14	100.0	0.0	0.0	0.0
15-19	82.1	16.2	1.3	0.3
20-24	38.1	57.2	4.1	0.7
25-29	15.9	77.2	4.6	1.8
30-34	5.4	86.1	4.7	3.6
35-39	3.6	84.5	4.9	7.0
40-44	2.5	79.9	5.7	11.9
45-49	1.6	76.2	3.8	18.4
50-54	0.9	59.5	5.9	33.7
		RURAL		
10-14	99.1	0.7	0.1	0.0
15-19	64.0	31.7	4.0	0.5
20-24	16.5	74.6	7.5	1.4
25-29	3.8	87.6	7.0	2.1
30-34	1.9	89.2	5.8	3.1
35-39	0.7	86.4	6.2	6.8
40-44	0.9	81.2	5.8	12.1
45-49	0.5	75.0	5.9	18.7
50-54	0.5	58.2	7.0	34.2

singulate mean age at marriage (SMAM). This measure employs cross-sectional data on the proportions single by age to estimate the mean number of years a person remains single before marrying for the first time. SMAM estimates for East Java are shown in Table 4.

TABLE 4. Singulate Mean Age at First Marriage by Sex, Urban and Rural, East Java, 1980

Area of Residence	Males	Females
East Java	24.4	19.9
Urban	25.4	22.2
Rural	24.1	19.3

The data show that females remain single 19.9 years on the average, while males remain single 24.4 years. The difference in average age at marriage between sexes is higher in rural areas (4.8 years) than in urban areas (3.2 years).

Changes over time in age at first marriage of females were investigated in the full report by comparing the results of the EJPS with results from the 1961 and 1971 censuses, and the 1976 Intercensal Survey. The data indicated an increase in age at marriage over time. For East Java, the singulate mean age at first marriage of females increased from 17.9 years in 1961 to 19.9 years in 1980.

Fertility

In the East Java Population Survey, information on fertility was obtained in terms of children ever born data, reference period data, and "own-children" data. A summary of the results pertaining to the analyses of these data follows.

Children Ever Born Data

Data on children ever born were collected by asking each ever-married woman the number of her own sons and daughters (1) who lived in the household, (2) who lived elsewhere, (3) who have died, and (4) the total number of sons and daughters ever born.[1] Childbearing in Indonesia occurs almost exclusively

[1]The households covered by the EJPS survey contained a total of 19,111 ever-married women under age 50. Children ever born data were collected for all but 111 of these women.

to ever-married women. As such, these data are appropriate for computing average parity values for all women, as well as for ever-married women.

Average parity values (or mean number of children ever born) for all women and ever-married women by age and area of residence are presented in Table 5. Overall, the mean number of children ever born to all women aged 15-49 is 2.35 and is slightly lower in the urban (2.17) than the rural (2.40) areas. The average parity of ever married women 15-49 years old is about half a child greater than the average parity of all women aged 15-49 years. In contrast to all women, average parity of ever-married women is higher in the urban than in the rural areas. This finding was unexpected. However, these data indicate that the higher fertility of the rural than the urban women indicated by the average parity data for all women results from the fact that women in rural areas marry earlier than women in urban areas.

TABLE 5. Mean Number of Children Ever Born Per Woman and Per Ever-Married Woman by Age, Urban and Rural, East Java, 1980

Age Group of Women	East Java	Urban	Rural
	MEAN NUMBER OF CHILDREN EVER BORN PER WOMAN		
15-19	.15	.11	.16
20-24	1.01	.85	1.05
25-29	2.10	1.98	2.14
30-34	3.06	3.11	3.05
35-39	3.96	3.85	3.96
40-44	4.11	4.16	4.10
45-49	4.43	4.38	4.44
15-49	2.35	2.17	2.40
	MEAN NUMBER OF CHILDREN EVER BORN PER EVER-MARRIED WOMAN		
15-19	.48	.66	.46
20-24	1.28	1.40	1.26
25-29	2.25	2.35	2.22
30-34	3.14	3.29	3.10
35-39	3.90	3.99	3.88
40-44	4.16	4.26	4.14
45-49	4.46	4.45	4.46
15-49	2.90	3.07	2.87

To provide information on time trends in parity values of ever-married women, results from the 1980 EJPS, the 1973 Indonesia Fertility-Mortality Survey, and the 1976 Indonesia Fertility Survey are presented in Table 6. The 1973 survey report suggests that children ever born were underreported by women aged 35 and above. This suspicion appears to be supported by the data from the EJPS, which generally indicates higher average parity for women over 35, and lower for women under 35, than the 1973 survey. When time trend information is limited to the 1976 and 1980 surveys, a decline in fertility is clear, as average parity values declined for all age groups. Overall parity values for ever-married women aged 15-49 between 1976 (3.2) and 1980 (2.9) declined by about one-third of a child.

TABLE 6. Average Parity Values for Ever-Married Women by Age, East Java, 1973, 1976, and 1980

Age Group of Women	Time Period		Age Group of Women	Time Period	
	1973	1980		1976	1980
15-19	.53	.48	15-24	1.2	1.04
20-24	1.43	1.28			
25-29	2.54	2.25	25-34	3.1	2.64
30-34	3.52	3.14			
35-39	3.66	3.90	35-44	4.4	4.03
40-44	4.28	4.16			
45-49	3.97	4.46	45-49	4.8	4.46
All Ages	NA	2.90	All Ages	3.2	2.90

NOTE: The 1973 Indonesia Fertility-Mortality Survey reported statistics for urban and rural areas, but not for all East Java. The statistics for the 1973 survey for all East Java were obtained by weighting the urban-rural statistics. The weights reflect the urban-rural distribution of females by five-year age group in East Java (Central Bureau of Statistics, 1975).

Sources: 1973: (University of Indonesia, 1974).

1976: (Central Bureau of Statistics, 1978).

Reference Period Data

Data on recent fertility were collected by asking a series of questions to ever-married women.[2] Each woman was asked to provide information concerning her last live birth, pregnancy after the last live birth, and penultimate birth. For each reported live birth, the respondent was asked to report the date of birth and whether or not the birth occurred after Lebaran 1978 (the Moslem religious holiday marking the end of Ramadan). On the basis of these two questions, all births were classified inside or outside of a reference period extending from the day after Lebaran 1978 (5 September 1978) to the survey date (8 May 1980).[3] This period centers on calendar year 1979 and covers an interval of 20 months, or 1.68 years.

In response to the questions on recent fertility, 18,662 births were reported. Of these, 3,921 were classified as having occurred during the reference period. After adjusting from a 20 to a 12-month period,[4] the crude birth rate was estimated as 25.9 per 1,000 population for all East Java, 24.8 per 1,000 population for urban areas, and 26.2 per 1,000 population for rural areas.

Age-specific and total fertility rates (TFR) estimated from the reference period data are given in Table 7. For all East Java, age-specific rates imply a TFR of 3.22 children per woman and reflect a relatively early age pattern of fertility as the rates peak in the age interval 20-24 and thereafter decline, first steadily, and then more rapidly. Some rural-urban differentials in age-specific rates exist. For women under 25 years of age, rates are distinctly lower in the urban than the rural areas, but for women aged 25 and over, rates are about the same in both areas. In terms of TFR, the level of fertility in the urban areas (2.96) is about ten percent lower than in the rural areas (3.29). This difference is almost entirely the result of lower fertility of women under 25 in the urban areas.

Table 7 also provides estimates from the 1973 Fertility-Mortality Survey and the 1976 Indonesia Fertility Survey. While caution should be exercised in drawing inferences on time trends from the data of various surveys, a clear persistent decline in East Java fertility is evident. Between 1965-70 and 1979, the TFR for East Java declined by about 36 percent, with almost

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[2]Of the 19,111 ever-married women under age 50 in the sample households, reference period birth data were collected for all but 111.

[3]Fieldwork for Round I of the EJPS survey was conducted in May and June, 1980. During the first fifteen days of that period, 91 percent of all interviews were completed. Thus, for the purpose of fixing the later boundary of the reference period, 8 May 1980 was set as the survey date. This implies a reference period of 612 days (5 September 1978 to 8 May 1980, inclusive).

[4]The adjusted procedure consisted of multiplying the births reported for the 20-month reference period by the factor (365/612) or .596.

TABLE 7. Age Specific Fertility Rates, Urban and Rural, East Java, 1965-70, 1971-75, and 1979 (Reference period data)

Age Group of Women	Survey Time Period for Rates			Percent Decline Between
	IFMS 1965-70	IFS 1971-75	EJPS 1979	1965-70 and 1979
		EAST JAVA		
15-19	173	117	81	53.2
20-24	244	221	185	24.2
25-29	225	180	161	28.4
30-34	170	151	118	30.6
35-39	118	81	64	45.8
40-44	72	45	27	62.5
45-49	11	24	8	27.3
T.F.R.	5.06	4.09	3.22	36.4
		URBAN		
15-19	126	NA	64	49.2
20-24	235	NA	162	31.1
25-29	236	NA	159	32.6
30-34	158	NA	114	27.8
35-39	90	NA	69	23.3
40-44	62	NA	14	77.4
45-49	9	NA	9	0.0
T.F.R.	4.58	NA	2.96	35.4
		RURAL		
15-19	183	NA	86	53.0
20-24	246	NA	191	22.4
25-29	223	NA	162	27.4
30-34	172	NA	119	30.8
35-39	123	NA	63	48.8
40-44	74	NA	30	59.5
45-49	11	NA	8	27.3
T.F.R.	5.16	NA	3.29	36.2

Note: See footnote bottom of Table 6 regarding Indonesia Fertility-Mortality Survey.

Sources: 1965-70: (University of Indonesia, 1974).
1971-75: (Central Bureau of Statistics, 1978).

identical declines in the urban and rural areas. The magnitude of fertility decline, however, differed among women of different ages. Fertility declines were relatively large for women under 20 years of age and for women above age 35, and substantial but not as large for women in the central ages of child-bearing.

Own-Children Data

The own-children technique (Cho, 1973) which reconstructs fertility rates for the years prior to the survey by using information on enumerated women and children by age, was also applied to the EJPS data. The results are shown in Table 8. The estimates show a uniform decline in fertility during the 1970s. Overall, between 1969-71 and 1977-79, the TFR declined by about 41 percent.

TABLE 8. Age Specific and Total Fertility Rates Using the Own-Children Technique, East Java, 1969-1979

Age Group of Women	TIME PERIOD								
	1969-1971	1970-1972	1971-1973	1972-1974	1973-1975	1974-1976	1975-1977	1976-1978	1977-1979
15-19	126	131	132	127	115	111	104	99	87
20-24	244	238	235	229	220	224	211	204	175
25-29	232	227	215	204	196	193	174	158	139
30-34	166	155	152	146	137	129	117	110	97
35-39	119	110	99	88	80	74	64	56	47
40-44	56	51	48	44	44	41	34	26	19
45-49	22	19	16	14	14	12	11	7	6
Total Fertility Rate	4.82	4.66	4.48	4.25	4.02	3.92	3.57	3.30	2.85

In general, the own-children estimates for different time periods are consistent with the reference period estimates. However, the own-children estimate of the TFR for 1977-1979 of 2.85 differs substantially from the reference period estimate of 3.22 for 1979. Because of the sensitivity of the own-children estimate to misreporting of children's ages, the reference period estimate is probably more accurate. The final resolution of the discrepancy, however, must await the data from subsequent rounds.

TABLE 9. Knowledge and Use of Contraception; Currently Married Women, East Java, 1980

Age Group of Women	Number of Currently Married Women Providing Data	PERCENT OF CURRENTLY MARRIED WOMEN									
		With Knowledge of a Birth Control Method	Currently Using a Birth Control Method	Currently Practicing Contraception by Method							
				Pill	IUD	Condom	Sterilization	Rhythm	Injection	Abstinence	Traditional
EAST JAVA											
15-19	1246	86.5	20.5	14.4	4.2	.3	.0	.1	.0	.2	1.3
20-24	2897	91.1	41.0	26.6	10.7	.5	.0	.5	.7	.4	1.6
25-29	3077	92.3	52.4	32.7	15.1	.6	.3	.5	.9	.4	1.9
30-34	2435	93.4	54.2	30.3	17.0	1.1	1.3	.6	1.0	.5	2.4
35-39	2615	90.7	51.1	26.5	18.3	1.4	1.1	.6	.5	.4	2.3
40-44	2295	84.8	35.0	19.0	10.1	.9	1.0	.6	.4	.7	2.3
45-49	1856	80.0	23.6	11.6	7.6	.7	.4	.4	.1	1.2	1.6
All Ages	16422	88.9	42.2	24.5	12.7	.8	.6	.5	.6	.5	2.0
URBAN											
15-19	170	87.3	17.6	14.1	2.8	.0	.0	.7	.0	.0	.0
20-24	507	90.5	32.7	23.0	4.8	1.6	.0	1.0	.9	.6	.8
25-29	620	93.6	42.9	28.7	5.9	2.1	.8	2.5	1.5	.3	1.1
30-34	481	95.7	54.1	28.5	11.8	3.0	4.6	2.2	2.0	1.0	.9
35-39	471	94.8	51.0	25.9	8.7	4.4	5.0	2.7	.7	1.8	1.8
40-44	421	85.7	32.0	13.6	4.5	1.9	4.2	3.0	.9	1.3	2.6
45-49	341	84.0	21.3	7.9	4.0	2.1	1.7	1.7	.5	2.7	.7
All Ages	3011	91.1	38.9	22.0	6.5	2.4	2.5	2.1	1.1	1.1	1.2
RURAL											
15-19	1076	90.6	20.8	14.4	4.4	.4	.0	.0	.0	.2	1.4
20-24	2389	91.1	42.7	27.4	12.0	.3	.0	.4	.6	.3	1.7
25-29	2458	91.8	55.4	33.7	17.4	.2	.2	.0	.7	.4	2.8
30-34	1954	92.6	53.9	30.7	18.2	.6	.4	.1	.8	.3	2.8
35-39	2145	89.5	51.2	26.6	20.4	.7	.3	.2	.4	.1	2.5
40-44	1874	84.6	15.4	20.2	11.4	.7	.2	.1	.3	.5	2.2
45-49	1515	78.9	23.9	12.4	8.4	.3	.1	.1	.0	.8	1.8
All Ages	13410	88.5	43.1	25.1	14.1	.5	.2	.2	.5	.4	2.1

Knowledge and Use of Birth Control

The EJPS also collected data on knowledge and use of contraception by asking questions of each currently married woman. Each woman was first asked if she had heard of a family planning method. If she had heard of a method, she was asked if she was currently using a method and, if appropriate, which method.

Data on the percent of currently married women who had heard of a method and were currently using a method are presented in Table 9. For all East Java, 89 percent of currently married women in the childbearing ages reported having heard of a method. The percent of women reporting knowledge of a method was about the same in the urban (91) and rural (89) areas.

For all East Java, 42 percent of women reported that they were current users of contraception. The percent of women using a birth control method varied with age with the youngest and the oldest women reporting relatively low rates of usage: 20 percent for women aged 15-19 and 24 percent for women aged 45-49. Among the methods available, currently married women primarily relied on the Pill (25 percent using) and the IUD (13 percent using). All other methods combined were used by about 5 percent of women.

Statistics by area of residence indicated only marginal differences in current use: 39 percent in urban areas and 43 percent in rural areas. However, between areas there were differences in methods used by women. Pills and IUDs ranked first and second in both areas, but IUD usage was only half as prevalent among the urban women (7 percent) as among the rural women (14 percent). All other methods considered jointly were used by a much higher percentage of urban women (11 percent) than rural women (4 percent).

TABLE 10. Use of Contraception by Area of Residence, East Java, 1973, 1976, and 1980

Area of Residence	Current Users as a Percent of Ever-Married Women Aged 15-49	Current Users as a Percent of Currently Married Women Aged 15-49	
	1973	1976	1980
East Java	12.4	32	42.2
Urban	10.3	NA	38.9
Rural	13.0	NA	43.1

Sources: 1973: (University of Indonesia, 1974).

1976: (Central Bureau of Statistics, 1978).

Data on the current usage of contraceptives in East Java available from the 1973 Fertility-Mortality Survey, the 1976 Indonesia Fertility Survey, and the EJPS are presented in Table 10. The data are not strictly comparable since, for 1973, they are for ever-married women while, for 1976 and 1980, they apply to currently married women. However, the overall trend is quite clear. Between 1973 and 1976 the percent of women currently using contraception increased nearly threefold, from 12 to 32 percent, and reached 42 percent by 1980. A similar trend is evident in both the urban and rural areas.

Mortality

The East Java Population Survey utilized several methods of data collection and several statistical techniques to estimate the various mortality rates desired. The full report of the survey provides detail of the methodology; this summary will cover the major findings in the areas of infant mortality, adult mortality, and the crude death rate.

Infant Mortality

Indirect estimates of infant and early child mortality were derived from childhood survivorship data reported by ever-married women.[5] Data analysis involved classifying women by five-year age groups and calculating statistics on the proportion dead of children ever born. Several models have been developed to transform proportion dead statistics into mortality probabilities, i.e., the probability of dying between birth and exact ages of early childhood (Brass, 1975; Feeney, 1977; Sullivan, 1972; Trussell, 1975). For the analysis of the EJPS data, the Sullivan model was used. Mortality estimates were derived from the data reported by women aged 20-24, 25-29, and 30-34. The time reference of the estimates was estimated from the Coale-Trussell model (Coale and Trussell, 1978) under the assumption of linear changes in mortality. Of the four variants, estimates from the South variant of the Sullivan model were selected because evidence exists which suggests that after allowing for age misreporting, the Indonesian mortality pattern is similar to the South pattern.

Infant mortality estimates for all East Java are presented in Table 11. The estimates for both sexes derived from women aged 20-24, 25-29 and 30-34 were 98 per 1,000 live births (1978), 94 (1976), and 94 (1974), respectively. As expected, the estimates for males (110, 103, and 100) exceeded those for females (86, 86, and 88). Estimates for rural areas (101, 100, 98) exceeded those for urban areas (83, 73, 78).

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[5]Of the 19,111 ever-married women in the surveyed population, childhood survivorship data were obtained from all but 111.

TABLE 11. Estimates of Infant Mortality from Childhood Survivorship Data by Sex, Urban and Rural, East Java, 1980

Age Group of Women	Time Reference of Estimate	Proportion Dead of Children Ever Born	Estimated Probability of Dying Between Birth and Exact Age a (per 1,000 births)		Infant Mortality Estimate (per 1,000 births)
	t^*	D_i	a	$q(a)$	$q(1)$
			BOTH SEXES		
20-24	1978	.117	2	121	98
25-29	1976	.127	3	125	94
30-34	1974	.135	5	134	94
			MALES		
20-24	1978	.133	2	138	110
25-29	1976	.139	3	137	103
30-34	1974	.143	5	141	100
			FEMALES		
20-24	1978	.100	2	105	86
25-29	1976	.115	3	114	86
30-34	1974	.128	5	126	88
			URBAN AREAS		
20-24	1978	.092	2	98	83
25-29	1976	.089	3	89	73
30-34	1974	.104	5	104	78
			RURAL AREAS		
20-24	1978	.123	2	127	101
25-29	1976	.137	3	135	100
30-34	1974	.144	5	142	98

The indirect infant mortality estimates derived from data reported by women aged 20-24, 25-29, and 30-34 form a time series of rates as they respectively apply to 1978, 1976, and 1974. For almost every set of estimates presented in Table 11, the estimate for 1978 is higher than the estimate for 1974. This implies that mortality has increased in recent years. If true, this is contrary to the general trend of mortality in East Java from the late 1960s through the early 1970s. More likely, time trends implied by these estimates reflect factors which bias upward the infant mortality estimates derived from data on women aged 20-24, i.e., the 1978 estimates.

The EJPS also collected reference period infant mortality data by asking female respondents about their last live birth, their penultimate pregnancy, and about the onset of pregnancy after the last live birth. For each reported live birth, the date of birth, whether it occurred before or after Lebaran 1978 (4 September 1978) and survival status were ascertained. Thus, it was possible to determine the number of births that occurred from the day after Lebaran 1978 (5 September 1978) to the survey date (8 May 1980) and to calculate the proportion of those births which had died. This proportion is a survivorship statistic for births applicable to a reference period of 1.68 years centered on 1979, and can be converted into an infant mortality rate by identifying a particular model life table which is consistent with this observed proportion.

Infant mortality estimates based on reference period survivorship statistics and the West life table system are presented in Table 12. For all East Java, the infant mortality estimate is 83.2 per 1,000 live births. The estimate for males (94.4) exceeds the estimate for females (72.0). The overall rate for rural areas (89.6) exceeds the rate for urban areas (57.6). Moreover, male rates exceed female rates within both urban (70.5 versus 45.1) and rural areas (99.8 versus 78.9).

When infant mortality estimates based on childhood survivorship data reported by women aged 20-24 (1978) and estimates based on reference period data (1979) are compared (see Tables 11 and 12), it is seen that estimates based on childhood survivorship data exceed the estimates based on reference period data by a significant margin. For example, the difference is 18 percent for all East Java (98 versus 83.2), 43 percent for urban areas (83 versus 57.6) and 12 percent for rural areas (101 versus 89.6). In this connection it is pertinent to note that in the 1976 Indonesian Fertility Survey (IFS), infant mortality estimates based on child survivorship data exceeded estimates based on reference period data (pregnancy history data) by about 25 percent (Central Bureau of Statistics, 1978). A re-analysis of the IFS data shown in the full report provides evidence that childhood survivorship estimates were biased upward by about 20 percent. In the case of women aged 20-24, the bias results from a violation of the "homogeneity assumption" embedded in the indirect models. This same bias would affect the childhood survivorship estimates of the EJPS survey and thus, for the EJPS, the infant mortality estimates based on reference period data are preferable to those based on childhood survivorship data.

TABLE 12. Infant Mortality Estimates by Sex from Reference Period Data, Urban and Rural, East Java, 1980

Sex of Births	Births During the Reference Period	Births Not Surviving the Reference Period	Proportion Dead	Infant Mortality Estimate (per 1000 births)
		EAST JAVA		
Both Sexes	3920	278	.0710	83.2
Males	2001	158	.0790	94.4
Females	1919	120	.0621	72.0
		URBAN		
Both Sexes	748	38	.0514	57.6
Males	380	23	.0615	70.5
Females	369	15	.0410	45.1
		RURAL		
Both Sexes	3172	240	.0756	89.6
Males	1621	135	.0831	99.8
Females	1551	105	.0678	78.9

Adult Mortality

Estimates of female mortality were made from data on the survivorship status of the mothers of respondents. A model developed by Brass (1975) was employed for this purpose. The model requires, as input data, maternal survivorship statistics for two consecutive five-year age groups of respondents, and the mean age of mothers. The model estimates the probability of surviving from age 25 to age 25+N, where N is the central age between the two groups of respondents.

There are two difficulties with interpreting the rates estimated by the Brass model. First, the age span to which each estimate applies (25 to 25+N) differs from estimate to estimate. Second, each estimated rate applies to a somewhat different time period. The first difficulty can be avoided by reporting the estimates in terms of a single mortality index, the mortality level of a model life table system. The second difficulty can be clarified by estimating the time reference t^*, of each estimate by a model developed by Brass and Bamgboye (1981).

Female adult mortality estimates are presented in Table 13. Considering the mortality levels by mortality pattern (last 4 columns), it will be noted that, regardless of the model life table system used to index the level of mortality, a similar pattern emerges. In terms of the West life table system, the estimated mortality level of 20.2 is the same for 1970 and 1972, and lower for the years from 1965 through 1968. Since lower mortality levels imply higher death rates, the implication is that mortality declined between 1965 and 1972.

TABLE 13. Female Adult Mortality Levels Based Upon Maternal Orphanhood Data, East Java, 1965 through 1972

Age Group of Respondents	Proportion with Mother Alive	Central Age *N*	Estimated Probability of Surviving from Age 25 to Age 25+*N*	Time Reference *t**	Mortality Level by Mortality Pattern			
					North	South	East	West
15-19	.9515							
20-24	.9311	20	.9468	1972	20.6	18.5	19.2	20.2
25-29	.8809	25	.9225	1970	20.4	18.2	19.2	20.2
30-34	.8074	30	.8705	1968	19.1	16.8	18.0	19.3
35-39	.6848	35	.7918	1967	17.5	15.2	16.7	18.1
40-44	.5269	40	.6568	1966	14.9	12.9	14.7	16.0
45-49	.4010	45	.4946	1965	12.8	11.4	13.3	14.1

Note: Data for respondents below age 15 were excluded because children usually do not report these data themselves and, if their biological mother has died, it is likely that the reports made for them refer to their adoptive mother. Data for respondents over age 50 were also excluded because age reporting errors are substantial for them.

Life Tables and Crude Death Rate

To generate a life table with the logit life table system, it is only necessary to have a standard schedule of ℓ_x values, an observed childhood mortality rate, and an observed adult mortality rate (Hill, *et al.*, 1981). For the female population of East Java, four life tables were generated based on standard schedules of ℓ_x values abstracted from the North, South, East and West life table systems (females, level 16), an adult female mortality rate estimated for 1972 (ℓ_{45}/ℓ_{20}) = .9468) and a female infant mortality rate based on birth history data for the period 1971-75 estimated from the Indo-

nesia Fertility Survey (92.3 per 1,000 births).[6] Estimates of life expectancy at birth (in years) were 65.1 (North), 63.4 (South), 64.5 (East), and 65.9 (West). Estimates of the crude death rate[7] per 1,000 population for females based on these tables were: 7.6 (North), 7.8 (South), 7.3 (East), and 7.1 (West). These rates are improbably low, in view of other available data about Indonesia and East Java.

Alternative estimates of the crude death rate for East Java (both sexes) for 1978-79 were obtained by selecting a life table from the Coale-Demeny model life tables on the basis of an infant mortality estimate from the EJPS survey, and weighting the mortality rates of the selected life table by the age distributions recorded in the EJPS survey. The estimated crude death rate based on the infant mortality estimate from reference period data, varied from 7.9 to 11.4 per 1,000 population, depending on the mortality pattern of the selected life table (North, 11.4; South, 7.9; East 8.7; West, 10.7). When based on the infant mortality rates derived from childhood survivorship data, the crude death rate estimates varied from 8.9 to 11.7 per 1,000 population.

The uncertainties concerning the true level of infant and adult mortality rates, and the crude death rate for East Java, should be clarified by data collected in Rounds II and III of the EJPS survey.

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[6]Indonesia Fertility Survey estimates were used because the EJPS did not provide direct estimates for this period.

[7]Crude death rate estimates are based on the female population age distribution recorded in the 1971 Census (Central Bureau of Statistics, 1975).

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