

THE USE OF SAMPLE SURVEYS IN DEMOGRAPHIC STUDIES IN INDIA

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1.1 The decennial censuses from 1870's contain a good deal of important population data but so far reliable estimates have not been available on basic vital rates such as the specific marriage, fertility, infant or general mortality rates which are essential for the scientific study of population dynamics. Marriages are mostly religious in India. Birth and death registration is known to be extremely defective, and cannot and have not been used in constructing the life tables given in successive census reports. Population problems, however, have a special urgency in India in relation to the current supply of food and the level of national production. The sharp oscillations in the decennial growth of population in India till 1930's and the subsequent rapid increase are not yet clearly understood, and current changes in vital rates and population growth require critical and continuing study in relation to future economic developments.

1.2 The registration of births and deaths is not likely to improve appreciably in the near future so that the use of properly designed sample surveys would appear to be the most promising approach in demographic studies in India at present. Demographic material has been collected by sampling methods in particular regions by the Indian Statistical Institute, the All India Institute of Public Health and Hygiene, and the Gokhale Institute of Politics and Economics in the past. A sample study of population problems on an intensive scale has been recently conducted in

Mysore State under the joint auspices of the United Nations and the Government of India and the report is under preparation. A good deal of information has also been already collected and is still being collected through the National Sample Survey (NSS) of India. The chief aim of the present note is to indicate the possibilities of using the National Sample Survey (NSS) for the collection of demographic data.

2.1 The National Sample Survey (NSS) was started by the Government of India in 1950-51 and is a continuing organization which operates in the form of two or more "rounds" of survey on a country-wide basis every year, covering both rural and urban areas. In the main survey, the sample-unit is the "household" defined (on the lines of the India census concept) as a common and messing unit of persons who have lived together and taken food from the same kitchen during a period of 16 days or more out of 30 days preceding the date of investigation. The information is collected by the interview method by investigators who make personal visits to the households included in the sample. The NSS has a whole-time staff of about 600 (inclusive of investigators, inspectors, supervisors and auxiliary staff) working under the direct control of the Ministry of Finance, Government of India. The schedules cover very detailed information relating to household consumption, agricultural and industrial production, retail trading, transport, professional and financial services, employment and unemployment, housing, literacy, wages and prices, etc. The statistical work (including the sample design, processing of data, analysis and writing of reports) is done in the Indian Statistical Institute. The sample design and field schedules are changed from time to time to suit current needs, and are also improved on the basis of increasing experience.

2.2 The main (household) survey covers at present in principle 960 villages, about 500 sample blocks in 50 towns, and the 4 big cities (Calcutta, Bombay, Madras and Delhi) in each round. The 2,400 odd tehsils (a tehsil is a rural administrative unit of average size 500 square miles roughly) are divided into 240 strata (on the basis of geographical location and contribution to national income). Two tehsils are selected with replacement from each stratum with probability proportional to population and/or cultivated area; and two sample villages are selected with replacement from each sample tehsil with probability proportional to population and/or area. A suitable number of sample households is then selected in each sample village for detailed investigation by the interview method.

2.3 One point may be stressed at this stage. One set of one sample tehsil from each stratum (having been selected with replacement) would constitute an independent sample from which a valid estimate would be available for each statistical variate of interest. In the same way, the second set of one sample tehsil from each stratum (having been selected with replacement) would provide a second and entirely independent and valid sample estimate of the same variate. In this way the NSS would supply two independent but equally valid sample estimates of each variate covering the same geographical area so that the probability of the "population median" (which would be appreciably equal to the "population average" in large samples) lying between the two sample estimates would be exactly half. In other words, the observed range would directly provide the 50 per cent margin of uncertainty. Also, if any derived quantities (such as vital rates, parameters of growth curves, income elasticities of consumption, econometric constants, etc.) are obtained by any kind of mathematical and numerical calculations, then two independent estimates of each such derived quantity would also become available based respectively on the two inter-

penetrating but independent samples so that the 50 per cent margin of uncertainty of the derived quantity would be automatically determined simultaneously with the two sample estimates of the derived quantity. The method of inter-penetrating samples thus supplies a powerful tool for statistical analysis as well as for statistical control at all stages of the survey.

2.4 From the 2nd to the 6th "round" of the NSS, information was collected on age at marriage of all couples (at least one partner of which was alive at the time of investigation) in each sample household, the interval between successive births, sex and present age (or age at death) of all children born to the couple in addition to very detailed social and economic information relating to the household or the individual concerned. In this way demographic data (combined with detailed socio-economic information) have become available for more than 70,000 couples in the aggregate up to the 6th round. In the 7th round, information was collected on current events with a period of reference of one year; and such data should be fairly free from bias arising from sex-differential lapse of memory (to which reference is made later). The NSS has already provided and can continue to provide (in the form of successive "rounds" of surveys) every year much basic material for the study of population growth in relation to geographic, ethnic, social, cultural, occupational, and economic factors of various kinds. Results based on different "rounds" of surveys would also provide information on progressive changes or fluctuations with time.

3.1 Owing to the higher priority of information on economic conditions it has not yet been possible to process the demographic data. Some specimen tabulations have been, however, made and the results are given here to indicate the kind of information that can be obtained from the National Sample Survey. Table (1) gives

the two independent sample estimates of the age at marriage of husbands and wives for 10,339 Hindu rural couples married after 1930 based on the NSS 2nd round in 1106 villages.

Table (1). Average age (in years) at marriage of husband and wife for two independent samples by population zones: NSS 2nd round: 10339 Hindu rural couples married after 1930 in 1106 villages.

popu- lation zone	no.of couples	husband				wife			
		sam- ple 1 (s ₁)	sam- ple 2 (s ₂)	com- bined (s)	% diff- erence	sam- ple 1 (s ₁)	sam- ple 2 (s ₂)	com- bined (s)	% diff- erence
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1.North	1666	16.47	16.46	16.47	0.06%	13.23	12.85	13.04	2.91%
2.East	2160	20.78	20.88	20.83	0.48	14.59	14.68	14.64	0.61
3.South	1637	23.85	23.44	23.66	1.73	15.87	16.10	15.98	1.44
4.West	1035	19.37	19.63	19.51	1.33	14.75	15.18	14.96	3.01
5.Central	2590	18.09	19.14	18.63	5.64	12.56	13.15	12.86	4.59
6.North- West	1251	18.45	18.88	18.57	1.72	13.78	14.08	13.90	2.16
7.All- India	10,339	19.50	19.72	19.61	1.12%	14.13	14.34	14.23	1.48%

Estimates are given separately for the six population zones (into which India was divided for the purposes of the 1951 census) and for India as a whole. It will be seen from line (7), cols (6) and (10), that the two sample estimates of the age at marriage of the husband differed by 1.12% and the two sample estimates of the age of the wife at marriage differed by 1.48%. The percentage difference is naturally somewhat higher for individual zones; but it would seem possible to secure quite useful estimates of age at marriage on the basis of the size of samples used in the National Sample Survey.

3.2 Table (2) shows the two sample estimates of the age of the husband and of the wife in one single State, West Bengal, in two different rounds, namely the 2nd and

the 4th on the basis.

Table (2). Average age (in years) at marriage of husband and wife from two independent samples in the 2nd and the 4th rounds of NSS: all rural couples in West Bengal State.

item	husband			wife		
	2nd round	4th round	diff- erence	2nd round	4th round	diff- erence
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1.sample 1	22.31	21.70	—	13.28	12.28	—
2.sample 2	22.70	21.50	—	12.77	12.24	—
3.difference	0.39	0.20		0.51	0.04	
4.combined	22.51	21.60	0.91	13.02	12.26	0.76
5.% difference	1.73	0.92		3.9	0.33	
6.no.of villages	57	72		57	72	
7.no.of couples	857	1026	—	857	1026	—

The average age at marriage of the husband came out as 22.31 and 22.70 years in the 2nd round with a difference of 0.39 as shown in col. (2). The two independent sample estimates in the 4th round were 21.70 and 21.50 years with a difference of 0.20 as given in col. (3). The pooled estimates in the 2nd and 4th rounds were 22.51 and 21.60 years respectively in line (4) with a "between-round" difference of 0.91 compared to "within-round" differences of 0.39 and 0.20. In the same way, the "between-round" difference in the estimates of the age at marriage of the wife is seen to be 0.76 in col. (7) compared to "within-round" differences of 0.51 and 0.04 in line (3). The two interpenetrating samples can in this way supply two independent estimates in each round and hence provide a valid basis for the study of the changes which occur from one round to another.

3.3 Another topic may be now considered, namely, the average interval of time between the date of marriage and the date of birth of the first child for which some information is given in Table (3). In line (8), the interval between marriage

and the first birth (for all ages of the wife's marriage) came out as 55.7 and 53.4 months in the two samples in the 2nd round with a percentage difference of 4.1% as shown in col. (5).

Table (3). Average interval in months between marriage and the first birth by wife's age at marriage from two samples: All-India rural Hindu couples married after 1930; NSS 2nd round, 1106 villages, 10339 households.

Wife's age at marriage in years	interval in months			percentage difference
	sample 1 (s ₁)	sample 2 (s ₂)	pooled (s)	
(1)	(2)	(3)	(4)	(5)
(1) 0 - 05	149.6	146.3	147.9	2.2%
(2) 06 - 11	92.3	94.7	93.4	2.5
(3) 12 - 14	51.9	50.2	51.1	3.2
(4) 15 - 16	40.6	42.3	41.4	4.0
(5) 17 - 21	40.3	33.5	36.9	18.3
(6) 22 - 26	30.0	28.8	29.3	3.9
(7) 27 and above	16.8	25.2	21.2	39.7
(8) all ages	55.7	53.4	54.6	4.1%

The percentage difference in individual age-groups were actually lower in most cases. But there were two exceptions ("17-21 years" and "27 years and above") which have very high percentage differences (18.3% and 39.7% respectively) and therefore look suspicious; there is evidently need of further examination of these two cases.

3.4 The average interval in months between successive births from two samples in the NSS 2nd round is shown in Table (4) and is based on 5207 rural Hindu couples in 1106 villages. It will be noticed that for All-India the percentage differences varied in line (7) from 0.44% in col. (5) to 2.40% in col.(13). The percentage differences for individual population zones were naturally somewhat higher but were still about 5% or less in most cases. Results based on inter-penetrating samples, in this case also, supply useful controls.

Table (4): Average interval in months between successive births from two samples; All-India rural Hindu sample couples married after 1930: NSS 2nd round; 1106 villages.

population zone.	<u>between 1st & 2nd birth</u>			<u>percentage deviation</u>	<u>between 2nd & 3rd birth</u>			<u>percentage deviation</u>	<u>between 3rd & 4th birth</u>			<u>percentage deviation</u>
	s ₁	s ₂	S		s ₁	s ₂	S		s ₁	s ₂	S	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1. North	32.73	34.12	33.41	4.16	27.02	31.72	29.28	16.05	31.94	32.55	32.23	1.89
2. East	36.05	34.58	35.33	4.16	34.59	32.91	33.75	4.98	32.18	33.59	32.86	4.29
3. South	34.38	34.74	34.55	1.04	34.64	34.90	34.76	0.75	36.69	34.84	35.76	5.17
4. West	31.60	31.38	31.47	0.70	33.34	35.36	34.50	5.86	31.54	30.58	31.02	3.09
5. Central	33.08	34.83	33.99	5.15	31.91	31.84	31.87	0.22	30.96	30.11	30.48	2.79
6. North-West	32.57	31.80	32.27	2.39	32.60	30.79	31.72	5.71	38.88	31.34	34.89	21.61
7. All India (5207 couples)	33.92	34.07	33.99	0.44	32.33	32.89	32.61	1.72	33.28	32.49	32.88	2.40

3.5 Some further examples of pairs of independent estimates based respectively on two inter-penetrating samples are given in Table (5).

Table (5) Sets of two independent estimates based on inter-penetrating samples; All-India Hindu rural couples married after 1930; NSS 2nd round, 1106 villages, 10,339 couples.

item	sample 1 (s ₁)	sample 2 (s ₂)	combined (s)	percentage difference
(1)	(2)	(3)	(4)	(5)
1. Number of male children born per 100 female children born	108.9	104.9	106.9	3.7
2. Number of children per couple:				
(a) born	1.71	1.72	1.72	0.6
(b) dying in first year of life	0.23	0.25	0.24	8.3
3. Number of children dying in first year of life per 1000 born	134	143	138	6.5
4. Average age at marriage (in years)				
(a) husband	19.50	19.72	19.61	1.1
(b) wife	14.13	14.34	14.23	1.5
5. Interval in months between marriage and first birth (all ages)	55.7	53.4	54.6	4.1

3.6 From the illustrative examples given in this paper, it would be appreciated that useful demographic information was secured even in the second round of the NSS when such data first began to be collected. The special feature in successive rounds has been the use of two inter-penetrating samples which supply two independent estimates of each item (and of any derived quantities) in every round. As already pointed out, it is possible to calculate separate sectorial estimates for any desired regional, social, economic, or other kinds of break-downs

but the margin of uncertainty would naturally increase with decreasing size of the sample for smaller breakdowns in any single round. On the other hand, as the survey methods remain basically the same from one round to another, the results for different rounds are comparable and can also be pooled together to supply estimates averaged over the period of time covered by two or more rounds of survey; and such pooled data would be based on much larger sizes of sample compared to sample sizes available in any single round. Furthermore, two independent estimates would continue to be provided in whatever way the data for different rounds are pooled together or broken down.

4.1 Attention may now be drawn to certain results of methodological interest. In the interview method, questions are usually asked about events

Table (6). Sex ratio (number of male children per 1000 female children born up to the fourth birth) for different marriage cohorts: All-India rural sample: NSS 2nd round, 1106 villages.

	period of marriage	no. of couples	sex-ratio
	(1)	(2)	(3)
(1)	Up to 1909	910	147
(2)	1909 - 1919	945	127
(3)	1920 - 1929	1459	143
(4)	1930 - 1939	2757	108
(5)	1940 - 1945	2204	107
(6)	1946 - 1951	1001	107
(7)	all couples	9276	120

(births, deaths etc.) which had occurred in the past; and it is possible that the response or replies given by the interviewee would be affected by lapses of

memory depending on the interval of time between the event and the date of the interview.

The figures given in col. (3) seem to indicate that there was a tendency to forget the birth of female children born in earlier years.

4.2 The data used in Table (6) can also be arranged in accordance with the order of birth of the child.

Table (7). Number of male children born per 100 female children born by order of birth: All-India rural: NSS 2nd round, 1106 villages.

order of birth	marriages	
	up to 1930 (3314 couples)	after 1930 (5962 couples)
(1)	(2)	(3)
1	162	107
2	138	110
3	122	108
4	110	99
1 - 4	139	108

For each order of birth the number of male births appear to be higher in marriages up to 1930 which again suggests that the lapse of memory in respect of female births was greater for the earlier marriages.

4.3 There is also evidence of lapse of memory about the death of infants with increasing interval of time.

Table (8). Number of children dying in the first year of life per 1000 children born: All-India rural households: NSS 2nd round, 1106 villages.

	period of marriage	no. of couples	number of infant deaths
	(1)	(2)	(3)
(1)	Before 1910	2177	88
(2)	1910 - 1919	2415	102
(3)	1920 - 1929	3612	126
(4)	1930 - 1939	4652	134
(5)	1940 - 1945	3306	133
(6)	1946 - 1951	3714	181
(7)	all couples	19,876	125

The figures in col. (3) decrease as the marriage period becomes more remote from the date of enquiry which suggests that the lapse of memory about deaths of infants increases with increasing interval of time.

4.4 In Table (6) there is some evidence to suggest that in India the birth of female children tends to be forgotten more easily compared to the birth of male children; this is what might be expected in view of the much greater social importance of the birth of a son in India. It is possible that the results given in Table (7) are also affected by the sex of the child. The progressive lapse of memory in recalling past births and deaths (which may also be sex-selective) is of importance in interpreting information collected by the

interview method. In the National Sample Survey arrangements were made in the seventh round to collect information on current events occurring during one year preceding the date of interview. A comparison of the results based on such current information with the results based on information relating to past periods of reference (which have been already collected in previous rounds of NSS) is likely to throw some light on the lapse of memory in recalling past events. It is hoped that it would be possible to undertake a detailed study of this question at an early date.

5.1 Some illustrative tables of demographic information are given below. Table (9) shows the proportion of marriages in different groups of age-at-marriage of husbands and wives by marriage period. It will be noticed from columns (3) and (6) that the proportion of earlier marriages has been steadily decreasing; and from columns (5) and (8) that the proportion of later marriages has been increasing in recent years. In consequence, the average age-at-marriage has also been rising.

Table (9): Proportion of marriages by age-at-marriage group out of every 100 marriages; All-India rural couples; NSS 2nd round, 1106 villages.

marriage period	no. of couples	husband's age at marriage			wife's age at marriage			average age at marriage	
		below 15	15-26	27 above	below 12	12-26	27 above	husband	wife
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1. Up to 1909	2177	28.14	62.59	9.27	40.90	58.55	0.55	18.21	12.62
2. 1910-1919	2415	21.69	67.86	10.45	34.90	64.35	0.75	19.59	13.66
3. 1920-1929	3612	23.30	60.96	15.74	33.23	64.91	1.86	19.82	13.96
4. 1930-1939	4652	19.69	64.63	15.68	28.38	69.76	1.86	20.12	14.26
5. 1940-1945	3306	21.25	64.55	14.20	27.52	70.45	2.03	19.72	14.29
6. 1946-1951	3714	21.40	62.27	16.33	27.36	68.99	3.65	19.76	14.54

5.2 Table (10) shows the proportion of marriages by age-at-marriage separately for the different population zones. It will be noticed that there are large variations in the proportion of early marriages in the different population zones; and early marriages are most frequent in North, Central and North-west India; moderate in East and West India; and very small in South India. (The results in this table are given separately for the two inter-penetrating samples to supply a valid basis for inter-zonal comparisons).

Table (10) Proportion of marriages by age-at-marriage out of every 100 marriages from two samples by population zones: All-India rural Hindu couples married after 1930: NSS 2nd round: 1106 villages.

population zone	no. of couples	sample	Husband's age at marriage in years			wife's age at marriage in years		
			below 15	15-26	27 above	below 12	12-26	27 above
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. North	1666	1	46.71	44.50	8.79	43.18	54.92	1.90
		2	39.83	51.00	9.17	41.19	55.55	3.26
		combined	43.29	47.73	8.98	42.19	55.23	2.58
2. East	2160	1	13.66	71.10	15.04	20.46	77.94	1.60
		2	14.93	67.22	17.85	24.14	74.58	1.28
		combined	14.41	69.11	16.48	22.34	76.22	1.44
3. South	1637	1	0.26	75.11	24.63	9.24	89.57	1.19
		2	1.38	76.39	22.23	8.44	90.85	0.71
		combined	0.77	75.70	23.53	8.87	90.16	0.97
4. West	1035	1	16.83	74.78	8.39	22.05	75.66	2.29
		2	19.40	65.27	15.33	21.52	74.71	3.77
		combined	18.15	69.89	11.96	21.78	75.16	3.06
5. Central	2590	1	29.76	60.50	9.74	46.05	52.48	1.47
		2	21.12	67.36	11.52	43.56	52.17	4.27
		combined	25.28	64.06	10.66	44.76	52.32	2.92
6. North-west	1251	1	33.98	45.23	20.79	37.11	57.92	4.97
		2	20.89	69.08	10.03	25.01	73.13	1.86
		combined	28.89	54.50	16.61	32.41	63.82	3.77
7. All-India	10339	1	23.57	61.21	15.22	29.68	68.08	2.24
		2	19.82	65.55	14.63	27.31	70.17	2.52
		combined	21.76	63.31	14.93	28.72	68.82	2.46

5.3 The next Table (11) shows the total number of children born per couple by wife's present age, and by duration of marriage.

Table (11): Total number of children born per couple (with duration of marriage 22 years and above) by wife's present age: All-India rural couples: NSS 2nd round, 1106 villages.

duration of marriage		wife's present age					all ages
years.	no. of couples	below 37 yrs.	37-41 yrs.	42-46 yrs.	47-51 yrs.	52 years and above	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. 22-26	1833	4.716	5.410	5.052	4.512	4.60%	4.930
2. 27-31	1328	5.203	5.393	5.873	5.360	4.771	5.422
3. 32 & above	2628	4.100	5.493	6.021	5.834	6.586	5.621
4. 22 above	5789	4.790	5.417	5.736	5.540	5.425	5.358

5.4 Table (12) gives the number of children born per couple by stages of years-after-marriage.

Table (12): Total number of children born per couple by stages of years-after-marriage and the maximum after 22 years: All-India rural couples: NSS 2nd round, 1106 villages.

years after marriage stages	no. of couples	married before 1930			married after 1930			
		wife's age at marriage			no. of couples	wife's age at marriage		
		below 15	15 & above	All ages		below 15	15 & above	all ages
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) 2	8111	0.056	0.152	0.095	10,543	0.176	0.079	0.271
(2) 7	7700	0.687	1.473	1.001	6,909	1.359	1.013	1.756
(3) 12	7273	1.807	2.764	2.187	4,072	2.646	2.238	3.154
(4) 22	6179	4.214	4.701	4.398	-	-	-	-
(5) maximum after 22	6179	5.406	5.283	5.360	-	-	-	-

5.5 The next Table (13) shows the number of children born per couple by stages of years-after-marriage and also by period of marriage. It will be noticed that in the first portion of the table for the stage of 2 years-after-marriage, in column (4) the number of children born per couple increases from 0.056 for marriages in the period 1930-39 to 0.102 for the marriage period 1940-45, and to 0.163 for the marriage period 1946-51. In the same way, in column (5), the figure increases from 0.222 for 1930-39 to 0.428 for 1946-51, and in column (6) from 0.132 for 1930-39 to 0.358 for 1946-51. A similar increase will be noticed in the second portion of the table (for the stage 7 years-after-marriage) where there is a similar increase in the number of children born per couple from 0.926 for the period 1930-39 to 1.223 for 1940-45 in column (4); from 1.711 for 1930-39 to 1.841 for 1940-45 in column (5); and from 1.276 for 1930-39 to 1.536 for 1946-51. The change is consistent in every case.

Table (13): Number of children born per couple at years-after-marriage stages 2, 7 and 12 years; All-India rural couples married after 1930; NSS 2nd round, 1106 villages.

<u>years after marriage stage</u>	<u>no. of couples</u>	<u>marriage period</u>	<u>wife's age at marriage</u>		
			<u>below 15</u>	<u>15 & above</u>	<u>all ages</u>
(1)	(2)	(3)	(4)	(5)	(6)
2 years	10,543	1930-39	0.056	0.222	0.132
		1940-45	0.102	0.245	0.175
		1946-51	0.163	0.428	0.358
		after 1930	0.079	0.271	0.176
7 years	6,909	1930-39	0.926	1.711	1.276
		1940-45	1.223	1.841	1.536
		after 1930	1.013	1.758	1.359
12 years	4,972	1930-39	2.238	3.154	2.646

5.6 Table (14) shows the number of children born per couple at assigned number of years after marriage separately for the six population zones. It will be noticed that there is a good deal of variation between the different population zones. The number of children born appears to have been consistently the highest in South India with comparatively low values in Central India.

Table (14): Total number of children born per couple at assigned number of years after-marriage by population zones: All-India rural Hindu couples married after 1930; NSS 2nd round, 1106 villages.

<u>population zones</u>	<u>2 years after marriage</u>					
	<u>2 - 6 years</u>		<u>7 - 11 years</u>		<u>12 - 21 years</u>	
	n	c	n	c	n	c
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) North	152	.254	285	.097	453	.052
(2) East	271	.285	405	.107	708	.105
(3) South	345	.428	356	.304	518	.294
(4) West	124	.203	185	.059	322	.076
(5) Central	274	.269	424	.113	728	.049
(6) Northwest	140	.247	181	.119	375	.146
(7) All-India	1306	.310	1834	.148	3102	.123

<u>population zones</u>	<u>7 years after marriage</u>				<u>12 years after marriage</u>	
	<u>7 - 11 years</u>		<u>12 - 21 years</u>		<u>12 - 21 years</u>	
	n	c	n	c	n	c
(1)	(8)	(9)	(10)	(11)	(12)	(13)
(1) North	285	1.270	453	.949	453	2.362
(2) East	403	1.464	708	1.243	708	2.634
(3) South	356	1.876	518	1.785	518	3.102
(4) West	185	1.569	322	1.326	322	2.825
(5) Central	424	1.332	728	0.900	728	2.255
(6) Northwest	181	1.332	375	1.152	373	2.543
(7) All-India	1834	1.497	3102	1.225	3102	2.608

n= no. of couples

c= no. of children

5.7 Table (15) gives the number of children born per couple by stages of years-after-marriage and by land possessed by the household. There are indications of interesting variations which deserve careful examination.

Table (15): Number of children born per couple by stages of years-after-marriage 2, 7, and 12 years by land possessed: All-India rural couples married after 1930: NSS 2nd round, 1106 villages.

Land possessed (in acres)	2 years after marriage					
	marriage duration					
	2 - 6 yrs.		7 - 11 yrs.		12 - 21 yrs.	
(1)	n	c	n	c	n	c
(1) 0 acre	382	.369	531	.217	883	.154
(2) 1 acre	136	.313	156	.127	295	.123
(3) 2 - 5 acres	359	.285	515	.132	895	.110
(4) 6 - 10 acres	222	.272	341	.177	463	.118
(5) 11 acres and above	332	.262	467	.097	744	.096

Land possessed (in acres)	7 years after marriage				12 years after marriage	
	marriage duration					
	2 - 6 years		7 - 11 years		12 - 21 years	
(1)	n	c	n	c	n	c
(1) 0 acre	531	1.712	883	1.357	883	2.802
(2) 1 acre	156	1.292	295	1.036	295	2.304
(3) 2 - 5 acres	515	1.545	895	1.324	895	2.713
(4) 6 - 10 acres	341	1.537	463	1.264	463	2.740
(5) 11 acres and above	467	1.422	744	1.176	744	2.512

n = no. of couples

c = no. of children

5.8 It is worth noting that the data given in Tables (12) - (15) seem to indicate that the number of children born per couple to recent marriage cohorts was greater than the number born to earlier cohorts. The results, however, are based on only the 2nd round of survey and are necessarily tentative and much further study is necessary before reaching definite conclusions.

5.9 Table (16) gives the two-way distribution of marriages by age-at-marriage of husbands and wives from which relevant information on correlation and regression can be easily determined. It may be noted that it is possible to obtain two independent sets of correlation tables based respectively on the two inter-penetrating samples in each round of survey; and calculate two sets of co-efficients of correlation and regression constants, and thus secure the over-all margin of uncertainty in each case.

Table (16): Proportion of marriages by husband's age at marriage and by wife's age at marriage out of every 100 marriages: All-India rural Hindu, 1030 sample couples married after 1930: NSS 2nd round, 1106 villages

wife's age (in years) at marriage	husband's age (in years) at marriage							all ages
	up to 5	6-11	12-14	15-16	17-21	22-26	27 above	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) up to 5	1.5	2.5	0.3	0.1	0.1	-	-	4.5
(2) 6 - 11	0.1	7.0	7.4	4.6	4.0	1.1	0.5	24.7
(3) 12 - 14	-	0.1	2.9	6.2	12.9	4.7	1.9	28.7
(4) 15 - 16	-	-	-	1.0	10.6	5.4	2.9	19.9
(5) 17 - 21	-	-	-	0.2	4.3	7.0	5.0	16.5
(6) 22 - 26	-	-	-	-	0.2	0.8	2.5	3.5
(7) 27 & above	-	-	-	-	-	0.1	2.1	2.2
(8) All ages	1.6	9.6	10.6	12.1	32.1	19.1	14.9	100

5.10 Finally in Table (17) some information is given on the number of children born per couple, the number dying in the first year of life per couple, and proportion of children dying in the first year of life per 1000 children born by occupation, religion, and Hindu caste groups. There is definite evidence of variations between the different groups which require careful study.

Table (17): Number of children born and number dying in the first year of life per couple by occupations, religions, and castes: All-India rural couples married after 1930: NSS 2nd round, 1106 villages.

<u>group</u>	<u>no. of couples</u>	<u>no. of children per couple born</u>	<u>no. of children per couple dying in 1st year of life</u>	<u>proportion of children dying in 1st yr. of life per 1000 children born.</u>
(1)	(2)	(3)	(4)	(5)
(A) Occupations				
(1) Agriculture	9861	1.72	0.24	138
(2) Others	1811	1.92	0.25	131
(B) Religions				
(3) Christians	171	2.53	0.26	102
(4) Sikh	306	2.16	0.29	132
(5) Muslim	755	1.98	0.27	135
(6) Hindu	10,339	1.72	0.24	138
(C) Hindu castes				
(7) Upper	713	1.75	0.27	155
(8) Middle	2556	1.56	0.24	154
(9) Lower	4472	1.76	0.23	128
(10) Scheduled.	2488	1.74	0.24	137

6. As already mentioned, all the results given above are based on one single round and are tentative. But much information has been collected from round to round and are still being collected through the NSS which would enable very detailed and critical studies being undertaken and followed up from round to round, and pursued by various types of breakdowns and by the pooling together of the data for two or more rounds.

The use of sample surveys in demographic studies in India

P.C. Mahalanobis and Agit Das Gupta

Summary

Vital rates on population growth (such as specific marriage, fertility, infant or general mortality rates) are not yet accurately known for India. Marriages are mostly religious and not registered; and birth and death registration is admittedly defective. In the immediate future properly designed sample surveys appear to be the only practical approach to the ascertainment of basic vital rates.

The National Sample Survey (NSS) which was initiated by the Government of India on a country-wide basis in 1950 can be effectively used for this purpose. The NSS operates in the form of successive "rounds" of survey in each year and covers both rural and urban areas. A good deal of material has been collected from the 2nd to the 8th round (which is in progress) but has not yet been analyzed (owing to the higher priority of information on economic conditions); some preliminary results of demographic interest have been, however, obtained and are presented here to show what kind of demographic data can be conveniently collected through large-scale sample surveys.

Special attention is drawn to the advantages of using independent and interpenetrating sub-samples which supply valid estimates of the margin of uncertainty of sample estimates and also provide powerful operational controls at all stages.

Attention is also drawn to progressive changes in recall (or response) lapses on sex-selective infant deaths, and their significance in interpreting the results. Some demographic facts are mentioned such as that recent marriage cohorts have more children per couple at different years after marriage than earlier cohorts.

Utilisation des sondages pour les études démographiques dans l'Inde

P.C. Mahalanobis et Agit Das Gupta

Résumé. Les registres de l'état civil, dans l'Inde, ne permettent pas encore d'avoir des renseignements statistiques précis sur le taux d'accroissement de la population ni sur ses composantes : taux de nuptialité, taux de natalité, taux de mortalité infantile ou taux général de mortalité. La plupart du temps, les mariages ne se font que religieusement et ne sont pas enregistrés; et il est reconnu que l'état civil ne tient pas un compte exact des naissances et des morts. Il semble que, pour l'avenir immédiat, des sondages bien conduits soient le seul moyen pratique d'obtenir des données statistiques de base.

L'Institut national de sondage (National Sample Survey - NSS) que le Gouvernement de l'Inde a créé en 1950, peut être très utile en cette matière. Le NSS effectue chaque année plusieurs "tours" de sondages, qui couvrent à la fois les régions urbaines et les régions rurales. Un grand nombre de renseignements démographiques ont été recueillis du second au huitième tour - auquel on procède actuellement - mais il n'a pas été possible, jusqu'ici, de les analyser car il a fallu réserver la priorité aux renseignements de caractère économique. Cependant, on a déjà pu tirer quelques conclusions. Ce sont ces conclusions que l'on présente ici afin de montrer le genre de renseignements démographiques qu'on peut facilement tirer de sondages de grande envergure.

On a spécialement attiré l'attention sur l'intérêt qu'il y a à faire des recoupements en pratiquant, pour chaque sondage général, des sondages indépendants mais dont les données se corroborent, ce qui permet d'estimer raisonnablement la marge d'erreurs et de contrôler efficacement les opérations dans toutes leurs phases.

On a également souligné les changements qui interviennent progressivement concernant les lacunes dans les renseignements afférents à la mortalité infantile pour chaque sexe et leur incidence sur l'interprétation des données des sondages. On a fait apparaître quelques faits démographiques. On a trouvé notamment que les cohortes récentes comptent, par couple, plus d'enfants, nés à des intervalles divers après le mariage, que les cohortes plus anciennes.