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## Wanted and Unwanted Fertility in Selected States of India

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**Abstract:** *In this report, we propose new measures of wanted and unwanted fertility based on actual and wanted parity progression ratios, and we apply these procedures to NFHS data for eight states in India. In the four large states with high fertility, levels of wanted fertility are high, at three or more children per married women, and the proportion unwanted ranges from 20 to 28 percent of total marital fertility. In the three states with moderate levels of fertility, the proportions of unwanted fertility are even higher, ranging from 31 to 34 percent. In Kerala, wanted fertility is already at replacement level, and there is very little unwanted fertility.*

In the high-fertility states, variation in wanted fertility is relatively large but variation in unwanted fertility is modest. In states with moderate levels of fertility, variation in unwanted fertility is much larger than variation in wanted fertility. Multivariate analysis indicates that education, religion, exposure to family planning messages on radio or television, experience of child loss, and son preference are among the important determinants of contraceptive use among women who want no more children.

In many developing countries, births that women have but do not want constitute a substantial proportion of all births (Blanc 1982) (Bongaarts 1990) (Bongaarts1997) (Lightbourne 1985) (United Nations 1987) (Westoff 1981). Studies document that unwanted births constitute 20 to 30 percent of total births in recent years in most developing countries (Bankole and Westoff 1995) (Blanc 1982) (Bongaarts 1990) (United Nations 1987) (Westoff 1981) (Westoff and Ochoa 1991). Reducing the level of unwanted births has important social, health, and demographic consequences. At the individual level, preventing unwanted births enhances the well being of women and their children. At the societal level, eliminating unwanted births leads to substantial reductions in fertility and rates of population growth (Bongaarts 1997). Measuring the level of unwanted fertility accurately and identifying the factors associated with variations in unwanted fertility can therefore provide valuable information to policymakers who are concerned about the welfare of women and children and about reducing fertility levels.

Research on unwanted fertility also improves our understanding of the process of transition from high to low levels of fertility. Unwanted fertility is likely to be nearly non-existent at the two extreme stages of transition initially when fertility desires are mostly unrestricted and at the end of the transition when couples have nearly complete control over their fertility. In intermediate situations many couples prefer a specific family size but do not regulate their fertility effectively and therefore have some unwanted births (Easterlin 1983) (Freedman and Coombs 1974). Bongaarts (1990, 1997) examined levels of unwanted fertility using data from 48 World Fertility Surveys (WFS) and Demographic and Health Surveys (DHS) and found that the proportion of unwanted births was low in countries with very low or very high levels of fertility and highest in countries with intermediate levels of fertility. It is also possible for actual fertility to be below the level of desired family size. In pre-transition populations, actual fertility may be below wanted fertility because of low fecundity associated with the malnutrition of women and a high prevalence of gynaecological problems. In post-transition populations, a substantial proportion of couples who desire more children may choose to have fewer children because of unfavourable socio-economic conditions or for other reasons. In Japan, for example, actual fertility has been substantially below desired family size since about 1975 (Retherford, Ogawa, and Sakamoto 1996).

Developmental factors, including modernisation and programme interventions, can have, conflicting influences on the extent of unwanted fertility. On the one hand, economic and social development may bring about a decline in desired family size, which, other things remaining equal, can increase unwanted fertility. Development can also lead to unwanted fertility through increased fecundity due to improved nutritional levels of women and reductions in spontaneous abortions and stillbirths. On the other hand, development forces typically reduce unwanted fertility by reducing the costs of fertility regulation: couples have increased knowledge of contraception and better access to contraceptive services, and there is greater social acceptance of the idea of birth control within marriage. The actual extent of unwanted fertility is the result of the relative strengths of these forces.

Commonly used measures of unwanted fertility have relied heavily on the reported ideal number of children or the reported wanted status of recent births. As Bongaarts (1990) has shown, the reported ideal number of children and reported wanted status of births tend to underestimate actual levels of unwanted fertility. Bongaarts has introduced a new measure of wanted fertility using information on recent fertility and respondents' desire for more children, arguing that the information on desire for more children does not suffer from the biases associated with the reported ideal number of children and wanted status of

recent births. Bongaart's measure of wanted fertility is conceptually complicated, however.

In this report we propose new measures of wanted and unwanted fertility based on actual and wanted parity progression ratios. The new measures are conceptually clear, and the computation is straightforward. We use them to estimate wanted and unwanted fertility for selected states of India that are at varying levels of fertility and socio-economic development. By examining this range of states, we hope to gain a better understanding of how levels of wanted and unwanted fertility change during the fertility transition. We use state-level data collected in the 1992-93 National Family Health Survey of India (NFHS), which offer a unique opportunity in this respect. Although the data are cross-sectional, the economic and social conditions in states at different stages of the fertility transition provide clues about what happens during the transition. The analysis of state-level variation in wanted and unwanted fertility, as well as variation by selected background characteristics of survey respondents, also provides information that may be useful to policymakers and programme administrators.

Most unwanted fertility results from failure to use contraceptive methods by couples who do not want any more children. Clarifying the factors associated with use-and non-use--of contraception among women who do not want more children can therefore help family planning programme managers interested in-reducing unwanted fertility. The final part of this report includes an analysis of contraceptive behaviour among women who do not want any more children.

## **Data**

The NFHS, the largest demographic survey ever conducted in India, collected information on fertility, family planning, and maternal and child health. Data from the survey cover 24 states and the National Capital Territory of Delhi, comprising 99 percent of India's population. The sample includes 89,777 ever-married women age 13-49 in 88,562 households. The survey used a systematic multi-stage, stratified sample design. In states where the urban population was not sufficient to provide a sample of at least 1,000 completed interviews with eligible women, urban areas were purposely over-sampled (UPS 1995). The computations in this report, therefore, use sample weights in states where urban populations were over-sampled. The analysis is limited to eight states in India that represent a wide range of geographic characteristics, cultural backgrounds, socio-economic conditions, and stages of demographic transition. They include three states in the northern region (Himachal Pradesh, Punjab, and Rajasthan), two in the central region (Uttar Pradesh and Madhya Pradesh), Bihar in the

eastern region, Maharashtra in the western region, and Kerala in the southern region.

Among these, Uttar Pradesh, Madhya Pradesh, Bihar, and Rajasthan are considered to be problem states, lagging far behind the others in their demographic transition and most indicators of socio-economic development. In contrast, Himachal Pradesh, Punjab, and Maharashtra have fertility and infant mortality rates that are well below the national level. Punjab and Himachal Pradesh are known to have higher levels of son preference than other Indian states (Mutharayappa et al. 1997). Punjab is also agriculturally the most advanced state in India and ranks second among the states in per capita state domestic product (SDP). Maharashtra, industrially the most advanced state, ranks third in per capita SDP. Kerala is not much ahead of the four problem states in economic conditions but with the highest literacy rate (89.8 percent according to the 1991 census), is the most advanced state in social development (CMIE 1994). Kerala also has low fertility, and the demographic situation there resembles the situation in developed countries.

Table 1 shows background characteristics of the NFHS sample respondents in these states. The proportion urban ranges from 9 percent in Himachal Pradesh to 39 percent in Maharashtra. The four most populous states-Uttar Pradesh, Bihar, Madhya Pradesh, and Rajasthan are similar in educational level and exposure to radio or television. Three-quarters or more of ever-married women there are illiterate, and only slightly more than one-quarter have been exposed to radio. In Himachal Pradesh, Punjab, and Maharashtra, women's literacy rate, exposure to television, and exposure to radio are all at about 50 percent. In Kerala, 84 percent of women are literate, and 71 percent have been exposed to radio. Standing out as having larger percentages of Muslims than other states (11-19 percent) are Uttar Pradesh, Bihar, Maharashtra, and Kerala. In Punjab, Sikhs are the major religious group, accounting for nearly 60 percent of the sample population. Madhya Pradesh, Rajasthan, Himachal Pradesh, and Punjab have comparatively high proportions (more than a quarter) of women from scheduled castes (SC) and scheduled tribes (ST), which are socially deprived groups. The four largest states (Uttar Pradesh, Bihar, Madhya Pradesh, and Rajasthan) have high total fertility rates (TFRs), ranging from 3.6 births per woman in Rajasthan to 4.8 in Uttar Pradesh. They also have high infant mortality rates (IMRs), ranging from 73 deaths per 1,000 births in Rajasthan to 100 in Uttar Pradesh. In their fertility transition these states lag far behind Kerala, which has achieved replacement-level fertility (TFR = 2.0) and a remarkably low IMR of 24. Himachal Pradesh, Punjab, and Maharashtra, with TFRs ranging between 2.9 and 3.0 and IMRs ranging between 51 and 56, are at the middle level of demographic transition.

**Table 1:** Sample Size and Percentage Distributions of ever-married Women age 13-49 by basic Background Characteristics in Selected States of India, NFHS 1992-93.

| State            | Percentage Distribution |       |            |            |       |          |        |       |             |    |       | Total fertility Rate* (TFR) | Infant Mortality Rate <sup>b</sup> (IMR) |
|------------------|-------------------------|-------|------------|------------|-------|----------|--------|-------|-------------|----|-------|-----------------------------|--|
|                  | Sample Size             | Urban | Illiterate | Exposed to |       | Religion |        |       | Caste/tribe |    |       |                             |  |
|                  |                         |       |            | TV         | Radio | Hindu    | Muslim | Other | SC          | ST | Other |                             |  |
| Uttar Pradesh    | 11,438                  | 20    | 76         | 19         | 30    | 83       | 16     | 1     | 18          | 1  | 81    | 4.8                         | 100                                      |
| Bihar            | 5,949                   | 13    | 78         | 13         | 26    | 82       | 16     | 2     | 10          | 9  | 82    | 4.0                         | 89                                       |
| Madhya Pradesh   | 6,254                   | 23    | 74         | 27         | 33    | 93       | 5      | 2     | 7           | 28 | 65    | 3.9                         | 85                                       |
| Rajasthan        | 5,211                   | 23    | 82         | 18         | 27    | 92       | 6      | 2     | 21          | 17 | 62    | 3.6                         | 73                                       |
| Himachal Pradesh | 2,962                   | 9     | 50         | 47         | 55    | 97       | 1      | 2     | 23          | 6  | 71    | 3.0                         | 56                                       |
| Punjab           | 2,995                   | 30    | 53         | 57         | 47    | 40       | 1      | 59    | 28          | 0  | 72    | 2.9                         | 54                                       |
| Maharashtra      | 4,106                   | 39    | 50         | 46         | 52    | 77       | 11     | 12    | 7           | 10 | 83    | 2.9                         | 51                                       |
| Kerala           | 4,332                   | 26    | 16         | 42         | 71    | 58       | 19     | 23    | 4           | 4  | 93    | 2.0                         | 24                                       |

SC - Scheduled Caste; ST - Scheduled Tribe

a. Based on birth to women age 15-49 during the three years preceding the survey.

b. Per 1,000 live births for the five years preceding the survey.

## Measuring Wanted and Unwanted Fertility

Studies of wanted fertility have used measures based on three types of information commonly available in fertility surveys, including the WFS and the DHS series: ideal family size, wanted status of recent births, and desire for more children. The first and simplest measure of wanted fertility is based on responses to a question on ideal family size (Easterlin 1978) (McClelland 1983), which often takes the following form: 'If you could choose exactly the number of children to have in your whole life, how many would that be? The second and most frequently used measure of wanted fertility is obtained by excluding unwanted births from the usual calculation of the total fertility rate (Bankole and Westoff 1995; Lightbourne 1985; Westoff 1981). Births that occur after a woman has achieved her ideal family size, or births that she reports as unwanted at the time of conception, are excluded. The third commonly used measure is based on a direct question to married women about children born to them during a recent reference period, typically the first four or five years preceding the survey. For these births, women are asked whether they wanted to become pregnant at the time of conception, later on, or not at all. Births reported as wanted 'not at all' are defined as unwanted (Weller et al. 1991) (Westoff, Moreno, and Goldman 1989).

In his review of methods of estimating wanted fertility, Bongaarts (1990) argues that these measures are likely to be biased on account of many factors. Those factors include respondents tendency to rationalise previously unwanted births as wanted, couples limiting fertility voluntarily before reaching their desired family size, their preference for a particular combination of male and female offspring, and the tendency of some respondents to give non-numeric responses to structured survey questions. Together these biases tend to produce over-estimations of wanted fertility (Bongaarts 1990). It is also possible that some women respond to the question on ideal number of children not by stating the number they consider ideal for themselves but instead a number they consider ideal for the general population. According to the NFHS (IIPS 1995), more than 60 percent of women with five or more children reported the ideal number of children to be smaller, two or three, than the number of children they had. It is likely that many of those women simply repeated the well publicised slogan 'of the official family planning program, 'Do yaa Teen Bas [Two or Three are Enough].' The reported wanted status of recent births also suffers from questionable validity. A recent Moroccan study on the validity of the reported wanted status of recent births documents that women's responses are highly unreliable (Bankole and Westoff in press). Women were asked about the wanted status of recent births in 1992 and again in 1995. Two-thirds of those who in 1992 reported a birth as 'unwanted' changed their response to 'wanted' three years later.

The measure of wanted births proposed by Bongaarts (1990) uses information on respondents' desire for more children. Bongaarts first computes age-specific fertility rates counting only the births to women who want to have more children. He then adds an estimate of the number of last wanted births to all women, which is approximately one. Because the computation of this measure relies on the desire for more children, the measure is unaffected by rationalisation of previously unwanted births as wanted. As we have noted, however, the measure is conceptually difficult to understand. That is because it has two components, one based on past fertility ('want more children') and the other an estimate of progression to last wanted birth. Applying the method to data from 48 WFS and DHS surveys, Bongaarts has found that his measure result in a lower level of wanted fertility than the measure based on age specific fertility rates and ideal number of children, the average difference being 0.33 births per woman. He also notes that the reported ideal number of children is larger, on average, than the new measure of wanted fertility by 0.81 births per woman.

NFHS respondents reported as unwanted 9 percent of the births that occurred during the four years preceding the NFHS (IIPS 1995, Table 7.11). The percentage varies from 2 percent in Kerala to 19 percent in Nagaland. When survey analysts calculated 'wanted more children' [TFR] by using the reported ideal family size as wanted family size, they found that 22 percent of total fertility in India during the three years before the NFHS survey was unwanted (IIPS 1995, Table 7.13). This percentage varies from 9 percent in Kerala to 31 percent in Himachal Pradesh. The large difference between these two estimates underscores the need for better measures of wanted and unwanted fertility in India.

### **New Parity Progression-Based Measures Of Wanted And Unwanted Fertility**

The measures of wanted and unwanted fertility we propose are based on actual and wanted parity progression ratios. We compute the total marital fertility rate based on period parity progression ratios (Feeney and Yu 1987) and a 'wanted total marital fertility rate,' defined below. Our measure of wanted fertility is the hypothetical level of fertility that would be achieved if all women who wanted to have more children did so and no other women did.

We first calculate parity-specific 'wanted parity progression ratios,' which are the same as the proportions of women of given parity who want more children, adjusted for the fact that some women may already have had some unwanted births.

**We begin with two sets of data.**

$P(i)$ : period parity progression ratio (Feeney and Yu 1987) for women of parity  $I$ , based on births in the period 1-36 months before the survey, and

$W(i)$ : unadjusted wanted parity progression ratio for women of parity  $i$ , calculated as the proportion of women of parity  $i$  who want at least one more child.

A total wanted fertility rate can be computed from the set of unadjusted wanted parity progression ratios  $W(i)$ . The result, however, will not be an accurate measure of wanted fertility because the denominator of  $W(i)$ , which consists of all women of parity  $i$ , includes women who already have borne some unwanted children. We need to adjust the denominator to obtain the proportion of women who want more children among those who have no unwanted children. The adjustments are made as follows:

**First we calculate**

$R(i)$ : the proportion of women reaching parity  $i$  in a synthetic cohort, defined as a group of women who experience the period parity progression ratios  $P(i)$  during their lifetime.

**Then**

$$R(0) = 1, \text{ and}$$

$$R(i) = R(i-1) P(i-1), i > 0.$$

We define  $R^*(i)$  to be the proportion of women who want to reach parity  $i$ .

**Then**

$$R^*(0)=1, \text{ and}$$

$$R^*(i)=R(i-1) W(i-1), i > 0.$$

We calculate the adjustment factor  $A(i)$  as the ratio of the number of women who want to reach parity  $i$  and the number of women who actually have an  $i$ th child (i.e., reach parity  $i$ ) in the synthetic cohort.

$$A(i) = R^*(i) / R(i).$$

Then we can calculate the adjusted wanted parity progression ratio  $W^*(i)$  by multi-plying the denominator of  $W(i)$  by the adjustment factor, which results in  $W^*(i) = W(i) / A(i)$ .

Once the  $W^*(i)$  are calculated, they are plugged into Feeney and Yu's (1987) formula for the parity progression-based total marital fertility rate (TMFR), yielding

$$WTMFR = W^*(0) + W^*(0) W^*(1) + W^*(0) W^*(1) W^*(2) + \dots + W^*(0) W^*(1) W^*(2) \dots W^*(k),$$

where  $k$  is the largest number of children ever born to women in the state under consideration, minus one. It follows that  $W^*(k + 1) = 0$ .

We also make use of the TMFR in the recent past, estimated from period parity progression ratios during the three-year period before the NFHS (Feeney and Yu 1987) (Gandotra et al. in preparation). It is calculated as

$$TMFR = P(0) + P(0) P(1) + P(0) P(1) P(2) + \dots + P(0) P(1) P(2) \dots P(k)$$

The unwanted total marital fertility rate (UTMFR) is then defined as the difference between TMFR and WTMFR. It can be interpreted as the total number of unwanted children per woman.

$$UTMFR = TMFR - WTMFR.$$

Table 2 illustrates the computation of wanted parity progression ratios and the wanted total marital fertility rate for the state of Himachal Pradesh. Note that the values of the adjustment factor,  $A(i)$ , are quite small for parities three and higher. This should not be a source of alarm. It just means that a large proportion of women at parities three and higher have at least one unwanted birth.

**Table 2:** Illustrative Computation of Parity Progression Based Wanted Total Marital Fertility Rate (WTMFR)

| Parity (I) | Unadjusted Wanted Parity Progression Ratio $W(I)$ | Proportion Reaching the Parity in the Synthetic Cohort $R(I)$ | Proportion Wanting to Reach the Parity $R^*(I)$ | Adjustment Factor $A(I)$ | Adjusted Wanted Parity Progression Ratio $W^*(I)$ |        |
|------------|---|---|---|--------------------------|---|--------|
| 0          | 0.988   | 0.9657  | 1.0000  | 1.0000                   | 1.000   | 0.9657 |

|       |       |        |        |        |       |        |
|-------|-------|--------|--------|--------|-------|--------|
| 1     | 0.967 | 0.8786 | 0.9880 | 0.9657 | 0.977 | 0.8989 |
| 2     | 0.761 | 0.2723 | 0.9554 | 0.8681 | 0.909 | 0.2997 |
| 3     | 0.542 | 0.1214 | 0.7271 | 0.2602 | 0.358 | 0.3393 |
| 4     | 0.434 | 0.0683 | 0.3941 | 0.0883 | 0.224 | 0.3049 |
| 5     | 0.582 | 0.0655 | 0.1710 | 0.0269 | 0.157 | 0.4162 |
| 6     | 0.450 | 0.0690 | 0.0995 | 0.0112 | 0.113 | 0.6131 |
| 7     | 0.228 | 0.0697 | 0.0448 | 0.0069 | 0.153 | 0.4546 |
| 8     | 0.241 | 0.0000 | 0.0102 | 0.0031 | N.A   | 0.0000 |
| 9     | 0.000 | 0.0000 | 0.0025 | 0.0000 | N.A   | 0.0000 |
| TMFR  |       |        | 3.39   | 2.23   |       |        |
| WTMFR |       |        |        |        |       |        |

NA: Not Applicable

The parity progression-based wanted total fertility rate is free from biases due to rationalisation because the measure uses information on whether a woman wants another child. As Bongaarts (1990) has pointed out, this type of information about fertility preferences is the least biased. The WTMFR measure is also conceptually intuitive, and the computation is relatively simple.

### Levels of Wanted and Unwanted Fertility in Eight States of India

Table 3 shows levels of the total marital fertility rate, the wanted total marital fertility rate, and the unwanted total marital fertility rate in the eight states, estimated by the method described above. Unwanted total marital fertility ranges from 16 to 34 percent of the total marital fertility rate and is within the range observed in other studies based on other measures (Blanc 1982) (Bongaarts 1990) (Westoff 1981) (Westoff 1991).

**Table 3:** Estimated Total Marital Fertility Rates (TFMR), wanted Total Fertility Rates (WTMFR), and Unwanted Total Marital Fertility Rates (UTMFR), by State

| Marital Fertility Rates |              |                |                  |                               |  |
|-------------------------|--------------|----------------|------------------|-------------------------------|--|
| State                   | Total (TMFR) | Wanted (WTMFR) | Unwanted (UTMFR) | Percent Unwanted <sup>a</sup> | Percent Unwanted by Conventional Method <sup>b</sup> |
| Uttar Pradesh           | 5.27         | 3.81           | 1.46             | 28                            | 21   |
| Bihar                   | 4.26         | 3.42           | 0.84             | 20                            | 21   |
| Madhya Pradesh          | 4.22         | 3.04           | 1.18             | 28                            | 18   |
| Rajasthan               | 3.86         | 2.95           | 0.91             | 24                            | 23   |
| Himachal Pradesh        | 3.39         | 2.23           | 1.16             | 34                            | 31   |

|                    |      |      |      |    |    |
|--------------------|------|------|------|----|----|
| <b>Punjab</b>      | 3.36 | 2.24 | 1.12 | 33 | 26 |
| <b>Maharashtra</b> | 3.30 | 2.27 | 1.03 | 31 | 26 |
| <b>Kerala</b>      | 2.37 | 2.00 | 0.37 | 16 | 9  |

a. Calculated as  $UTMFR/TMFR * 100$

b. Based on the conventional computation of the total fertility rate (TFR) and the unwanted total fertility rate (UTFR), treating births that occur after achieving the ideal number of children as unwanted. Calculate as  $UTFR/TFR * 100$

The last column of Table 3 shows the proportions of unwanted births computed by the conventional method (IIPS 1995, Table 7.13). The conventional wanted total fertility rate is computed in the same way as the total fertility rate, based on age-specific fertility rates, excluding the births that occurred after women reached their current ideal number of children. Because the conventional wanted total fertility rate is based on age-specific fertility rates of all women, it cannot be compared directly, with our measure of the wanted total marital fertility rate, which is based on age specific fertility rates of married women. If births outside marriage are rare, as in India, however, the proportions of unwanted fertility based on these two measures of wanted fertility are roughly comparable. It is noteworthy that the proportion of unwanted births derived from the new measure tends to be slightly higher than the proportion of unwanted births derived from the conventional measure.

The unwanted total marital fertility rate is lowest in Kerala (0.37 unwanted births) and highest in Uttar Pradesh (1.46 unwanted births). In the remaining six states, levels of unwanted total fertility are similar, at about one child per woman. The percentage unwanted is lowest in both the high- and low-fertility states and highest in the states with intermediate levels of fertility (Punjab, Maharashtra, and Himachal Pradesh). This pattern is consistent with the expectation that unwanted fertility is lowest at the start and the end of the fertility transition and highest in the middle of the transition.

In the four large states with high levels of fertility (Uttar Pradesh, Bihar, Madhya Pradesh, and Rajasthan), women want three or more children on the average. The wanted total marital fertility rate in those states ranges from 2.95 to 3.81 children per woman. The recent total marital fertility levels there are higher than wanted fertility by as much as 1.46 children. If the family welfare programme succeeds in helping women in these four states to achieve the family size they want, even without changing their family-size desires, fertility will be reduced by 20 to 28 percent. To achieve replacement-level fertility in the four states, the family welfare programme needs not only to strengthen the delivery of family planning services in order to reduce unwanted fertility but also to intensify its

efforts to bring down desired family size. The second objective is especially important in Uttar Pradesh.

In Himachal Pradesh, Punjab, and Maharashtra, wanted fertility is not much higher than the replacement level, but unwanted fertility is quite high. The family welfare programme should concentrate on minimising unwanted births in these states for example, by including efforts to improve women's motivation to use contraception when they want no more children, offering easy access to appropriate contraceptive methods, and providing quality follow-up services to women who have adopted a family planning method. Eliminating unwanted births would reduce total marital fertility rates by 31 to 34 percent in these states.

### Differentials in Wanted and Unwanted Fertility

Desired family size and the motivation and ability to achieve it by timely and effective use of contraception are likely to vary among couples according to their socio-cultural and economic situation. Hence, the extent of unwanted fertility is likely to vary among different segments of society. Identifying the groups experiencing higher unwanted fertility can be helpful to family planning programmes. We therefore examine levels of wanted and unwanted fertility in the eight states by four characteristics of women: urban-rural residence, religion, caste/tribe, and education.

Table 4 presents estimates of total marital fertility, wanted total marital fertility, and unwanted total marital fertility by residence in the eight states. In Uttar Pradesh and Bihar the wanted fertility rate is about one child higher among rural woman than among urban women. In other states the urban-rural differences in wanted fertility are smaller. Urban-rural differences in wanted fertility are quite small in all eight states. In the four states with high fertility, the percentage of unwanted fertility is higher in urban areas than in rural areas. In the other states, either the percentage of unwanted fertility is higher in rural areas or there is no Urban-rural difference.

**Table 4:** Estimated Total Marital Fertility Rates (TFMR), Wanted Total Marital Fertility Rates (WTMFR), and Unwanted Total Marital Fertility Rates (UTMFR), by Residence and by State.

| State         | Residence | TMFR | WTMFR | UTMFR | Percent Unwanted |
|---------------|-----------|------|-------|-------|------------------|
| Uttar Pradesh | Urban     | 4.09 | 2.92  | 1.17  | 28.6             |
|               | Rural     | 5.58 | 4.09  | 1.49  | 26.7             |
| Bihar         | Urban     | 3.52 | 2.67  | 0.85  | 24.1             |
|               | Rural     | 4.43 | 3.61  | 0.82  | 18.5             |

|                         |       |      |      |      |      |
|-------------------------|-------|------|------|------|------|
| <b>Madhya Pradesh</b>   | Urban | 3.85 | 2.58 | 1.27 | 33.0 |
|                         | Rural | 4.36 | 3.22 | 1.14 | 26.1 |
| <b>Rajasthan</b>        | Urban | 3.47 | 2.36 | 1.11 | 32.0 |
|                         | Rural | 4.01 | 3.12 | 0.89 | 22.2 |
| <b>Himachal Pradesh</b> | Urban | 2.57 | 1.69 | 0.88 | 34.2 |
|                         | Rural | 4.01 | 2.30 | 1.19 | 34.1 |
| <b>Punjab</b>           | Urban | 2.57 | 2.02 | 0.88 | 30.3 |
|                         | Rural | 3.49 | 2.33 | 1.16 | 33.2 |
| <b>Maharashtra</b>      | Urban | 3.17 | 2.10 | 1.07 | 33.8 |
|                         | Rural | 3.45 | 2.44 | 1.01 | 29.3 |
| <b>Kerala</b>           | Urban | 2.16 | 1.84 | 0.32 | 14.8 |
|                         | Rural | 2.46 | 2.07 | 0.39 | 15.9 |

Tables 5 and 6 show estimates of total marital fertility, wanted total marital fertility, and unwanted total marital fertility by religion and caste / tribe. In states with sizeable Muslim populations, both wanted fertility and unwanted fertility are higher among Muslims than among Hindus. Within states having sizeable 'other' religious groups, wanted and unwanted fertility do not differ much between Hindus and women belonging to 'other' religions. Scheduled-caste and scheduled-tribe women frequently have higher wanted fertility than other women in the same state but no consistent pattern is found in the variation of unwanted fertility by caste or tribe.

**Table 5:** Estimated Total Fertility rates (TMFR), wanted Total Marital Fertility Rates (WTMFR), and unwanted Total Marital Fertility Rates (UTMFR), By Religion and By State.

| State                 | Religion | TMFR | WTMFR | UTMFR | Percent Unwanted |
|-----------------------|----------|------|-------|-------|------------------|
| <b>Uttar Pradesh</b>  | Hindu    | 5.10 | 3.69  | 1.41  | 27.6             |
|                       | Muslim   | 6.10 | 4.50  | 1.50  | 25.0             |
|                       | Other    | NC   | NC    | NC    | NC               |
| <b>Bihar</b>          | Hindu    | 4.04 | 3.26  | 0.78  | 19.3             |
|                       | Muslim   | 5.59 | 4.54  | 1.05  | 18.8             |
|                       | Other    | NC   | NC    | NC    | NC               |
| <b>Madhya Pradesh</b> | Hindu    | 4.22 | 3.08  | 1.14  | 27.0             |
|                       | Muslim   | NC   | NC    | NC    | NC               |
|                       | Other    | NC   | NC    | NC    | NC               |
| <b>Rajasthan</b>      | Hindu    | 3.87 | 2.94  | 0.93  | 24.0             |
|                       | Muslim   | NC   | NC    | NC    | NC               |
|                       | Other    | NC   | NC    | NC    | NC               |

|                         |        |      |      |      |      |
|-------------------------|--------|------|------|------|------|
| <b>Himachal Pradesh</b> | Hindu  | 3.36 | 2.21 | 1.15 | 34.2 |
|                         | Muslim | NC   | NC   | NC   | NC   |
|                         | Other  | NC   | NC   | NC   | NC   |
| <b>Punjab</b>           | Hindu  | 3.39 | 2.24 | 1.15 | 33.9 |
|                         | Muslim | NC   | NC   | NC   | NC   |
|                         | Other  | 3.36 | 2.24 | 1.12 | 33.9 |
| <b>Maharashtra</b>      | Hindu  | 3.17 | 2.23 | 0.94 | 29.7 |
|                         | Muslim | 4.28 | 2.89 | 1.41 | 32.9 |
|                         | Other  | 2.94 | 2.12 | 0.82 | 27.9 |
| <b>Kerala</b>           | Hindu  | 2.08 | 1.81 | 0.27 | 14.8 |
|                         | Muslim | 3.23 | 2.80 | 0.43 | 13.3 |
|                         | Other  | 2.30 | 1.96 | 0.34 | 14.8 |

NC: Not Computed because of the small number of women

**Table 6:** Estimated Total Marital Fertility Rates (TMFR), wanted Total Marital Fertility Rates (WTMFR), and Unwanted Total Marital Fertility Rates (UTMFR), by Caste\Tribe and by State.

| State                   | Caste\Tribe     | TMFR | WTMFR | UTMFR | Percent Unwanted |
|-------------------------|-----------------|------|-------|-------|------------------|
| <b>Uttar Pradesh</b>    | Scheduled Caste | 6.01 | 4.36  | 1.65  | 27.5             |
|                         | Scheduled Tribe | NC   | NC    | NC    | NC               |
|                         | Other           | 5.10 | 3.69  | 1.41  | 27.6             |
| <b>Bihar</b>            | Scheduled Caste | 4.71 | 3.91  | 0.80  | 17.0             |
|                         | Scheduled Tribe | 3.71 | 3.34  | 0.37  | 10.0             |
|                         | Other           | 4.30 | 3.41  | 0.89  | 20.7             |
| <b>Madhya Pradesh</b>   | Scheduled Caste | 4.91 | 3.48  | 1.43  | 29.1             |
|                         | Scheduled Tribe | 4.32 | 3.44  | 0.88  | 20.4             |
|                         | Other           | 4.14 | 2.89  | 1.25  | 30.2             |
| <b>Rajasthan</b>        | Scheduled Caste | 4.55 | 3.34  | 1.21  | 26.6             |
|                         | Scheduled Tribe | 3.95 | 3.21  | 0.74  | 18.7             |
|                         | Other           | 3.65 | 2.77  | 0.88  | 24.1             |
| <b>Himachal Pradesh</b> | Scheduled Caste | 3.65 | 2.39  | 1.26  | 34.5             |
|                         | Scheduled       | NC   | NC    | NC    | NC               |

|                    | Tribe           |      |      |      |      |
|--------------------|-----------------|------|------|------|------|
|                    | Other           | 3.29 | 2.14 | 1.15 | 35.0 |
| <b>Punjab</b>      | Scheduled Caste | 4.15 | 2.60 | 1.55 | 37.3 |
|                    | Scheduled Tribe | NC   | NC   | NC   | NC   |
|                    | Other           | 3.15 | 2.16 | 0.99 | 31.4 |
| <b>Maharashtra</b> | Scheduled Caste | NC   | NC   | NC   | NC   |
|                    | Scheduled Tribe | 3.44 | 2.58 | 0.86 | 25.0 |
|                    | Other           | 3.22 | 2.22 | 1.00 | 31.1 |
| <b>Kerala</b>      | Scheduled Caste | NC   | NC   | NC   | NC   |
|                    | Scheduled Tribe | NC   | NC   | NC   | NC   |
|                    | Other           | 2.40 | 2.01 | 0.39 | 16.3 |

NC: Not Computed Because of the Small Number of Women

The differentials by education, presented in Table 7, show an especially interesting pattern. In the four states with high levels of fertility, there is a strong negative relationship between wanted fertility and education. The difference in wanted fertility between illiterate women and women with more than a primary education ranges from 0.92 in Rajasthan to 1.69 in Uttar Pradesh. The lowest level of unwanted fertility in these four states is observed among women with more than a primary education, and the highest level of unwanted fertility is usually observed among women with a primary education. In Uttar Pradesh, illiterate women have the highest unwanted fertility. Within these states, the difference in unwanted fertility between the education categories with the highest and lowest unwanted fertility ranges from 0.65 births in Rajasthan to 0.82 births in Bihar.

**Table 7:** Estimated Total Marital Fertility Rates (TMR), Wanted Total Marital Fertility Rates (WTMFR), and Unwanted Total Marital Fertility Rates (UTMFR), by Women's Education and by State.

| State                | Education  | TMR  | WTMFR | UTMFR | Percent Unwanted |
|----------------------|------------|------|-------|-------|------------------|
| <b>Uttar Pradesh</b> | Illiterate | 5.72 | 4.23  | 1.49  | 26.0             |
|                      | Primary    | 4.27 | 3.10  | 1.17  | 27.4             |
|                      | More       | 3.28 | 2.54  | 0.74  | 22.6             |
| <b>Bihar</b>         | Illiterate | 4.54 | 3.74  | 0.80  | 17.6             |
|                      | Primary    | 4.25 | 2.98  | 1.27  | 29.9             |

|                         |            |      |      |      |      |
|-------------------------|------------|------|------|------|------|
|                         | More       | 2.94 | 2.46 | 0.45 | 15.3 |
| <b>Madhya Pradesh</b>   | Illiterate | 4.65 | 3.34 | 1.31 | 28.2 |
|                         | Primary    | 4.04 | 2.70 | 1.34 | 33.2 |
|                         | More       | 2.90 | 2.25 | 0.65 | 22.4 |
| <b>Rajasthan</b>        | Illiterate | 3.95 | 3.10 | 0.85 | 21.5 |
|                         | Primary    | 3.86 | 2.58 | 1.28 | 33.2 |
|                         | More       | 2.81 | 2.18 | 0.63 | 22.4 |
| <b>Himachal Pradesh</b> | Illiterate | 3.80 | 2.42 | 1.38 | 36.3 |
|                         | Primary    | 3.32 | 2.22 | 1.10 | 33.1 |
|                         | More       | 2.70 | 2.04 | 0.66 | 24.4 |
| <b>Punjab</b>           | Illiterate | 3.88 | 2.47 | 1.41 | 36.3 |
|                         | Primary    | 3.14 | 2.24 | 0.90 | 28.7 |
|                         | More       | 2.60 | 1.98 | 0.62 | 23.8 |
| <b>Maharashtra</b>      | Illiterate | 3.64 | 2.57 | 1.74 | 29.4 |
|                         | Primary    | 3.19 | 2.25 | 0.94 | 29.5 |
|                         | More       | 2.72 | 1.95 | 0.77 | 28.3 |
| <b>Kerala</b>           | Illiterate | 2.54 | 1.72 | 0.82 | 32.3 |
|                         | Primary    | 2.51 | 2.04 | 0.47 | 18.7 |
|                         | More       | 2.18 | 2.00 | 0.18 | 8.3  |

In the four states with moderate to low fertility, wanted fertility varies comparatively little by education. The difference in wanted fertility between illiterate women and women with more than a primary education ranges from 0.28 births in Kerala to 0.62 births in Maharashtra. Illiterate women in Himachal Pradesh, Punjab, and Maharashtra want about 2.5 children. Women with any formal education in these states and women in all education categories in Kerala want fewer than 2.3 children per woman. In contrast, unwanted fertility in these four states has a strong negative relationship with education. The differences in unwanted fertility range from 0.64 births in Kerala to 0.97 births in Maharashtra.

The very low wanted fertility (1.72 children, on average) among illiterate women in Kerala is curious. One possible reason is that in a state where the literacy rate is quite high, illiterate women belong to a severely disadvantaged minority who want few children because they have a pessimistic view of their children's future. The patterns of wanted and unwanted fertility by education in the eight states suggest that during the fertility transition wanted fertility declines first among the more educated and then diffuses among the less educated. The decline in unwanted fertility seems to follow a similar path, but the process lags behind the decline in wanted fertility. Wanted fertility tends to fall fairly early during the fertility transition, whereas unwanted fertility declines much later.

The variations by education in the relationship between the level of fertility and the proportion of unwanted fertility provides additional indirect evidence of how unwanted fertility evolves during the fertility transition. The education groups in the different states can be regarded as representing a range of stages in the transition. The least-educated group in the high-fertility states represents the situation early in the transition, and the most-educated group in the low-fertility states represents the situation late in the transition.

Figure 1 [Figure 1 is missing] shows the relationship between the total marital fertility rate and the wanted total marital fertility rate and also the relationship between the total marital fertility rate and the unwanted total marital fertility rate. Each plotted point represents a group of women in one of the three education categories in one of the eight states. At TMFRs of 4.0 and above, there is a strong positive relationship between TMFR and WTMFR, but the relationship is weak at lower levels of TMFR. In contrast, UTMFR does not vary much when TMFR is 4.0 or higher, but it has a strong positive relationship with TMFR when TMFR is below 4.

Figure 2 [Figure 2 is missing] graphs the proportion of unwanted total marital fertility against the level of total marital fertility. The pattern approximates an inverted U shape, the proportion of unwanted fertility being highest at intermediate levels of total fertility and lowest at low and high levels of total fertility. This pattern accords with the pattern observed by Bongaarts (1990) when he examined variation at national levels.

### **Contraceptive Use among Women Who Want No More Children**

In an ideal situation, all women who do not want any more children and are exposed to conception would use some kind of contraception. In the real world, however, some women fail to use contraception and are at risk of having unwanted births. The NFHS data enable us to examine the prevalence of contraceptive use and the factors associated with such use among women who do not want any more children.

The first column of Table 8 shows, for the eight selected states, the proportion of currently married women who want no more children. Women who responded 'cannot have children' are excluded from the analysis unless they are sterilised or their husbands are sterilised, in which case they are considered as wanting no more children. All other women are considered as wanting to have more children. The second column of table 8 shows the proportions of women using contraception among those who want no more children, excluding those who were pregnant at the time of survey. The last column of Table 8 shows the estimated proportion of women who are at risk of having unwanted births,

namely those who do not want any more children, are exposed to conception, and are not using contraception.' The concept is similar to the concept of 'unmet need for limiting births' used by Westoff and his colleagues (Westoff 1981) (Westoff and Bahkole 1995) (Westoff and Ochoa 1991).

**Table 8:** Percentage of Currently Married Women Who Want No More Children, and Among Them, the Percentage Using Contraception, By State.

| State            | Percent Who Want No More Children | Percent Using Contraception Among Those Wanting No More Children | Percent at Risk of Having Unwanted Births |
|------------------|-----------------------------------|--|---|
| Uttar Pradesh    | 48.5                              | 42.1   | 28.1                                      |
| Bihar            | 47.6                              | 53.2   | 22.3                                      |
| Madhya Pradesh   | 54.4                              | 71.8   | 15.3                                      |
| Rajasthan        | 55.5                              | 61.6   | 21.3                                      |
| Himachal Pradesh | 74.7                              | 80.2   | 14.8                                      |
| Punjab           | 75.5                              | 78.7   | 16.1                                      |
| Maharashtra      | 70.9                              | 79.3   | 14.7                                      |
| Kerala           | 71.2                              | 87.0   | 9.3                                       |

The eight states can be classified into three groups according to the proportion of women who want no more children and the proportion among them who are using contraceptives. In Uttar Pradesh and Bihar, about half of all women covered in the survey want no more children, and half or fewer of these are using contraception. In Madhya Pradesh and Rajasthan, the proportion of women wanting no more children is about the same as in Uttar Pradesh and Bihar, but the proportion among them using contraception is much higher. In the remaining four states, nearly three-quarters of women want no more children, and among these about 80 percent or more are using contraception.

Knowledge of the factors associated with the use or non-use of contraceptives among women who do not want more children is potentially useful to family planning programme managers. We therefore examine factors thought to be associated with the probability of using contraception among women who do not want more children but are exposed to conception by being fecund, currently married, and currently not pregnant. We use logistic regression models to identify factors affecting contraceptive use. The covariates included in the models are: (1) urban-rural residence; (2) religion (Hindu, Muslim, other); (3) caste/tribe (scheduled caste, scheduled tribe, other); (4) woman's education; (5) whether a woman heard a family planning message on radio or television during the month before the survey; (6) experience of child mortality; (7) whether the

number of surviving children is less than a woman's ideal number of children; (8) whether the number of surviving sons is less than a woman's ideal number of sons; (9) woman's age; and (10) number of surviving children. The last two factors are included mainly as controls, and we do not discuss their effects in detail. Tables 9-15 show the net effects of each of these factors on the use of contraception after controlling for the effects of all the other factors by setting them at their mean values.

In three of the four high-fertility states, urban women are more likely than rural women to use contraception if they do not want more children (Table 9). Among the states with moderate or low fertility, urban residence is generally not a statistically significant factor associated with use of contraception when other factors are controlled. Maharashtra is an exception. There, urban women are less likely to use contraception than rural women. Because our model already includes many socio-economic characteristics of women, external factors are likely to be the cause of the low level of contraceptive use among urban women in Maharashtra. One possibility is that a substantial proportion of urban women, such as those in Mumbai (formerly known as Bombay), are only weakly motivated to limit fertility or have limited access to the family welfare programme's services. Certainly, more in-depth studies are necessary to identify the causes of low contraceptive use among urban Maharashtra women who want no more children.

**Table 9:** Adjusted Percentage Using Contraception Among Women Who Want No More Children, by Residence and by State

| State            | Residence | Percent Using Contraception |
|------------------|-----------|-----------------------------|
| Uttar Pradesh    | Urban     | 45*                         |
|                  | Rural     | 40                          |
| Bihar            | Urban     | 59*                         |
|                  | Rural     | 50                          |
| Madhya Pradesh   | Urban     | 72                          |
|                  | Rural     | 72                          |
| Rajasthan        | Urban     | 72*                         |
|                  | Rural     | 59                          |
| Himachal Pradesh | Urban     | 84                          |
|                  | Rural     | 81                          |
| Punjab           | Urban     | 78                          |
|                  | Rural     | 80                          |
| Maharashtra      | Urban     | 77*                         |
|                  | Rural     | 83                          |
| Kerala           | Urban     | 89                          |

In all eight states except Madhya Pradesh, Muslims are less likely to use contraception than Hindus or women of other religions (Table 10). The low level of contraceptive use among Muslims, when the effects of other factors are controlled, indicates that the family welfare programme in India is not very well accepted among Muslims. A study based on an experimental programme in Jamshedpur, Bihar found that Muslims were less likely to accept sterilisation than other methods when other contraceptive methods were available (Bhende et al. 1991). Another study in a predominantly Muslim area of Maharashtra found that Muslims tended to avoid sterilisation but accepted other forms of contraception (Jejeebhoy and Kulkani 1985). These studies suggest that providing easy access to a variety of contraceptive methods would increase contraceptive use among those Muslim women who want no more children.

**Table 10:** Adjusted Percentage Using Contraception Among Women Who Want No More Children, by Religion and by State.

| State            | Religion | Percent Using Contraception |
|------------------|----------|-----------------------------|
| Uttar Pradesh    | Hindu    | 44                          |
|                  | Muslim   | 26*                         |
|                  | Other    | 43                          |
| Bihar            | Hindu    | 57                          |
|                  | Muslim   | 19*                         |
|                  | Other    | 57                          |
| Madhya Pradesh   | Hindu    | 72                          |
|                  | Muslim   | 72                          |
|                  | Other    | 68                          |
| Rajasthan        | Hindu    | 64                          |
|                  | Muslim   | 37*                         |
|                  | Other    | 74                          |
| Himachal Pradesh | Hindu    | 82                          |
|                  | Muslim   | 63*                         |
|                  | Other    | 65*                         |
| Punjab           | Hindu    | 79                          |
|                  | Muslim   | 60*                         |
|                  | Other    | 80                          |
| Maharashtra      | Hindu    | 83                          |
|                  | Muslim   | 60*                         |
|                  | Other    | 80                          |
| Kerala           | Hindu    | 90                          |
|                  | Muslim   | 74*                         |

|  |       |    |
|--|-------|----|
|  | Other | 91 |
|--|-------|----|

Notes: See footnotes to Table 9 on computation of percentages. Hindu religion is used as the reference category. \*Indicates that the underlying coefficient is statistically significant at the 5 percent level.

Caste or tribe makes a difference in contraceptive use in Bihar, Rajasthan, Himachal Pradesh, and Punjab, but the pattern varies from state to state (Table 11). Scheduled-caste women in Bihar, Himachal Pradesh, and Punjab and scheduled-tribe women in Bihar are more likely to use contraception than 'other' women. In contrast, both scheduled-caste and scheduled-tribe women in Rajasthan and scheduled-tribe women in Himachal Pradesh are less likely to use contraception than 'other' women.

**Table 11:** Adjusted Percentage Using Contraception Among Women Who Want No More Children, by Caste/Tribe and by State.

| State            | Caste/Tribe     | Percent Using Contraception |
|------------------|-----------------|-----------------------------|
| Uttar Pradesh    | Scheduled Caste | 39                          |
|                  | Scheduled Tribe | 39                          |
|                  | Other           | 42                          |
| Bihar            | Scheduled Caste | 54*                         |
|                  | Scheduled Tribe | 44*                         |
|                  | Other           | 40                          |
| Madhya Pradesh   | Scheduled Caste | 72                          |
|                  | Scheduled Tribe | 73                          |
|                  | Other           | 72                          |
| Rajasthan        | Scheduled Caste | 59*                         |
|                  | Scheduled Tribe | 57*                         |
|                  | Other           | 65                          |
| Himachal Pradesh | Scheduled Caste | 85*                         |
|                  | Scheduled Tribe | 69*                         |
|                  | Other           | 80                          |
| Punjab           | Scheduled Caste | 84*                         |
|                  | Scheduled Tribe | -                           |
|                  | Other           | 78                          |
| Maharashtra      | Scheduled Caste | 83                          |
|                  | Scheduled Tribe | 76                          |
|                  | Other           | 81                          |
| Kerala           | Scheduled Caste | 94                          |
|                  | Scheduled Tribe | 92                          |
|                  | Other           | 88                          |

Notes: See footnote to Table 9 on computation of percentages. Non-Scheduled caste\tribe ('Other') is used as the reference category.

\*Indicates that the underlying coefficient is statistically significant at the 5 percent level.

The relationship between education and contraceptive use varies from state to state but is statistically significant only in the four states with high fertility (Table12).

**Table 12:** Adjusted Percentage Using Contraception Among Women Who Want No More Children, by Educational and State.

| State                   | Education  | Percent Using Contraception |
|-------------------------|------------|-----------------------------|
| <b>Uttar Pradesh</b>    | Illiteracy | 38                          |
|                         | Primary    | 48*                         |
|                         | Middle     | 51*                         |
|                         | More       | 53*                         |
| <b>Bihar</b>            | Illiteracy | 47                          |
|                         | Primary    | 63*                         |
|                         | Middle     | 70*                         |
|                         | More       | 62*                         |
| <b>Madhya Pradesh</b>   | Illiteracy | 71                          |
|                         | Primary    | 78*                         |
|                         | Middle     | 79                          |
|                         | More       | 70                          |
| <b>Rajasthan</b>        | Illiteracy | 64                          |
|                         | Primary    | 66                          |
|                         | Middle     | 56                          |
|                         | More       | 50*                         |
| <b>Himachal Pradesh</b> | Illiteracy | 80                          |
|                         | Primary    | 80                          |
|                         | Middle     | 85                          |
|                         | More       | 83                          |
| <b>Punjab</b>           | Illiteracy | 79                          |
|                         | Primary    | 81                          |
|                         | Middle     | 80                          |
|                         | More       | 80                          |
| <b>Maharashtra</b>      | Illiteracy | 81                          |
|                         | Primary    | 81                          |
|                         | Middle     | 75                          |
|                         | More       | 79                          |

|               |            |    |
|---------------|------------|----|
| <b>Kerala</b> | Illiteracy | 87 |
|               | Primary    | 91 |
|               | Middle     | 88 |
|               | More       | 86 |

In Uttar Pradesh, where fertility is highest, the effect of education is large and positive. In Bihar the effect of education is large, but the highest level of contraceptive use is not among women with the highest level of education but rather among women with a middle-school level education. In Madhya Pradesh the effect of education is not large, but the relationship between education and contraceptive use is otherwise similar to the pattern observed in Bihar. In Rajasthan the effect of education is small, and women with a primary level of education have the highest contraceptive use.

Two observations can be made on the basis of these results. First, the effect of education is statistically significant and large when the overall level of fertility is high. The effect is statistically significant but smaller in states with somewhat lower levels of fertility, and in states with moderate or low levels of fertility the effect is not statistically significant. The second and more interesting observation concerns the direction of the effect. In the state with the highest level of fertility, Uttar Pradesh, the highest prevalence of contraceptive use is observed among women with the highest level of education. As we move toward lower levels of fertility, the highest prevalence of contraceptive use is found among women with progressively less education. This pattern is likely to originate from differentials in the degree of motivation and ability to use contraception among women who do not want more children. In Uttar Pradesh, where the general norm favours large families, women who say that they do not want more children are exceptional. Such women are likely to be strongly motivated to use contraception, and it is not surprising that they tend to be highly educated. In states with somewhat lower levels of fertility, the general norm is changing toward smaller family size. Highly educated women may say that they want no more children, in line with the new norm, but their willingness to adopt contraception may lag behind their stated preference for small families. In these states, women with lower levels of education are perhaps more likely to really mean it when they say they do not want more children. Thus, the percentage using contraception in these groups tends to be high. In the four states with moderate to low fertility (Himachal Pradesh, Punjab, Maharashtra, and Kerala), the level of contraceptive use appears to have caught UP, with fertility preferences, and the effect of education has accordingly become statistically insignificant.

In six of the eight states, women who have been exposed to family planning messages on radio or television are much more likely to use contraception than

women who have not been exposed (Table 13). It is possible that women who have a favourable attitude toward family planning, who are considering the use of contraception, or who are using contraception are more likely to seek and recognise family planning messages so that the observed effect is partly a result of reverse causation. However, the fact that a strong association persists after other factors are controlled suggests that there is a real causal effect. Findings from other studies that have examined the effects of exposure to radio or television (Ramesh, Gulati, and Retherford 1996) (Retherford and Mishra 1997) (Westoff and Rodriguez 1995) have reached a similar conclusion: women who are with the new norm, but their willingness to adopt contraception may lag behind their stated preference for small families. In these states, women with lower levels of education are perhaps more likely to really mean it when they say they do not want more children. Thus, the percentage using contraception in these groups tends to be high. In the four states with moderate to low fertility (Himachal Pradesh, Punjab, Maharashtra, and Kerala), the level of contraceptive use appears to have caught up, with fertility preferences, and the effect of education has accordingly become statistically insignificant.

**Table 13:** Adjusted Percentage Using Contraception Among Women Who Want No More Children, by Exposure to Family Planning Message On Radio or Television and by State.

| State            | Exposed to Radio or Television | Percent Using Contraception |
|------------------|--------------------------------|-----------------------------|
| Uttar Pradesh    | Yes                            | 48*                         |
|                  | No                             | 38                          |
| Bihar            | Yes                            | 60*                         |
|                  | No                             | 48                          |
| Madhya Pradesh   | Yes                            | 75*                         |
|                  | No                             | 71                          |
| Rajasthan        | Yes                            | 71*                         |
|                  | No                             | 58                          |
| Himachal Pradesh | Yes                            | 83*                         |
|                  | No                             | 79                          |
| Punjab           | Yes                            | 83*                         |
|                  | No                             | 73                          |
| Maharashtra      | Yes                            | 81                          |
|                  | No                             | 80                          |
| Kerala           | Yes                            | 89                          |
|                  | No                             | 89                          |

Notes: See footnote to Table 9 on computation of percentages. "No exposure" is used as the reference category.

\*Indicates that the underlying coefficient is statistically significant at the 5 percent level.

In six of the eight states, women who have been exposed to family planning messages on radio or television are much more likely to use contraception than women who have not been exposed (Table 13). It is possible that women who have a favourable attitude toward family planning, who are considering the use of contraception, or who are using contraception are more likely to seek and recognise family planning messages so that the observed effect is partly a result of reverse causation. However, the fact that a strong association persists after other factors are controlled suggests that there is a real causal effect. Findings from other studies that have examined the effects of exposure to radio or television (Ramesh, Gulati, and Redierford 1996; Retherford and Nfishra 1997; Westoff and Rodriguez 1995) have reached a similar conclusion: women who are exposed to family planning messages on radio or television are more likely to use contraception than those who are not exposed. This finding suggests that in India, where a substantial proportion of women are illiterate, the electronic mass media can play an important role in increasing women's contraceptive use. It is notable that the two states where this variable is not a significant factor, Maharashtra and Kerala, are those with the highest levels of literacy and social development.

We would expect women who have experienced the loss of a child to be less likely than other women to adopt family planning, even when they say they want no more children. Such women might want to replace the lost child or perhaps have one or more extra children as insurance against further child loss. Our analysis confirms this expectation in three states with high levels of infant mortality Uttar Pradesh, Bihar, and Madhya Pradesh (Table 14). In these states the infant mortality rate during the five years preceding the NFHS is estimated to have been 85 deaths per 1,000 births or higher. Here, women who have experienced a child death are less likely to use contraception than women who have not, even when they report that they want no more children. Among women who report, that they want no more children in the other five states, where infant mortality is lower, the experience of child loss does not have a statistically significant effect on the use of contraception.

**Table 14:** Adjusted Percentage Using Contraception Among Women Who Want No More Children, by Experience of Child Loss and by State.

| State         | Experienced Child Loss | Percent Using Contraception |
|---------------|------------------------|-----------------------------|
| Uttar Pradesh | Yes                    | 38*                         |

|                         |     |     |
|-------------------------|-----|-----|
|                         | No  | 44  |
| <b>Bihar</b>            | Yes | 47* |
|                         | No  | 54  |
| <b>Madhya Pradesh</b>   | Yes | 69* |
|                         | No  | 74  |
| <b>Rajasthan</b>        | Yes | 64  |
|                         | No  | 62  |
| <b>Himachal Pradesh</b> | Yes | 81  |
|                         | No  | 81  |
| <b>Punjab</b>           | Yes | 76  |
|                         | No  | 80  |
| <b>Maharashtra</b>      | Yes | 81  |
|                         | No  | 80  |
| <b>Kerala</b>           | Yes | 86  |
|                         | No  | 89  |

Notes: See footnote 1 to Table 9 on computation of percentages. "No Child Death" is used as the reference category.

\* Indicate that the underlying coefficient is statistically significant at the 5 percent level.

Table 15 shows, the proportion using contraception among women who do not want more children, broken down by (1) women who have not reached their ideal number of children, (2) women who have reached their ideal number of children but not their ideal number of sons, and (3) women who have reached both their ideal number of children and their ideal number of sons. Whether women have already reached their ideal number of children or not has a statistically significant effect on contraceptive use in all eight states. Not surprisingly, women who have not reached their ideal family size are less likely to use contraception than those who have. It is noteworthy, however, that the proportion of women using contraception among women who have reached their ideal family size varies greatly from state to state, being quite low in three of the four high-fertility-states: Uttar Pradesh, Bihar, and Rajasthan.

**Table 15:** Adjusted Percentage Using Contraception Among Women Who Want No More Children, by Whether the Women Has Already Reached her Ideal Number of Children and Ideal Number of Sons by State.

| State         | Have Ideal Number of Children | Have Ideal Number of Sons | Percent Using Contraception |
|---------------|-------------------------------|---------------------------|-----------------------------|
| Uttar Pradesh | No                            | --                        | 31*                         |

|                         |     |     |     |
|-------------------------|-----|-----|-----|
|                         | Yes | No  | 35* |
|                         | Yes | Yes | 47  |
| <b>Bihar</b>            | No  | --  | 47* |
|                         | Yes | No  | 49* |
|                         | Yes | Yes | 57  |
| <b>Madhya Pradesh</b>   | No  | --  | 70* |
|                         | Yes | No  | 70  |
|                         | Yes | Yes | 74  |
| <b>Rajasthan</b>        | No  | --  | 52* |
|                         | Yes | No  | 51* |
|                         | Yes | Yes | 68  |
| <b>Himachal Pradesh</b> | No  | --  | 71* |
|                         | Yes | No  | 72* |
|                         | Yes | Yes | 83  |
| <b>Punjab</b>           | No  | --  | 76* |
|                         | Yes | No  | 71* |
|                         | Yes | Yes | 82  |
| <b>Maharashtra</b>      | No  | --  | 72* |
|                         | Yes | No  | 71* |
|                         | Yes | Yes | 82  |
| <b>Kerala</b>           | No  | --  | 85* |
|                         | Yes | No  | 90  |
|                         | Yes | Yes | 90  |

Notes: See footnote to Table 9 on computation of percentages. Having reached the respondents ideal number of children and ideal number of sons is used as the reference category.

a. Women who had reached their ideal number of sons but not their ideal number of children were not considered as a separate group.

\*Indicates that the underlying coefficient is statistically significant at the 5 percent level.

Another notable finding is observed in all the states except Kerala. Among women who say do not want any more children and who have obtained their ideal number of children, those who have not obtained their ideal number of sons are less likely to use contraception than those who have. In fact, in all states except Kerala, women who have not reached their ideal number of sons behave very much like women who have not reached their ideal number of children. This finding indicates that son preference can be a major barrier to the adoption of contraception for some women in India. The proportion of women who have reached their ideal number of children but not their ideal number of sons, however, is small in most states (Table 16). Therefore, the overall effect of son

preference on fertility levels is likely to be modest. A recent in-depth study of the effect of son preference on fertility in India using the NFHS data indicates that the total fertility rate would be reduced by about 8 percent if the effect of son preference on fertility were eliminated (Mutharayappa et al. 1997).

**Table 16:** Among Women Who Want No More Children, Percentage Distribution According to Whether they have Reached their Ideal Number of Children and Ideal Number of Sons, by State.

| State            | Have Ideal Number of Children | Have Ideal Number of Sons | Percent Distribution |
|------------------|-------------------------------|---------------------------|----------------------|
| Uttar Pradesh    | No                            | --                        | 24                   |
|                  | Yes                           | No                        | 10                   |
|                  | Yes                           | Yes                       | 66                   |
| Bihar            | NO                            | --                        | 28                   |
|                  | Yes                           | No                        | 31                   |
|                  | Yes                           | Yes                       | 41                   |
| Madhya Pradesh   | NO                            | --                        | 29                   |
|                  | Yes                           | No                        | 11                   |
|                  | Yes                           | Yes                       | 60                   |
| Rajasthan        | NO                            | --                        | 20                   |
|                  | Yes                           | No                        | 12                   |
|                  | Yes                           | Yes                       | 68                   |
| Himachal Pradesh | NO                            | --                        | 8                    |
|                  | Yes                           | No                        | 9                    |
|                  | Yes                           | Yes                       | 83                   |
| Punjab           | NO                            | --                        | 17                   |
|                  | Yes                           | No                        | 12                   |
|                  | Yes                           | Yes                       | 71                   |
| Maharashtra      | NO                            | --                        | 9                    |
|                  | Yes                           | No                        | 9                    |
|                  | Yes                           | Yes                       | 82                   |
| Kerala           | NO                            | --                        | 23                   |
|                  | Yes                           | No                        | 12                   |
|                  | Yes                           | Yes                       | 65                   |

- a. Women who had reached their ideal number of sons but not their ideal number of children were not considered as a separate group.

Our multivariate analysis of contraceptive use among women who want no more children indicates that education, religion, exposure to family planning messages

on radio or television, experience of child loss, and son preference are among the important determinants. Muslim women are less likely than women of other religious groups to 'want no more children,' and Muslim women who want no more children are less likely than other women to use contraception. This pattern persists even after controlling for the effects of other socio-economic factors. Inasmuch as previous studies have found that Muslims tend to prefer contraceptive methods other than sterilisation (Bhende et al. 1991; Jejeebhoy and Kulkani 1985), providing easy access to a variety of contraceptive methods may increase contraceptive prevalence among Muslims.

By emphasising formal and informal education for women, making more imaginative and culturally sensitive use of radio and television to promulgate the advantages of small families, striving to improve child survival rates, and projecting a more positive image of girls and women, the Indian family welfare programme can strengthen women's motivation to use contraception for limiting their fertility to the level they desire. Improvements in women's educational levels cannot be achieved in a short time, however. Therefore it is important to strengthen further the role of electronic mass media in providing women with information on family planning and ways to improve their children's survival.

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### **End Note**

1. We did not control for women's menstruating status in this computation. We believe that this lack of control has a minimal effect on the estimated proportion not using contraception. On the one hand, women who are not using contraception because they are in post-partum Amenorrhoea and do not need protection are included in the denominator, resulting in an underestimation of the proportion. On the other hand, women who are sterilised, are in menopause, or are in post-partum Amenorrhoea are included both in the denominator and the numerator, resulting in an overestimation of the proportion. The combination of these two effects results in a very small bias in the estimated proportions. Our main interest is in examining socio-economic factors associated with the use of contraception, and there is no reason to believe that being in menopause or in post-partum

Amenorrhoea would confound the relationship between using contraceptives and the factors we examine.

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