# CHAPTER 1

# INTRODUCTION

## 1.1    Background of the Survey

India's first National Family Health Survey (NFHS-1) was conducted in 1992–93. The Ministry of Health and Family Welfare (MOHFW) subsequently designated the International Institute for Population Sciences (IIPS), Mumbai, as the nodal agency to initiate a second survey (NFHS-2), which was conducted in 1998–99. An important objective of NFHS-2 is to provide state-level and national-level information on fertility, family planning, infant and child mortality, reproductive health, child health, nutrition of women and children, and the quality of health and family welfare services. Another important objective is to examine this information in the context of related socioeconomic and cultural factors. The survey is also intended to provide estimates at the regional level for four states (Bihar, Madhya Pradesh, Rajasthan, and Uttar Pradesh) and estimates for three metro cities (Calcutta, Chennai, and Mumbai), as well as slum areas in Mumbai. This information will assist policymakers and programme administrators in planning and implementing strategies for improving population, health, and nutrition programmes.

The NFHS-2 sample covers more than 99 percent of India's population living in all 26 states. It does not cover the union territories. NFHS-2 is a household survey with an overall target sample size of approximately 90,000 ever-married women in the age group 15–49. This report presents findings based on the analysis of all the states in India except Tripura, where the fieldwork was delayed.

NFHS-2 was conducted with financial support from the United States Agency for International Development (USAID), with additional funding from UNICEF. Technical assistance was provided by ORC Macro, Calverton, Maryland, USA, and the East-West Center, Honolulu, Hawaii, USA. Thirteen field organizations were selected to collect the data. Eight of the field organizations are private sector organizations and five are Population Research Centres (PRCs) established by the Government of India in various states. Each field organization had responsibility for collecting the data in one or more states. A complete list of these field organizations is given in Appendix A.

## 1.2    Basic Demographic Features of India

India crossed the one billion population mark in May 2000. According to the Census of India, India had a population of 548 million in 1971, 683 million in 1981, and 846 million in 1991. The exponential growth rate was virtually constant between 1961–71 and 1971–81 (2.22 and 2.20 percent, respectively), but it declined to 2.14 in 1981–91. The sex ratio of the Indian population has been unfavourable to females since the beginning of this century and has declined in every decade except 1971–81. The sex ratios were 930, 934, and 927 females per 1,000 males in 1971, 1981, and 1991, respectively. Population density increased from 177 persons per km$^2$ in 1971 to 216 in 1981 and 267 in 1991, indicating increasing population pressure on the land. As per the 1991 Census, 37 percent of the population is in the childhood ages (0–14 years), 7 percent is in the age group 60 and over, and 55 percent is in the working-age group 15–59, which indicates a

high dependency burden. The process of urbanization has been rather slow in India. The percentage of the total population living in urban areas increased from 20 percent in 1971 to 23 percent in 1981 and 26 percent in 1991. During the decade 1981–91 the growth rate of the rural population was 2.00 percent per annum, while that of the urban population was 3.65 percent per annum. One-fifth of India's population lives in Class I cities and Class II towns that have populations of 50,000 and above. One-fourth of India's population lives in villages that have fewer than 1,000 residents. As per the 1991 Census, 16 percent of India's population belongs to scheduled castes and 8 percent belongs to scheduled tribes[1] (Central Statistical Organisation, 1999; Ministry of Health and Family Welfare, 1998a).

## 1.3    Economic Development

India's gross national product in the year 1999–2000 was Rs. 17.5 trillion at current prices. India's national income (NNP at factor cost) was five times as high in 1992–93 (Rs. 2.0 trillion) as in 1950–51 (Rs. 0.4 trillion) at constant (1980–81) prices. From 1993–94 to 1998–99, the NNP increased by an additional 38 percent, reaching Rs. 9.5 trillion at 1993–94 prices. Between 1950–51 and 1992–93, however, per capita income only doubled and it increased further by only 27 percent between 1993–94 and 1998–99. In 1998–99, India's per capita income was Rs. 14,682 at current prices. The growth rate of national income at constant prices increased from 3.6 percent per annum during the first plan (1951–56) to 6.6 percent per annum during the eighth plan (1992–97). The corresponding increase in the growth rate of per capita income was from 1.8 percent to 4.6 percent per annum (Ministry of Finance, 2000). Between 1950–51 and 1998–99, gross domestic savings and gross domestic capital formation as a percentage of the gross domestic product (GDP) increased from around 10 percent to 22 percent.

Agricultural production increased nearly fourfold from 1950–51 to 1998–99. The century ended with the country's output of food grains crossing 200 million tonnes, a fourfold increase since 1950–51, mainly due to the success of the green revolution since the 1970s. Although the area under cultivation with food grains has remained virtually constant since 1970–71, the yield has increased by 65 percent. India had to import food grains for some time after independence, but now it has emerged as a marginal exporter of food grains (Ministry of Finance, 2000). Agriculture contributes nearly one-fourth of the GDP (Reserve Bank of India, 1999) and provides a livelihood to about two-thirds of all workers in the country (Central Statistical Organisation, 1999). Although the percentage of land cultivated with food crops that is irrigated increased from 24 percent in 1970–71 to 41 percent in 1996–97, the performance of Indian agriculture still largely depends on monsoon rains. In spite of a fourfold increase in food production since the early fifties, daily per capita net availability of cereals and pulses has increased by only 18 percent, from 395 grams to 467 grams per day (Ministry of Finance, 2000).

At the time of independence, India had a weak industrial base. Since 1948, within the framework of planned development of the economy, India has adopted the concept of a mixed economy for overall industrial development. The industrial policy resolution of 1948 demarcated the scope for development of industries in the private sector and also provided for reservation of some areas for exclusive development in the public sector. In subsequent industrial policy statements, the government adopted a variety of measures to modify licensing policies and

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[1]Scheduled castes and scheduled tribes are castes and tribes that the Government of India officially recognizes as socially and economically backward and in need of special protection from injustice and exploitation.

regulate the private sector. Since 1980, however, the government has taken several steps towards liberalization of industrial policy (Singh, 1986). With the introduction of the New Industrial Policy, 1991, a substantial programme of structural reforms for liberalization and globalization has been undertaken to accelerate the process of making Indian industry internationally competitive.

The industrial production index was more than 18 times as high in 1999–2000 (148) as it was in 1950–51 (8). Production of finished steel has increased from 1 million tonnes to 24 million tonnes, and production of coal from 32 million tonnes to 316 million tonnes. The generation of electricity has increased from 5 billion kwh to 448 billion kwh. The Indian economy is expected to grow by 5 percent in 1999–2000 and, as a result of industrial recovery, the growth of GDP from manufacturing will almost double to 7.0 percent in 1999–2000 from 3.6 percent in 1998–99. From 1950–51 to 1998–99, exports increased from US $1.3 billion to US $33.7 billion, while imports increased from US $1.3 billion to US $41.9 billion (Ministry of Finance, 2000). India's achievements in the field of information technology have been internationally recognized. Software exports continued to show vigorous growth of over 50 percent from April to September 1999.

## 1.4    Performance of Social Sectors and Demographic Change

The approach to the Ninth Five-Year Plan adopted by the National Development Council has accorded priority to social sector development. The goal is growth with social justice and equity. As per the latest Human Development Report (United Nations Development Program, 2000), India's rank among countries in terms of GDP per capita is 121, while in terms of the human development index India ranks somewhat lower (128). In contrast, China's rank in terms of the human development index (99) is not only much above India's rank, but China ranks slightly higher than India in terms of GDP per capita (106). Some indicators of the performance of social sectors in India underscore the need for giving high priority to key sectors like education, health, and poverty eradication; these areas are also crucial for accelerating the demographic transition in India.

As per the estimates of the Planning Commission, the percentage of the population living below the poverty line declined from 55 percent in 1973–74 to 36 percent in 1993–94 (Central Statistical Organisation, 1999). The literacy rate in India increased from 18 percent in 1951 to 52 percent in 1991. The literacy rate for adults in India (62 percent) is much lower than the rate in China (83 percent); in the Philippines and Thailand, the adult literacy rate is as high as 95 percent. In India, gross enrolment as a percentage of the total population for the age group 6–11 years increased from 43 percent in 1950–51 to 90 percent in 1997–98, while for ages 11–14 the corresponding increase was from 13 percent to 59 percent (Central Statistical Organisation, 1999).

During the half century since India adopted the family planning programme as its official programme, India has seen the following improvements in its demographic situation (Ministry of Health and Family Welfare, 2000):

- A reduction of the crude birth rate from 40.8 births per 1,000 population in 1951 to 26.4 in 1998

- A halving of the infant mortality rate from 146 per 1,000 live births in 1951 to 72 per 1,000 live births in 1998

- A quadrupling of the couple protection rate from 10 percent in 1971 to 44 percent in 1999

- A reduction of the crude death rate from 25 deaths per 1,000 population in 1951 to 9 in 1998

- The addition of 25 years to life expectancy from 37 years to 62 years

- A reduction in the total fertility rate from 6.0 in 1951 to 3.3 in 1997

However, achievements in these areas have been less evident in India than in most other countries in Asia. India's maternal mortality ratio (estimated at 408 maternal deaths per 100,000 live births in 1997) is several times as high as the MMR of 115 in China or 30 in Sri Lanka (Ministry of Health and Family Welfare, 2000). India's infant mortality rate is much higher than that of China (31), Indonesia (46), and Thailand (22). Life expectancy at birth in India (62 years) is much lower than that of China, the Republic of Korea, and Malaysia (all above 70 years). India's total fertility rate (3.3) is much higher than that of countries like China (1.8), Sri Lanka (2.1), and Thailand (1.9). Although India's crude death rate is fairly low (9), it is still somewhat higher than the crude death rate in countries like China, Vietnam, and Sri Lanka (6). Similarly, India' s crude birth rate is much higher than the birth rate of China (15), Thailand (16), and Sri Lanka (18) (Population Reference Bureau, 2000).

India's population, which already exceeds one billion, is expected to reach 1.26 billion by March 2016 (Ministry of Health and Family Welfare, 2000). With the objective of stabilizing the population at a level consistent with the requirements of the national economy for improving the quality of life, several measures have been adopted recently to make the family welfare programme more broad based. These measures are summarized in the next section.

## 1.5    Population Policies and Programmes

The Family Welfare Programme in India has undergone important changes in recent years, particularly during the last five or six years. The government has dispensed with its procedure, initiated during the Fourth Five-Year Plan, of monitoring the family welfare programme on the basis of method-specific family planning targets to achieve a couple protection rate (CPR) of 60 percent. Experience has shown that the emphasis on achieving method-specific targets, particularly sterilization targets, has created a situation in which targets for numbers of acceptors gained precedence over everything else and the programme was not driven by demand. This led to the acceptance of sterilization by older and higher-parity couples at the expense of the promotion of spacing between children among younger couples. The target approach, along with incentive schemes to encourage better performance, led to unhealthy competition among states and among personnel at different levels within states. This emphasis had an adverse impact on the quality of services and care provided by the programme. Adequate emphasis was not placed on informed choice, counselling, and follow-up services to clients.

The scope of the services provided by the progamme has increased consistently over the years. At the time of initiation of the programme in 1952, it was primarily a clinic-based family planning programme. After the adoption of the extension approach in 1963 and subsequent

integration with the maternal and child health (MCH) programme, the activities of the programme broadened significantly. In addition to family planning, the programme was supposed to provide a variety of services to mothers and children, including antenatal, delivery, and postnatal care, immunization of children against various vaccine-preventable diseases, and counselling on maternal and child health problems and nutrition. In 1992, the Child Survival and Safe Motherhood (CSSM) Programme was launched as part of the Family Welfare Programme. This was done with the intention of having an integrated package of interventions for the betterment of the health status of mothers and children. Under this programme, treatment of diarrhoea and acute respiratory infections, essential newborn care, and strengthening of emergency obstetric care services were the additional areas emphasized.

In 1993, the Government of India constituted a committee under the chairmanship of Dr. M.S. Swaminathan to draft a new National Population Policy. The committee submitted its report in May 1994. The report consisted of a number of important recommendations, one of which was to abolish the target-oriented approach. After the International Conference on Population and Development (ICPD) in 1994 in Cairo, the programme was gradually reoriented towards the holistic approach of the Reproductive and Child Health (RCH) Programme. In addition to the activities covered under the CSSM Programme, the RCH Programme includes components relating to sexually transmitted diseases (STD) and reproductive tract infections (RTI).

The family welfare programme's target-free approach (TFA) was implemented throughout the country in 1996. This was done after some initial experiments to gauge the impact of making the programme target free in a few selected districts. The essence of the TFA was to modify the system of monitoring the programme and to make it a demand-driven system in which a worker would assess the needs of the community at the beginning of each year. Such an assessment would form the basis for planning and monitoring the programme during the year. Workers are supposed to assess the needs of the community on the basis of consultations with families in the area, Mahila Swasthya Sangh, anganwadis, and panchayats (Ministry of Health and Family Welfare, 1998b). To remove any misconceptions about the TFA, it was subsequently renamed the community needs assessment (CNA) approach.

The recent National Population Policy (NPP), released in February 2000, paid special attention to the health and education of women and children to achieve population stabilization for the country by 2045. This suggests a paradigm shift to reproductive and child health with utmost concern towards improving the quality of care. The policy document begins with the statement that 'the overriding objective of economic and social development is to improve the quality of lives that people lead, to enhance their well-being, and to provide them with opportunities and choices to become productive assets in society' (Ministry of Health and Family Welfare, 2000).

For the first time, the policy prepones to 2010 the time period for attaining the goal of replacement level fertility (that is, a net reproduction rate of 1.0). The NPP has elaborated 12 strategies to achieve its socio-demographic goals. The strategies can have far-reaching implications, including reductions in the high level of unwanted as well as wanted fertility. Unwanted fertility is high due to high levels of unmet need for family planning as first revealed by the 1992–93 National Family Health Survey (International Institute for Population Sciences, 1995). Wanted fertility is expected to decline with the control of infant and child mortality.

To achieve its objectives, the NPP reaffirms continuation of the TFA and emphasizes informed contraceptive choice and the availability of good quality services. The policy proposes decentralized planning and programme implementation. Towards the goal of lowering fertility, a number of strategies were suggested to improve RCH services, including an emphasis on education, women's empowerment, and the involvement of men in the programme. The policy envisages free and compulsory school education up to age 14, a reduction in the infant mortality rate to less than 30 infant deaths per 1,000 live births, and a reduction in the maternal mortality ratio to less than 100 maternal deaths per 100,000 live births. The policy also aims to achieve universal immunization of children, delivery assistance by trained personnel for all births, and 100 percent registration of births, deaths, marriages, and pregnancies. Another important emphasis of the policy is the need for promoting delayed marriages for girls, the provision of wider choice and universal access to family planning information and services, and the prevention of major infectious diseases, including RTIs and AIDS. All these goals are to be achieved by 2010 to realize replacement level fertility by that year with an estimated population of 1.11 billion and population stabilization by 2045.

## 1.6    Questionnaires

NFHS-2 collected information on a variety of indicators that will assist policymakers and programme managers to formulate and implement strategies to reach the goals set in the National Population Policy. NFHS-2 used three types of questionnaires: the Household Questionnaire, the Woman's Questionnaire, and the Village Questionnaire. The overall content and format of the questionnaires were determined through a series of workshops held at IIPS in Mumbai in 1997 and 1998. The workshops were attended by representatives of a wide range of organizations in the population and health fields, as well as experts working on gender issues. The questionnaires for each state were bilingual, with questions in both the language of the state and English.

The Household Questionnaire listed all usual residents in each sample household plus any visitors who stayed in the household the night before the interview. For each listed person, the survey collected basic information on age, sex, marital status, relationship to the head of the household, education, and occupation. The Household Questionnaire also collected information on the prevalence of asthma, tuberculosis, malaria, and jaundice, as well as three risk behaviours—chewing *paan masala* or tobacco, drinking alcohol, and smoking. Information was also collected on the usual place where household members go for treatment when they get sick, the main source of drinking water, type of toilet facility, source of lighting, type of cooking fuel, religion of the household head, caste/tribe of the household head, ownership of a house, ownership of agricultural land, ownership of livestock, and ownership of other selected items. In addition, a test was conducted to assess whether the household uses cooking salt that has been fortified with iodine. Finally, the Household Questionnaire asked about deaths occurring to household members in the two years before the survey, with particular attention to maternal mortality. The information on the age, sex, and marital status of household members was used to identify eligible respondents for the Woman's Questionnaire.

The Woman's Questionnaire collected information from all ever-married women age 15–49 who were usual residents of the sample household or visitors who stayed in the sample household the night before the interview. The questionnaire covered the following topics:

Background characteristics: Questions on age, marital status, education, employment status, and place of residence provide information on characteristics likely to influence demographic and health behaviour. Questions are also asked about a woman's husband, gender roles, and the treatment of women in the household.

Reproductive behaviour and intentions: Questions cover dates and survival status of all births, current pregnancy status, and future childbearing intentions of each woman.

Quality of care: Questions assess the quality of family planning and health services.

Knowledge and use of contraception: Questions cover knowledge and use of specific family planning methods. For women not using family planning, questions are included about reasons for nonuse and intentions about future use.

Sources of family planning: Questions determine where a user obtained her family planning method.

Antenatal, delivery, and postpartum care: The questionnaire collects information on whether women received antenatal and postpartum care, who attended the delivery, and the nature of complications during pregnancy for recent births.

Breastfeeding and health: Questions cover feeding practices, the length of breastfeeding, immunization coverage, and recent occurrences of diarrhoea, fever, and cough for young children.

Reproductive health: Questions assess various aspects of women's reproductive health and the type of care sought for health problems.

Status of Women: The questionnaire asks about women's autonomy and violence against women.

Knowledge of AIDS: Questions assess women's knowledge of AIDS and the sources of their knowledge, as well as knowledge about ways to avoid getting AIDS.

In addition, the health investigator on each survey team measured the height and weight of each woman and each of her children born since January 1995 (in states where fieldwork started in 1998) or January 1996 (in states where fieldwork started in 1999) [see Table 1.1 for the month and year of fieldwork in each state]. This height and weight information is useful for assessing levels of nutrition prevailing in the population. The health investigators also took blood samples from each woman and each of her children born since January 1995/1996 to assess haemoglobin levels. This information is useful for assessing prevalence rates of anaemia among women and children. Haemoglobin levels were measured in the field at the end of each interview using portable equipment (the HemoCue) that provides test results in less than one minute. Severely anaemic women and children were referred to local medical authorities for treatment. In

Delhi and Mumbai, the blood samples of young children were also used to test levels of lead using the portable LeadCare instrument.

For each village selected in the NFHS-2 sample, the Village Questionnaire collected information on the availability of various facilities in the village (especially health and education facilities) and amenities such as electricity and telephone connections. Respondents to the Village Questionnaire were also asked about development and welfare programmes operating in the village. The village survey included a short, open-ended questionnaire that was administered to the village head, with questions on major problems in the village and actions that could be taken to alleviate the problems.

## 1.7    Sample Design and Implementation

### Sample Size and Reporting Domains

The sample size for each state was specified in terms of a target number of completed interviews with eligible women. The target sample size was set considering the size of the state, the resources available for the survey, and the aggregate level (urban/rural, region, metropolitan cities) at which separate estimates were needed. The initial target sample size was 4,000 completed interviews with eligible women in states with a 1991 population of more than 25 million, 3,000 completed interviews with eligible women in states with a 1991 population between 2 and 25 million, and 1,500 completed interviews with eligible women in states with a population of less than 2 million. However, there are some exceptions. For Uttar Pradesh, Bihar, Madhya Pradesh, and Rajasthan, the samples were designed to provide estimates for major regions of the states. The target sample size was set at 10,000 completed interviews with eligible women in Uttar Pradesh and 7,000 completed interviews with eligible women in Madhya Pradesh, Bihar, and Rajasthan.

For Maharashtra, West Bengal, and Tamil Nadu, the initial target samples were increased to allow separate estimates to be made for the metropolitan cities of Mumbai, Calcutta, and Chennai. The target sample size was 5,500 in Maharashtra, 4,750 in West Bengal, and 4,750 in Tamil Nadu. For Mumbai, the target sample was large enough to allow separate estimates for its slum and non-slum populations.

The urban and rural samples within each state were drawn separately and, to the extent possible, the sample within each state was allocated proportionally to the size of the state's urban and rural populations. In states where the proportion of urban population was not sufficiently large to provide a sample of at least 1,000 completed interviews with eligible women, the urban areas were appropriately oversampled (except in Goa, Sikkim, and the six small northeastern states where the target sample size was only 1,500 eligible women each). The state samples are not large enough to provide reliable estimates for individual districts in any state.

### Sample Design

A uniform sample design was adopted in all the states (see Table B.1 in Appendix B for a summary of the sample characteristics). In each state, the rural sample was selected in two stages: the selection of Primary Sampling Units (PSUs), which are villages, with probability proportional to population size (PPS) at the first stage, followed by the random selection of

households within each PSU in the second stage. In urban areas, a three-stage procedure was followed. In the first stage, wards were selected with PPS sampling. In the next stage, one census enumeration block (CEB) was randomly selected from each sample ward (except in Jammu and Kashmir, where two CEBs were randomly selected from each sample ward). In the final stage, households were randomly selected within each sample CEB.

**Sample Selection in Rural Areas**

In rural areas, the 1991 Census list of villages served as the sampling frame. The list was stratified by a number of variables. Except in Delhi, the first level of stratification was geographic, with districts being subdivided into contiguous regions. Within each of these regions, villages were further stratified using selected variables from the following list: subregions, village size, percentage of males working in the nonagricultural sector, percentage of the population belonging to scheduled castes or scheduled tribes, and female literacy. However, not all variables were used in every state. Each state was examined individually and a subset of variables was selected for stratification with the aim of creating not more than 6 strata for small states, not more than 12 strata for medium size states, and not more than 15 strata for large states. Female literacy was used for implicit stratification (i.e., the villages were ordered prior to selection according to the proportion of females who were literate) in every state except Kerala and Orissa, where female literacy was an explicit stratification variable. From the list of villages arranged in this way, villages were selected systematically with probability proportional to the 1991 Census population of the village. Small villages with 5–49 households were linked with an adjoining village to form PSUs with a minimum of 50 households. Villages with fewer than five households were excluded from the sampling frame.

In every state, a mapping and household listing operation was carried out in each sample area. The listing provided the necessary frame for selecting households at the second stage. The household listing operation involved preparing up-to-date notional and layout sketch maps of each selected PSU, assigning numbers to structures, recording addresses of these structures, identifying residential structures, and listing the names of heads of all the households in residential structures in the selected PSUs. Large sample villages (with more than a specified number of households, usually 500) were segmented, and two segments were selected randomly using the PPS method. Household listing in the segmented PSUs was carried out only in the selected segments. Each household listing team comprised one lister and one mapper. Senior field staff of the concerned field organization supervised the listing operation.

The households to be interviewed were selected with equal probability from the household list in each area using systematic sampling. The interval applied for the selection was determined to obtain a self-weighting sample of households. On average, 30 households were initially targeted for selection in each selected enumeration area. To avoid extreme variations in the workload, minimum and maximum limits were put on the number of households that could be selected from any area, at 15 and 60, respectively. Each survey team supervisor was provided with the original household listing, layout sketch map, and the list of selected households for each PSU. All the households which were selected were contacted during the main survey, and no replacement was made if a selected household was absent during data collection. However, if a PSU was inaccessible, a replacement PSU with similar characteristics was selected by IIPS and provided to the field organization.

**Sample Selection in Urban Areas**

The procedure adopted for the first stage of the sample design in urban areas was similar to the one followed in rural areas. The 1991 Census list of wards was arranged according to districts and within districts by the level of female literacy, and a sample of wards was selected systematically with probability proportional to size. Next, one census enumeration block, consisting of approximately 150–200 households, was selected from each selected ward using the PPS method. In Jammu and Kashmir, two census enumeration blocks were selected in each selected ward. As in rural areas, a household listing operation was carried out in each selected census enumeration block, which provided the necessary frame for selecting households in the third stage of sample selection. On average, 30 households per block were targeted for selection (except in Jammu and Kashmir and in Mumbai, where the target was 20 households per block).

**Sample Weights**[2]

At the national level, the overall sample weight for each household or woman is the product of the design weight for each state (after adjustment for nonresponse) and the state weight.

The national weights are defined below:

Let

$W_{sij}$ = weight for the $j^{th}$ household (or woman) in the $i^{th}$ PSU in state $s$

$W^a_{sij}$ = weight for the $j^{th}$ household (or woman) in the $i^{th}$ PSU in state $s$ for the national estimate

$$= \frac{P_s}{\sum_{ij} W_{sij}} * W_{sij}$$

where $P_s$ = projected population of state $s$

After adjustment for nonresponse, the weights are normalized so that the total number of weighted cases is equal to the total number of unweighted cases. The final normalized weight for a household (or eligible woman) for the national estimate is:

$W^b_{sij}$ = normalized weight for the $j^{th}$ household (or woman) in the $i^{th}$ PSU in state $s$ for the national estimate

$$= \frac{\sum n_i}{P} * \frac{P_s}{\sum_{ij} W_{sij}} * W_{sij}$$

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[2]The population covered in NFHS-2 differs slightly from that in NFHS-1. NFHS-1 did not include Sikkim and the Kashmir region of Jammu and Kashmir. NFHS-2 covered all the 26 states, but the survey work in Tripura was delayed considerably due to some local problems. Therefore, estimates for Tripura are not included in the national estimates. However, the population of the regions not common in the two surveys is small and should have only a negligible impact on the comparability of the national estimates from the two surveys.

where $P$ = projected population of the 25 states[3]

$n_i$ = sample size in the $i^{th}$ state

For the tabulations on anaemia and height/weight of women and children, two separate sets of weights were calculated using a similar procedure. In this case, however, the response rates for anaemia (for both women and children) are based on the percentage of eligible women whose haemoglobin level was measured and the response rates for height/weight (for both women and children) are based on the percentage of eligible women who were weighed or measured.

**Sample Implementation**

In order to achieve better coordination and supervision, the NFHS-2 survey operation was carried out in two phases. The first phase included the states of Andhra Pradesh, Bihar, Gujarat, Haryana, Madhya Pradesh, Punjab, Rajasthan, Sikkim, Uttar Pradesh, and West Bengal. The second phase states were Arunachal Pradesh, Assam, Delhi, Goa, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, and Tamil Nadu. Tripura fieldwork was delayed due to local problems.

Table 1.1 shows the period of fieldwork, number of households and eligible women interviewed (excluding Tripura), and the household and women's response rates. A total of 91,196 households were interviewed, two-thirds of which were rural. The overall household response rate—the number of households interviewed per 100 occupied households—was 98 percent. The household response rate was more than 94 percent in every state except Meghalaya and Delhi where it was 89 percent and 91 percent, respectively. The household response rate was almost 100 percent in Tamil Nadu.

In the interviewed households, interviews were completed with 89,199 eligible women who stayed in the household the night before the household interview. The individual response rate—the number of completed interviews per 100 identified eligible women in the households with completed interviews—was 96 percent for the country as a whole. The variation in the women's response rate by state was similar to that observed for the household response rate.

**1.8    Recruitment, Training, and Fieldwork**

In order to maintain uniform survey procedures across the states, four manuals dealing with different aspects of the survey were prepared. The *Interviewer's Manual* consists of instructions to the interviewers regarding interviewing techniques, field procedures, and the method of asking questions and recording answers. The *Manual for Field Editors and Supervisors* contains a detailed description of the role of field editors and supervisors in the survey. A list of checks to be made by the field editor in the filled-in questionnaires is also provided in this manual. The *Household Listing Manual*, designed for household listing teams, contains procedures to be adopted for household listing. Guidelines for the training of the field staff are described in the manual entitled *Training Guidelines*.

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[3]All states except Tripura

Table 1.1  Number of households and women interviewed by state

Month and year of fieldwork and number of households and women interviewed by residence and state (based on the unweighted sample), India, 1998–99

| State | Month and year of fieldwork | | Number of households interviewed | | | Number of women interviewed | | | Household response rate | Women's response rate |
|---|---|---|---|---|---|---|---|---|---|---|
| | From | To | Urban | Rural | Total | Urban | Rural | Total | | |
| **India** | 11/98 | 12/99 | 30,435 | 60,761 | 91,196 | 27,862 | 61,337 | 89,199 | 97.5 | 95.5 |
| **North** | | | | | | | | | | |
| Delhi | 3/99 | 4/99 | 2,564 | 199 | 2,763 | 2,287 | 190 | 2,477 | 91.3 | 90.8 |
| Haryana | 11/98 | 5/99 | 891 | 1,950 | 2,841 | 826 | 2,082 | 2,908 | 98.5 | 97.6 |
| Himachal Pradesh | 4/99 | 8/99 | 1,086 | 2,357 | 3,443 | 835 | 2,177 | 3,012 | 99.3 | 96.5 |
| Jammu & Kashmir | 4/99 | 9/99 | 887 | 1,899 | 2,786 | 797 | 1,947 | 2,744 | 97.0 | 93.4 |
| Punjab | 11/98 | 5/99 | 1,066 | 1,901 | 2,967 | 993 | 1,803 | 2,796 | 98.5 | 97.3 |
| Rajasthan | 11/98 | 2/99 | 1,546 | 4,765 | 6,311 | 1,592 | 5,221 | 6,813 | 95.9 | 92.8 |
| **Central** | | | | | | | | | | |
| Madhya Pradesh | 11/98 | 4/99 | 1,799 | 4,950 | 6,749 | 1,829 | 5,112 | 6,941 | 97.5 | 97.5 |
| Uttar Pradesh | 12/98 | 3/99 | 1,835 | 6,847 | 8,682 | 1,813 | 7,479 | 9,292 | 96.7 | 93.0 |
| **East** | | | | | | | | | | |
| Bihar | 12/98 | 4/99 | 701 | 5,644 | 6,345 | 687 | 6,337 | 7,024 | 98.8 | 96.2 |
| Orissa | 3/99 | 6/99 | 932 | 3,757 | 4,689 | 868 | 3,557 | 4,425 | 99.2 | 98.4 |
| West Bengal | 12/98 | 4/99 | 2,335 | 2,390 | 4,725 | 1,947 | 2,461 | 4,408 | 96.6 | 96.6 |
| **Northeast** | | | | | | | | | | |
| Arunachal Pradesh | 5/99 | 8/99 | 174 | 1,245 | 1,419 | 145 | 972 | 1,117 | 94.4 | 91.6 |
| Assam | 3/99 | 6/99 | 838 | 2,283 | 3,121 | 808 | 2,633 | 3,441 | 98.1 | 96.1 |
| Manipur | 7/99 | 10/99 | 536 | 1,153 | 1,689 | 479 | 956 | 1,435 | 99.6 | 96.8 |
| Meghalaya | 5/99 | 12/99 | 256 | 984 | 1,240 | 193 | 752 | 945 | 89.0 | 90.5 |
| Mizoram | 6/99 | 8/99 | 781 | 592 | 1,373 | 597 | 451 | 1,048 | 97.6 | 94.3 |
| Nagaland | 5/99 | 12/99 | 237 | 896 | 1,133 | 167 | 651 | 818 | 98.4 | 98.0 |
| Sikkim | 12/98 | 3/99 | 164 | 1,135 | 1,299 | 129 | 978 | 1,107 | 96.2 | 94.3 |
| **West** | | | | | | | | | | |
| Goa | 3/99 | 6/99 | 623 | 976 | 1,599 | 491 | 755 | 1,246 | 98.6 | 95.0 |
| Gujarat | 11/98 | 3/99 | 1,709 | 2,223 | 3,932 | 1,657 | 2,188 | 3,845 | 98.4 | 96.6 |
| Maharashtra | 3/99 | 6/99 | 3,662 | 2,168 | 5,830 | 3,191 | 2,200 | 5,391 | 97.6 | 94.1 |
| **South** | | | | | | | | | | |
| Andhra Pradesh | 11/98 | 3/99 | 1,018 | 2,854 | 3,872 | 1,068 | 2,964 | 4,032 | 99.4 | 98.2 |
| Karnataka | 3/99 | 9/99 | 1,552 | 2,721 | 4,273 | 1,504 | 2,870 | 4,374 | 97.1 | 94.7 |
| Kerala | 3/99 | 7/99 | 855 | 1,979 | 2,834 | 846 | 2,038 | 2,884 | 98.0 | 92.9 |
| Tamil Nadu | 3/99 | 6/99 | 2,388 | 2,893 | 5,281 | 2,113 | 2,563 | 4,676 | 99.8 | 99.7 |

Note: This table is based on the unweighted sample; all other tables are based on the weighted sample unless otherwise specified. This table shows the number of households and *de facto* women with completed interviews. The household response rate is defined as the number of households interviewed per 100 occupied households. The women's response rate is defined as the number of eligible women interviewed per 100 eligible women identified in the selected households. Information on Tripura is not included in this report because the fieldwork was not completed at the time this report was prepared.

Representatives of each field organization were trained in Training of Trainers Workshops organized by IIPS at the beginning of each phase of data collection. The purpose of these workshops was to ensure uniformity in data collection procedures in different states. The workshops covered the objectives of NFHS-2, different aspects of the survey, roles of various organizations participating in the survey, details of each of the three questionnaires used in the survey, methods of data collection and field supervision, and guidelines for the training of the field staff. Persons who were trained in each workshop subsequently trained the field staff in each state according to the standard procedures discussed in the Training of Trainers Workshops.

The fieldwork in each state was carried out by a number of interviewing teams, each team consisting of one field supervisor, one female field editor, four female interviewers, and one health investigator. The number of interviewing teams in each state varied according to the sample size. In each state, interviewers were hired specifically for NFHS-2, taking into consideration their educational background, experience, and other relevant qualifications. All interviewers were female, a stipulation that was necessary to ensure that women who were survey respondents would feel comfortable talking about topics that they may find somewhat sensitive.

Training of the field staff lasted for a minimum of three weeks in each state. The training course consisted of instruction in interviewing techniques and survey field procedures, a detailed review of each item in the questionnaires, instruction and practice in weighing and measuring children, mock interviews between participants in the classroom, and practice interviews in the field. In addition, at least two special lectures were arranged in each state: one on the topic of family planning at the beginning of training on the section on contraception in the Woman's Questionnaire, and one on maternal and child health practices, including immunizations, at the beginning of training on the section on the health of children. In addition to the main training, two days' training was arranged for field editors and supervisors, which focused on the organization of fieldwork as well as methods of detecting errors in field procedures and in the filled-in questionnaires. Health investigators attached to interviewing teams were given additional specialized training on measuring height and weight and testing for anaemia in a centralized training programme conducted by IIPS in collaboration with the All India Institute of Medical Sciences (AIIMS), New Delhi. This specialized training included classroom training and extensive field practice in schools, *anganwadis*, and communities.

Assignment of Primary Sampling Units (PSUs) to the teams and various logistical decisions were made by the survey coordinators from each field organization. Each interviewer was instructed not to conduct more than three individual interviews a day and was required to make a minimum of three callbacks if no suitable informant was available for the household interview or if the eligible woman identified in the selected household was not present at the time of the household interview.

The main duty of the field editor was to examine the completed questionnaires in the field for completeness, consistency, and legibility of the information collected, and to ensure that all necessary corrections were made. Special attention was paid to missing information, skip instructions, filter questions, age information, and completeness of the birth history and the health section. If major problems were detected, such as discrepancies between the birth history and the health section, the interviewers were required to revisit the respondent to correct the errors. An additional duty of the field editor was to observe ongoing interviews and verify the accuracy of the method of asking questions, recording answers, and following skip instructions.

The field supervisor was responsible for the overall operation of the field team and collection of information on villages using the Village Questionnaire. In addition, the field supervisor conducted spot-checks to verify the accuracy of information collected on the eligibility of respondents. IIPS also appointed one or more research officers in each state to help with monitoring throughout the training and fieldwork period in order to ensure that correct survey procedures were followed and data quality was maintained. Survey directors and other senior staff from the field organizations, project coordinators, other faculty members from IIPS,

senior research officers, and staff members from ORC Macro and the East-West Center also visited the field sites to monitor the data collection operation. Medical health coordinators appointed by IIPS monitored the nutritional component of the survey. Field data were quickly entered into microcomputers, and field-check tables were produced to identify certain types of errors that might have occurred in eliciting information and filling out questionnaires. Information from the field-check tables was fed back to the interviewing teams and their supervisors so that their performance could be improved.

## 1.9    Data Processing

All completed questionnaires were sent to the office of the concerned field organization (FO) for editing and data processing (including office editing, coding, data entry, and machine editing). Although field editors examined every completed questionnaire in the field, the questionnaires were re-edited at the FO headquarters by specially trained office editors. The office editors checked all skip sequences, response codes that were circled, and information recorded in filter questions. Special attention was paid to the consistency of responses to age questions and the accurate completion of the birth history. In the second stage of office editing, appropriate codes were assigned for open-ended responses on occupation and cause of death, and commonly mentioned "other" responses were added to the coding scheme. For each state, the data were processed with microcomputers using the data entry and editing software known as the Integrated System for Survey Analysis (ISSA). The data were entered directly from the precoded questionnaires, usually starting within one week of the receipt of the first set of completed questionnaires. Data entry and editing operations were usually completed a few days after the end of fieldwork in each state. Computer-based checks were used to clean the data and remove inconsistencies. Age imputation was also completed at this stage. Age variables such as the woman's current age and the year and month of birth of all of her children were imputed for those cases in which information was missing or incorrect entries were detected.

Preliminary reports with selected results were prepared for each state within a few months of data collection and presented to policymakers and programme administrators responsible for improving health and family welfare programmes. Detailed NFHS-2 state reports are being prepared by IIPS, in collaboration with the Population Research Centres, other local organizations, ORC Macro, and the East-West Center. The state reports contain detailed information on such topics as the state's survey design and implementation, household and respondent background characteristics, fertility and fertility preferences, family planning, mortality, morbidity, child immunization, lifestyle indicators, domestic violence, knowledge of HIV/AIDS, nutritional status of women and children, infant feeding practices, anaemia among women and children, maternal care and reproductive health, and the quality of care of health and family welfare services.