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# From Editor's Desk.....

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30-07-2013

# CONTENT



# Multidimensional Poverty and Household Environmental Deprivations in Urban India

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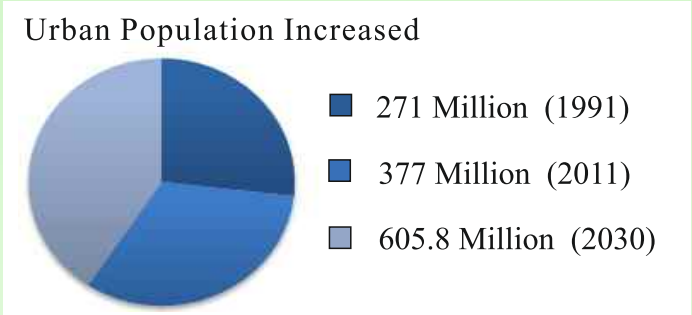
## Introduction

By 2011, the urban population in less developed[1] countries were estimated at 2668 million (46.5% of total population) and likely to be 5124 million by 2050 (64% of total population) (United Nations 2012). The increase in urban population is the combined effect of natural increase and rural-urban migration and associated with growing income inequality, inequality in education and skill, inequality in health and health care utilization and heavy pressure on natural habitats and biodiversity (Clark 1998; Davis 2006; Jhaiand Wang 2002).The increase in urban population lead to increase in slums which are overcrowded and often deprived of improved water, clean fuel and basic sanitation and at higher risk of infectious diseases (UN-Habitat 2003; Sclar et al 2005). On the other-hand, the Goal 7 of the Millennium Declaration aimed at ensuring environmental sustainability by improving access to safe drinking water and urban sanitation by 2015. Moreover, the deprivation in basic necessities is a


human right issue.It is even complex in the context of urbanization in developing countries. The HDR 2011 argued to examines the household's environmental deprivations in a poverty-focused



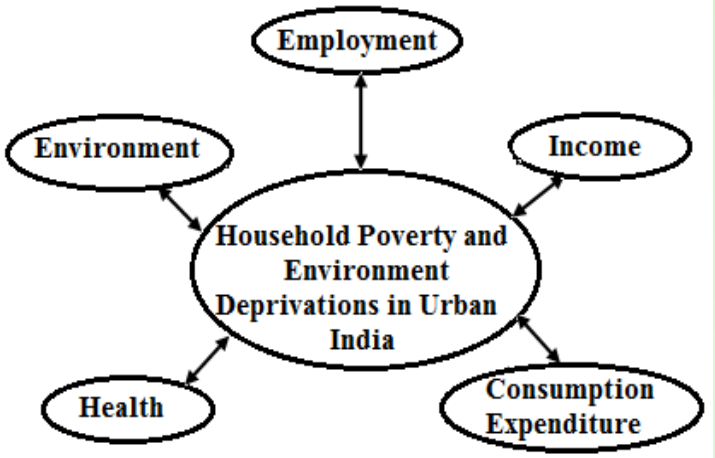

lens (UNDP 011).India, like many developing countries, is experiencing rapid growth of urban population (2.76% of annual exponential urban growth rate compared to 1.64% of overall annual exponential growth rates during 2001-11). The urban population in India has increased from 217 million (25.7% of total population) in 1991 to 377 million (31.2% of total population) in 2011 and projected to be 605.8 million (39% of total population) by 2030 (United Nations 2012). With the urban sprawl, the slum population has increased from 23% in 2001 to 26.7% in 2010 (GOI 2010). Such estimates vary largely in city centres; about 53 percentage of population are living in slums in Mumbai. In 2011 an estimated 7.6 million children (13% of total child population of the urban areas) aged 0-6 years were living in slums in India. In urban India, 13% households do not have basic sanitation (using open field), 34% lack access to clean fuel[2] and 30% lack access to tap water[3] (Census of India 2011).

The objective of this paper is to examine the relationship of household poverty and household environmental deprivation in urban India. The paper has been conceptualized with the following rationale. First, there are a limited number of studies that explore the linkages of household poverty and access to basic household environmental conditions at micro level

[1]Less developed countries comprise all regions of Africa, Asia (excluding Japan), Latin America and the Caribbean plus Melanesia, Micronesia and Polynesia.

[2]Clean fuel includes LPG/PNG, electricity and bio-gas. [3]Tap water includes both treated as well as un-treated source.

using unit level data. Second, the pattern of urbanization in India is different from that of other developed and developing countries. The urbanization in India is often characterized by growth of slums that lack access to sanitation, drinking water and cleaner fuel. Third, the household environmental deprivation has a direct bearing on health and productivity of the population.




## Data and Methodology

The study used the unit data from the India Human Development Survey 2004-05 (IHDS) conducted by the University of Maryland and the National Council of Applied Economic Research (NCAER), New Delhi. The survey interviewed 41,554 households and covered 215,754 individuals from 1503 villages and 971 urban blocks of India (in all states and union territories of India except Andaman Nicobar and Lakshadweep). The survey covered a wide range of topics; income, consumption expenditure, employment, education, fertility, reproductive health, child health, morbidities, gender relations, social capital and cognitive development of children. It collected detailed income data as well as the consumption expenditure. The details of the survey design, sampling, instrument, variables and constructed variables, and various code used are available in the IHDS report (Desai et al. 2008).

The household poverty is measured in multi-dimensional domain incorporating four key dimensions of human development; namely, knowledge, health, consumption expenditure and work/employment. The knowledge dimension includes two indicators; years of schooling for adult members (15 years and above) and the school enrolment status. A household is defined as educationally poor if it does not have any adult member with 5 years of schooling or any child in the school going age (6-14 years) has not enrolled in school. A household is considered as health poor if it has at least one undernourished mother (BMI < 18.5) or any child or adult death (<60 years) in last one year from the date of survey. A household is defined as consumption poor if the monthly per capita consumption expenditure falls below the official poverty line (as defined by the Planning Commission, Govt. of India). This is similar to the classification of households living below poverty line. Similarly, a household is defined as poor in work and employment if the household is a labourer household (either agricultural or non-agricultural) or depends on allied agricultural activities such as vegetable vendors, petty shops, fish seller, firewood collection, tuition classes, etc. Based on the union approach, households are classified as multidimensional poor and non-poor. Based on union approach, households are classified as non-poor, one-dimensional poor and multidimensional poor. The household environmental deprivations are measured by using three household environmental indicators, namely, basic sanitation, cooking fuel and source of drinking water. Bi-variate analysis is used to understand the differentials in household environmental deprivations by the dimensional poor.

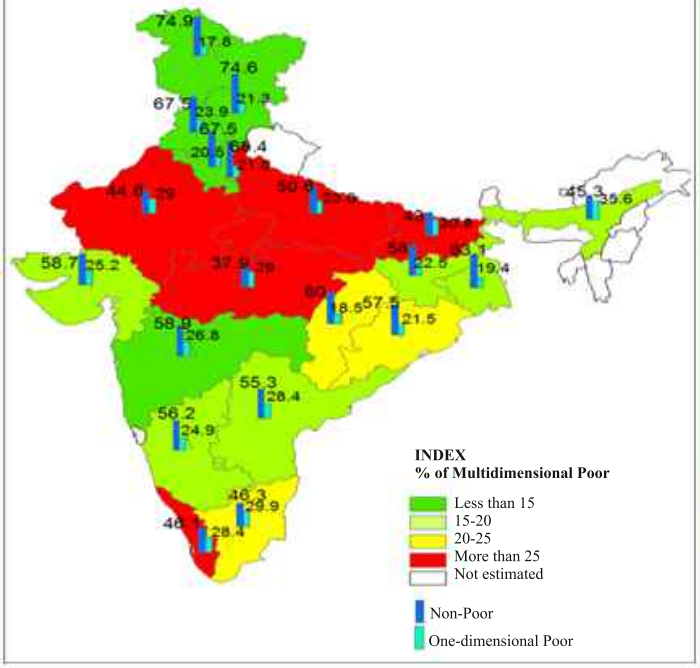
## Results

The results are presented in two sections. Section one describes the spatial pattern of multidimensional poverty in the states of urban India. Section two describes the household environmental deprivations by multidimensional poverty in urban India and states.

## Spatial Pattern of Multidimensional Poverty

In urban India, about 19% households were multidimensional poor compared to 25.5% one-dimensional poor and 55.5% non-poor households.

Spatial Distribution of Non-poor, One-dimensional poor and Multidimensional poor Households in Urban India, 2004 - 05.

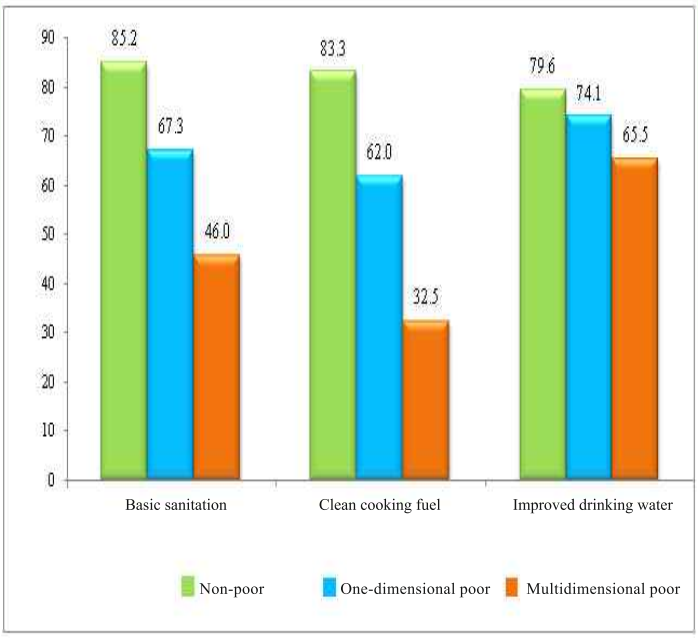



Map 1 presents the spatial distribution of non-poor, one-dimensional poor and multidimensional poor households in urban India. We have categorized the states into four categories according to the distribution of multidimensional poor households. We found that in five states, namely, UttarPradesh, Bihar, Madhya Pradesh, Rajasthan and Kerala, more than 25% households were multidimensional poor.

In the states of Odisha, Chhattisgarh and Tamil Nadu, 20 to 25 percent households were multidimensional poor. The states with 15 to 20 percent multi-dimensional poor households are Andhra Pradesh, Karnataka, Gujarat, Jharkhand, West Bengal and Assam. There are six states (Jammu and Kashmiri, Himachal Pradesh, Haryana, Punjab, Delhi and Maharashtra) where less than 15% households were multidimensional poor.

**Figure1.** provides the distribution of basic sanitation, clean cooking fuel and improved drinking water among non-poor households, one-dimensional poor households and multidimensional poor household in urban India. We found that 73% of urban households had access to basic sanitation in India. However, among multidimensional poor households only 46% households had access to basic sanitation compared to 85% among non-poor households and 67% among one-dimensional poor households in urban India. We have used the type of chula used for cooking in the households to define clean cooking fuel. Biomass[4] stove and improved chula with chimney are considered as clean cooking fuel. We found that in urban India about one-third households (68%) were deprived in using clean cooking fuel. The multidimensional poor households were most deprived in accessing clean cooking fuel. For example,among the multidimensional poor households only one-third (32.5%) households had accessed to clean cooking fuel compared to 83% among non-poor and 62% among one-dimensional poor households. About 76% of the households had access to improved drinking water. Among the multidimensional poor 65% of households had access to improved water compared to 80% among non-poor and 74% among one-dimensional poor households.

**Figure 1:** Percentage of household having access to basic sanitation, using clean cooking fuel and improved drinking water among non-poor, one-dimensional poor and multidimensional poor households in urban India, 2004 - 05.




[4] Biomass includes LPG/PNG, electricity

The distribution of household environmental deprivations among states is presented in table1. The spatial pattern of access to basic sanitation among the states is shown in map 2. The pattern of accessing sanitation is similar among multidimensional poor households followed by one-dimensional poor household and highest among non-poor households. For example in Odisha only 10% among multidimensional poor households had access to basic sanitation compared to 49% among one-dimensional poor and 83% among non-poor households. Only five states, namely, Kerala, Punjab, Haryana, Delhi and Assam where more than 60% multidimensional poor household had access to basic sanitation.

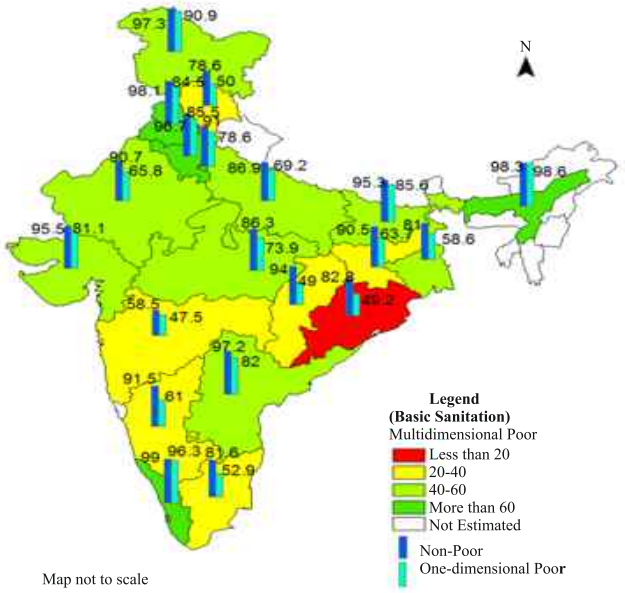
The spatial pattern of access to clean cooking fuel is shown in Map 3. From the map it is found that in the states of Chhattisgarh, Odisha, Jharkhand, Uttar Pradesh, Punjab, Madhya Pradesh and West Bengal, less than one-fifth households among multi dimensional poor had access to clean cooking fuel. However, only in Delhi, more than 60% households among multidimensional poor households used clean cooking fuel.

The spatial pattern of improved water among the states in urban India is shown in map 4. From the map we found that in the states of Bihar, less than one-fifth households among multidimensional poor had access to improved drinking water. In three states, namely, Uttar Pradesh, West Bengal and Assam, 20 to 40 percentages of households had access to clean water. In the states such of Odisha, Jharkhand, Chhattisgarh, Punjab, Haryana and Kerala 40 to 60 percent of multidimensionally poor households had access to improved drinking water.

## Discussion and Conclusions

In this paper, we estimate the household poverty in a multidimensional framework and link to the household environmental condition; basic sanitation, clean cooking fuel and improved water. Using the union approach, we defined the household poverty in the domain of health, knowledge, consumption expenditure and work using the unit level data.

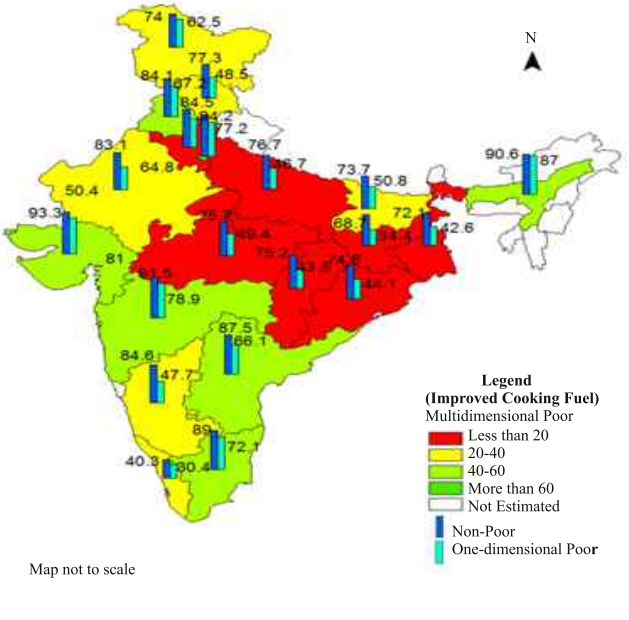
Spatial Distribution of Basic Sanitation among Multidimensional poor, One-dimensional poor and Non-poor households in Urban India, 2004 - 05




**Indian Human Development Survey (IHDS) 2004-05.**

About one-fifth of the households were multi-

Use of Improved Cooking Fuel among Multidimensional Poor, One-dimensional Poor and Non-poor households in Urban India, 2004-05



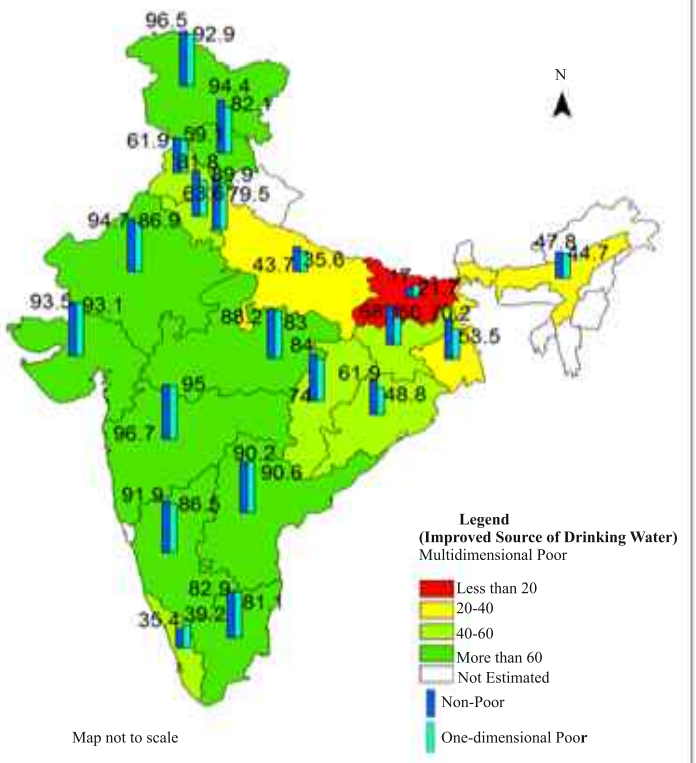
dimensional poor. We found that the household environmental conditions vary directly with the household poverty in urban India. The deprivation in household environmental conditions is maximum among those multidimensional poor households and least among those non-poor households. More than one-fourth households in urban India did not have access to basic sanitation and used open field.

In 2011, 13% of households did not have basic toilet facilities in urban India (Census 2011). However, more than half of the households among multidimensional poor households do not have access to basic sanitation. In the context of access to clean cooking fuel, it was even worse among the urban households. In urban India, only one-third multidimensional poor households had access to clean cooking fuel. Though there was little higher percentage of households with access to improved drinking water compared to other household environmental conditions, urban India still is lagging behind compared to the other developing countries in accessing clean drinking water.

**Table 1: Multidimensional poverty and household environmental deprivations in states of urban India, 2004-05**

| States/ India | Basic Sanitation | | | | Clean Cooking Fuel | | | | Improved Water | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Non poor** | **One-dimensional poor** | **Multi dimensional poor** | **All** | **Non poor** | **One-dimensional poor** | **Multi dimensional poor** | **All** | **Non poor** | **One-Dimension al poor** | **Multi dimension al poor** | **All** |
| **Andhra Pradesh** | 97.2 | 82.0 | 58.1 | 86.6 | 87.5 | 66.1 | 46.1 | 74.7 | 90.2 | 90.6 | 85.4 | 89.5 |
| **Assam** | 98.3 | 98.6 | 94.7 | 97.7 | 90.6 | 87.0 | 59.4 | 83.0 | 47.8 | 44.7 | 26.4 | 42.5 |
| **Bihar** | 95.3 | 85.6 | 46.3 | 79.2 | 73.7 | 50.8 | 22.3 | 51.7 | 17.0 | 21.7 | 15.7 | 18.1 |
| **Chhattisgarh** | 86.3 | 49.0 | 31.0 | 67.5 | 75.2 | 43.5 | 5.6 | 54.6 | 84.0 | 74.0 | 50.0 | 74.8 |
| **Jammu & Kashmir** | 97.3 | 90.9 | 54.6 | 93.0 | 74.0 | 62.5 | 27.3 | 68.3 | 96.5 | 92.9 | 81.8 | 94.8 |
| **Jharkhand** | 90.5 | 63.7 | 26.6 | 71.8 | 68.7 | 34.4 | 7.6 | 48.9 | 68.1 | 50.0 | 57.0 | 61.9 |
| **Karnataka** | 91.5 | 61.0 | 31.4 | 72.6 | 84.6 | 47.7 | 20.2 | 63.2 | 91.9 | 86.5 | 75.5 | 87.4 |
| **Kerala** | 99.0 | 96.3 | 93.1 | 96.7 | 40.3 | 30.4 | 35.5 | 36.3 | 35.4 | 39.2 | 54.5 | 41.4 |
| **Madhya Pradesh** | 94.0 | 73.9 | 43.7 | 71.5 | 75.7 | 49.4 | 19.6 | 48.5 | 88.2 | 83.0 | 73.1 | 81.7 |
| **Maharashtra** | 58.5 | 47.5 | 35.0 | 52.2 | 91.5 | 78.9 | 48.4 | 82.0 | 96.7 | 95.0 | 92.5 | 95.6 |
| **Orissa** | 82.8 | 49.2 | 10.6 | 60.5 | 74.6 | 44.1 | 12.9 | 55.1 | 61.9 | 48.8 | 50.0 | 56.6 |
| **Punjab** | 98.1 | 84.5 | 80.3 | 93.4 | 84.1 | 67.2 | 43.3 | 76.5 | 61.9 | 59.1 | 47.5 | 60.0 |
| **Rajasthan** | 90.7 | 65.8 | 53.3 | 73.5 | 83.1 | 50.4 | 28.0 | 59.0 | 94.7 | 86.9 | 82.2 | 89.1 |
| **Tamil Nadu** | 81.6 | 52.9 | 27.6 | 60.3 | 89.0 | 72.1 | 40.2 | 72.3 | 82.9 | 81.1 | 84.4 | 82.7 |
| **Uttar Pradesh** | 86.9 | 69.2 | 52.4 | 73.8 | 76.7 | 46.7 | 18.2 | 53.9 | 43.7 | 35.6 | 27.4 | 37.6 |
| **West Bengal** | 81.0 | 58.6 | 48.8 | 71.0 | 72.1 | 42.6 | 19.0 | 56.1 | 70.2 | 53.5 | 35.4 | 60.9 |
| **Other States** | 90.3 | 81.3 | 56.2 | 86.1 | 82.2 | 62.1 | 41.4 | 75.1 | 89.5 | 84.0 | 75.1 | 87.4 |
| **India** | 85.2 | 67.3 | 46.0 | 73.2 | 83.3 | 62.0 | 32.5 | 68.0 | 79.6 | 74.1 | 65.5 | 75.5 |

Spatial Distribution of Improved source of Drinking Water among Multi-dimensional Poor, One-dimensional Poor, Non-poor Households in Urban India, 2004 -05.





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To achieve the target of MDG goal 7 i.e. ensuring environmental sustainability by 2015, access of clean cooking fuel as well as basic sanitation needs to be accelerated in the urban India and more especially among multidimensional poor households.

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**SAVE ENVIRONMENT .....**

# Impact of Demographic and Household Environmental Factors on Water Born Diseases among Children in India

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## Importance of the Problem

Morbidity is not a single problem with a single solution. Therefore a series of approaches and policies have been evolved to deal with complex health hazards. Prevalence of diseases among children under age 5 is considered as one of the most important indicator of the effectiveness of public health program as well as social health hazard. A child under ages 5, who are naturally innocent, vulnerable and depend on parents, often suffers from various infectious diseases. Improving the child wellbeing remained as one of the major goal of all national level policies for health and social development in order to achieve the millennium development goals. Child wellbeing is generally addressed in terms of morbidity conditions, where morbidity has been defined as "any departure, subjective or objective, from a state of physical well-being" (WHO, 1959, 1968).

In 1990, the child mortality rate was above 100 per 1000 live birth in 55 countries, out of which about 50 countries failed to reduce the under-five mortality to less than 70 death per 1000 live birth during 2001 (DHS, 2004).The Millennium Development Goal assigned new target for reduction in child mortality by two-thirds as compared to the previous target (United Nations, 2001). Acute respiratory infections and diarrhea have been globally identified as poising major threats to survival of children under the age of five (Black, 2003). A global estimate given by UNICEF (2007), 9.2 million children who born alive die before their fifth-birthday.Most of these deaths occur in developing countries, which are largely due to lack of proper hygiene and sanitation.

Sanitation in and around house is determined by number of people living in the house, source of drinking water, use of clean (portable) water, disposal of wastage, type of toilet facility and personal hygiene. Diarrhea and fever are probably initiated and sustained


by environmental factors, which are closely linked to sanitation and water supply. Inadequate knowledge of hygiene and sanitation makes both the mother and child extremely vulnerable to many infections. Poor quality of housing, lack of environmental sanitation and low level of immunity affects child morbidity to a great extent.

In India, **diarrhea** is a major public health problem among children under age of five years. When WHO initiated the diarrheal disease control program in 1980, approximately four million children were dying every year due to dehydration caused by diarrhea. It is estimated that children under five years suffer from 45,000,000 episodes of diarrhea per year and 1.5 million children under five years die due to diarrheal disease every year and about 80 percent of child die due to dehydration. According to DHS, 2004, oral rehydration therapy may now be preventing about 1 million dehydration related deaths in every year. This is also true for India, where these two childhood diseases, have been remained the major causes behind infant mortality. Recognizing the severity of these health hazards in the child survival program in India, diarrhea control program was launched back in 1978 and acute respiratory infections control program in a phased manner in 1991 (National Child Survival And Safe Motherhood Program, 1994).

Traditionally, social science research on child health

has focused on association between socio-economic status and level and pattern of morbidity and mortality in populations. Correlation between morbidity and socio-economic characteristics are used to generate casual inference about determinants of morbidities. In 1984, W.Heney Mosley and Lincoln C. Chen proposed an analytical framework for the study of child survival in developing countries. The approach incorporates both social and biological variables and integrates research methods employed by social and medical scientists. It also provides measurement for the morbidity and mortality in single variable. In fact, the morbidity of infant and children results in mortality causing untold misery to parents at family level, and the depletion of resources at national level (Dhanlakshmi and Murthy, 1996).

In the recent past, rapid deterioration in the quality of environment has overburdened the health system in many countries. Air and water are directly responsible for many of the health problems it is evident that domestic (household) environment is a major contributor to this burden (Usha Ram, 2007). Evidences suggest that diarrhea is particularly important at altitude, as we believe dehydration may be a risk factor for developing altitude sickness. (Kean, 1963). Factor that promote the spread of enteric pathogens at high altitude include cramp sleeping arrangements, poor hygiene and sanitation, concurrent illness and medication. Many high altitude areas are snow bound, others are more or less desert communities. A relative lack of water and sewages management facilities in such locales exacerbates the risk of diarrhea (Buddha, Thomas, Robert, 2001).

Empirical studies on child morbidity have often found that morbidity strongly co-related with age, education of parents, ethnic group. Kabir and Shahadat (1997) observed morbidity differential by place of residence, region of residence, level of income, possession of land etc. found that morbidity of children declines with increase in level of education of parents, and weather children living in house built with cement had a lower prevalence of morbidity than children living in mud houses. Declrque and Mangami (1988) using cross-sectional survey data, collected in Bas Zaire from the mother of 1,200 urban and 1,670 rural children born in the previous five years, found maternal age and birth order as determinant of diarrhea and other child morbidity. Ross and Duff (1982) suggested that Child morbidity can be affected directly through living conditions to which it is exposed. Second, health could be affected indirectly through good medical care. Studies in north and south India have found that boys are much more likely to be taken to health treatment when in morbid condition then girl (Caldwell and Caldwell, (1990), Reddy (1990), Das Gupta (1987), Ganatra and Hirve (1984), Mishra, Roy and Retherford (2004).

Chowdhury (1996) investigates pattern of morbidity by children's immunization status, classified as fully immunized (having received all recommended vaccination) and partially immunized. This study revealed that the diseases affected a smaller percentage of children having been fully vaccinated. Also poor housing condition may accelerate the vulnerability of household environment which also in turn increases the susceptibility to morbidity. For instance there may have probability of crowding, lack of proper hygiene of water and sanitation which may in turn affect the health of child. (Arokiasamy, 2007). However, due to transitional nature of the programmatic response to the childhood morbidities under various program thrusts ranging from NHP,1983; UIP,1986; ORT,1988; CSSM,1992 to NRHM 2005, the micro level factors operating within the framework of child morbidities and survival become pivotal and hence form an important issue for research and action.

## Need for the study

Over the years, there are growing evidences suggesting that socio-economic and demographic factors are important in determining the infant and childhood morbidity and mortality in India. Parental education and economic status of households also act as important co-factors of child morbidity and mortality primarily through variation in perception and practices in treatment seeking behaviors. However, very little is known whether household environment and socio-economic status operate synergistically or independently to influence children's health. Prevention as well as effective treatment of these diseases depends on a host of individual, socio-economic and environmental factors. According to WHO, India is the home of two most common diseases among children that are Diarrhea and Fever. This study aims to examine the prevalence of these two diseases among children under age five years, and to determine factor causing such morbidities.

This study explores the association between childhood morbidities and their determinants in general and certain environmental factor in particular. Along with environmental factors, socio-economic and demographic variables have a decisive influence on morbidity. Historically, the socio-economic status has shown inverse relationship with morbidity. The finding of the study conducted in 1984 by Chojhacka and Adgebola seems to suggest that, although both medical and non-medical factor contribute to the change in morbidity pattern, role of socio-economic factors also found to be significant. A number of studies have analyzed the socio economic effect of household environment on child health status in term of morbidity keeping socio economic condition as a cofactor.

## Objectives

The specific objectives of the study are,

1) To examine the prevalence of diarrhea and fever by some selected socio-economic and environmental factors among children under age 5 in India.

2) To study the determinants of diarrhea and fever among children under age 5 in India.

## Hypotheses

1) Prevalence of diarrhea increases with increase in altitude.

2) Likelihood of getting diarrhea increases with poor sanitation condition in the household.

## Data and Methodology

The basic data used for this study are taken from National Family Health Survey-3 (NFHS-3).The study is based on analysis of kids file containing information about children less than five years of age. The sample of children thus obtained is 56438. In fact, in NFHS-3, mothers were asked a number of questions on child feeding practices and morbidity. Some of these questions are: whether the child had diarrhea in the last two weeks. If the child suffered from the disease, mothers were next asked about symptoms and fluid or food offered to the child during diarrhea episode. Similar types of question were asked for Fever as, whether the child has fever at any time in last two weeks If mothers response was positive, mother were further asked symptoms of illness/sickness. Thus, total number of cases with reported morbidity was Fever (7,852), and Diarrhea (4,755).It is needless to mention that Diarrhea and Fever are the primary dependent variables as per the main thrust of the study.

Diarrhea is defined as the passage of loose, liquid or watery stools. Theses liquid stools pass more than three times a day. However, it is the recent change in consistency and character of stools rather than the number of stools that is more important. Regardless of the etiologic agent –bacterial, viral, or parasitic –diarrheal diseases are almost always transmitted "by direct contact with feces or by contact with water, food, utensils, flies, or soil that has been contaminated with feces" (Black and Lanata, 1995).A safe supply of drinking water and an adequately means of excreta disposal are key determinants of diarrheal disease.

On the other hand fever is a nonspecific symptom associated with many different diseases. Fever is most common symptom of illness in young children, and it is associated with wide range of causes primarily by unhygienic storage of drinking water in different regions of world. Thus, differential diagnosis by health care practitioners of a child pertaining with fever requires knowledge of locally endemic disease and epidemic diseases that may or may not be seasonal. Fever is a common symptom of both non-life threatening illness, which do not require medical attention, like most viral based infections and extremely life threatening illness which do require urgent medical attention, like cerebral malaria, meningitis, septicemia, and typhoid.

To explore the major correlates of both the dependent variables, the study has used a series of socio-demographic, environmental and behavioral predictors having potential to influence the response either in isolation or in combination to other covariates.

## Results and Discussions

This section aims to analyze prevalence of two most significant childhood morbidities namely Diarrhea and Fever by different socio-economic, demographic and environmental factors. It is organized in to two sections. The first section deals with prevalence of childhood morbidities by a set of socio-economic and environmental factors, while the adjusted effects of these factors on diarrhea and fever have been analyzed in the second section. The issues emerged from this analysis may have a larger potential to enable us to

make better assessment and care, which may consequently enhance our understanding for the programmatic response.

## Prevalence of Childhood Morbidities

It is evident from the analysis that almost 9 percent of children below five years of age in India were suffering from diarrhea in the two weeks prior to the survey. The corresponding proportion of children suffering from fever was 15 percent. Age related susceptibility is clearly demonstrated while analyzing the association with prevalence of childhood morbidities. The prevalence of Fever is little higher (16 percent) among children below age one than among children of 1-5 year age group (14 percent). However, the age differential is further pronounced in case of the prevalence of Diarrhea, which is almost twice likely (14 percent) among children below 1 year than the children in age group 1-5 years (8 percent).

Diarrhea is a frequent complication of other infectious illnesses and hence its prevalence may be affected with variation in immunization coverage. Of course, the difference may not be significant but the children who are fully immunized are less likely to be affected by diarrhea (8 percent) than those who are not immunized (9 percent). However, there has been a distinct pattern prevalence of fever analyzed by the extent of immunization coverage. To measure variation in prevalence of Diseases by altitude, diarrhea shows a vital effect. With increasing altitudes the prevalence of Diarrhea is increasing from 8 percent in less than 1000 meter to 10 percent above 1000 meter. So it can be said that with increasing altitudes the prevalence of diarrhea increases.

Results establish the linkages of prevalence of different morbidities with household environmental factors. Prevalence of diarrhea and fever are found to be higher among houses where household density is five persons and above. Disposal of stool is significantly associated with both the diseases. Those houses where toilet is always used for disposal of stool, prevalence of diarrhea and fever are lower than those where toilet is not used for stool disposal. Also houses with no toilet facility shows high prevalence of diarrhea (9 percent) than those using flush toilet (8 percent). Prevalence of both the diseases are found to be higher among males, among under five children in rural areas, among those coming from Lower SLI households, children belonging to less educated mothers and those among Muslims. Thus, mothers need special attention in terms of enhancing awareness about ORS and other forms of liquids, which may help them in the window periods prior to reaching the health care facilities/providers. In fact, functioning of anganwadi centers under the ICDS and effective presence of ASHA under the NRHM scheme may be used to enhance awareness of pregnant and lactating mothers, especially among those living in rural areas and coming from low SLI households, in order to minimize the missed opportunity to treat these childhood morbidities.

## Socio-economic and Environmental Correlates of Different Childhood Morbidities

This section aims to present the adjusted effects of different socio-demographic, environmental and behavioral factors on the prevalence of two prominent childhood morbidities. To show the adjusted effects of different predictors on the prevalence of diarrhea, logistic regression odds ratios are presented in Table3. If reveals relative contribution of different factors in explaining the variation in the prevalence of disease. The children in the age group 1-5 years are less likely to suffer with diarrhea than the children below 1 year. Thus, all the lactating mothers having children age 1 should have special provision of awareness on childhood morbidities, especially on exclusive breast feeding practices and supplementary feeding. This issue is further supported with the finding of inverse relationship with mother's age and hood likely of experiencing diarrhea by their children. It is evident from the Table that children of mother age 20-30 years are almost 30 percent less likely to experience diarrhea than the children whose mothers age below 20 years. This differential is further widened with a sharp decline in the odds of experiencing diarrhea among children of mothers aged 30 years and above as against those to the mothers of age less than 20 years. These findings clearly reveal that younger mothers may be less experienced in child rearing practices, especially in terms of feeding practices both in the traditional as well as transitional societies. However, with increasing birth order the pattern of relationship gets reversed, which reveals that with increasing number of children, mothers may be losing their control on care and attention on children of higher birth orders.

With increasing altitude the risk of diarrhea is increasing as those living at the altitude above 1000 meter are 1.43 times more likely to suffer with diarrhea than those living at the altitude below 1000 meter, which may be due to increasing dehydration and developing altitude sickness, however, the exact causation is seldom to predict with the available information. The children of working mothers are significantly more likely to suffer with diarrhea (OR= 1.1, $p < 0.05$) as against the children of non working mothers. It is worth mentioning that majority of working women in India are engaged in blue collar jobs, where there may not be a provision to child feeding centers at workplace. On the other hand, if women leave their children at home, a number of other factors like long working hours, poor quality feeding practices by siblings or elderly in the family may be contributing towards risk of diarrhea. Further, children who are fully immunized are 0.87 times less likely to suffer with diarrhea than those who received no vaccination. Household sanitation assessed in terms of availability of flush toilet, has a profound impact on the prevalence of diarrhea, as children of these houses are 0.75 times are less likely to suffer with diarrhea than those living in houses without any toilet facility.

Logistic regression odds ratios for the risk of fever in the last two weeks prior to the survey show that those children in the age-group 1-5 years are 0.85 times less likely to have fever. Sex of the child is also significant here, female child is 0.89 times less likely to have fever than male child. Younger aged mother's child are more likely to suffer from fever against older aged mother's child. Among those children with birth order four and above the risk of suffering with fever is found to be higher. Place of residence too shows a significant relationship as children living in rural area are 1.14 times more likely to associate with the risk of fever than urban children. Children of working mothers are 1.13 times more likely to suffer from fever. The type of house shows a significant relationship with fever prevalence. Those children live in semi puccha or puccha houses are less likely for having fever problem. Like diarrhea, hood likely of experiencing fever is also found to be low among children whose mothers are more exposed to mass media and are coming from high SLI households. Thus, there should be differential emphasis on educational and awareness programs about child care and child feeding practices among mothers coming from rural areas and those belonging to relatively poorer households.

## Summary

This study reveals that the age of child is a significant factor in the prevalence of diarrhea and fever among children under age five. Prevalence of any morbidity was highest among children under one year. Child less than one year of age crawl on floor and has tendency to put their hands frequently in the mouth, which makes them more venerable to get infected with the disease. Type of housing is one of the important risk factors for both the morbidities. Children living in houses built with tin or earthen material mostly suffers from diarrhea compared with children lived in houses built with brick/cement. This is because children living in puccha houses enjoyed better socio-economic status which in turn ensures better health. Child who belongs to low SLI families suffers more from these diseases and vice-versa.

Exposure to mass-media always had a prominent positive impact and better understanding towards the child health care. Children whose mothers have no mass-media exposure are more susceptible to the disease. Similarly children belonging to rural area are more prone to both diarrhea and fever. Results of this study indicate that prevalence of diarrhea and fever is slightly higher among male children.

It is evident from the study that prevalence of diarrhea increase with altitude. Thus it establishes the hypothesis “prevalence of diarrhea increases with increase in altitude”. Childhood immunization played an important role as it is seen that prevalence of diarrhea were higher among children who have not received any vaccination.

Similarly, unhygienic conditions and environment like unhygienic storage of drinking water, portability of drinking water, type of toilet facility, unsafe disposal of stool of children and household density were positively associated with incidence of diarrhea. Hence the hypothesis related to diarrhea and poor sanitation condition has been accepted on the basis of this analysis. It can be said that diarrhea and fever are most common symptom of illness among young children in India, and it is associated with a wide range of cause. Thus, differential diagnosis by health care practitioners of a child pertaining with these diseases requires knowledge of proper hygiene and sanitation in which they grow and also to ensure better environmental conditions. Therefore any interventions related to child

development should specially target the "household environmental factors" that mitigate prevalence of different diseases among them.

## Quotes on Environment

- ✓ "The earth, the air, the land and the water are not am inheritance from our fore fathers but on loan from our children. So we have to handover to them at least as it was handed over to us."
  - Mahatma Gandhi
- ✓ "Earth provides enough to satisfy every man's needs, but not every man's greed."
  - Mahatma Gandhi
- ✓ "What we are doing to the forests of the world is but a mirror reflection of what we are doing to ourselves and to one another."
  - Mahatma Gandhi
- ✓ "The poetry of the earth is never dead."
  -John Keats
- ✓ "We need the tonic of wildness...At the same time that we are earnest to explore and learn all things, we require that all things be mysterious and unexplorable, that land and sea be indefinitely wild, unsurveyed and unfathomed by us because unfathomable. We can never have enough of nature."
  -Henry David Thoreau, Walden: Or, Life in the Woods
- ✓ "If we surrendered to earth's intelligence we could rise up rooted, like trees."
  -Rainer Maria Rilke, Rainer Maria Rilke's the Book of Hours: A New Translation with Commentary
- ✓ "What's the use of a fine house if you haven't got a tolerable planet to put it on?"
  -Henry David Thoreau, Familiar Letters
- ✓ "Landscapes of great wonder and beauty lie under our feet and all around us. They are discovered in tunnels in the ground, the heart of flowers, the hollows of trees, fresh-water ponds, seaweed jungles between tides, and even drops of water. Life in these hidden worlds is more startling in reality than anything we can imagine. How could this earth of ours, which is only a speck in the heavens, have so much variety of life, so many curious and exciting creatures?"
  -Walt Disney Company
- ✓ "If the bee disappeared off the face of the earth, man would only have four years left to live."
  -Albert Einstein

**Table-1: Variation in prevalence of Diarrhea and fever within two weeks prior to the survey among children under age 5 by some selected socio-economic and demographic characteristics, India, 2005-06.**

| Risk factor | Total number of children under age 5 | No. of children suffering from Diarrhea | Prevalence of Diarrhea | No. of children suffering from Fever | Prevalence of Fever |
|---|---|---|---|---|---|
| **Age of the child** | | | | | |
| **< 1 year** | 10401 | 1498 | 14.4 | 1706 | 16.4 |
| **1-5 year** | 42445 | 3257 | 7.7 | 6146 | 14.5 |
| **Sex of child** | | | | | |
| **Male** | 27617 | 2630 | 9.5 | 4264 | 15.4 |
| **Female** | 25227 | 2125 | 8.4 | 3587 | 14.2 |
| **Birth order** | | | | | |
| **1** | 16567 | 1400 | 8.5 | 2315 | 14.8 |
| **2-3** | 22727 | 1929 | 8.5 | 3189 | 14.7 |
| **4 and above** | 12261 | 1111 | 9.1 | 1701 | 14.9 |
| **Place of residence** | | | | | |
| **urban** | 13660 | 1215 | 8.9 | 1918 | 14.0 |
| **Rural** | 39186 | 3540 | 9.0 | 5934 | 15.1 |
| **PSU Altitude in Meter** | | | | | |
| **<1000** | 47843 | 4054 | 8.5 | 6710 | 14.9 |
| **>1000** | 3712 | 368 | 10.4 | 495 | 13.9 |
| **Mothers education** | | | | | |
| **No education** | 25925 | 2246 | 8.7 | 3779 | 14.6 |
| **Primary** | 7396 | 706 | 9.5 | 1150 | 15.5 |
| **Secondary and above** | 19496 | 1803 | 9.2 | 2923 | 15.0 |
| **Religion** | | | | | |
| **Hindu** | 41265 | 3080 | 8.7 | 5693 | 13.8 |
| **Muslim** | 9081 | 909 | 10.0 | 1815 | 20.0 |
| **Others** | 2452 | 235 | 9.6 | 337 | 13.7 |
| **Caste/Tribe** | | | | | |
| **SC/ST** | 15836 | 1382 | 8.7 | 2199 | 13.9 |
| **OBC** | 21306 | 2029 | 9.5 | 3109 | 14.6 |
| **Others** | 14291 | 1223 | 8.6 | 2270 | 15.6 |
| **Mothers occupation** | | | | | |
| **Not working** | 33341 | 3008 | 9.0 | 4943 | 14.8 |
| **Working** | 19451 | 1744 | 8.9 | 2906 | 14.9 |
| **Type of house** | | | | | |
| **Puccha** | 7736 | 709 | 9.2 | 1188 | 15.4 |
| **Semi puccha** | 22250 | 1987 | 8.9 | 3458 | 15.5 |
| **puccha** | 18086 | 1582 | 8.7 | 2537 | 14.0 |
| **SLI** | | | | | |
| **Low** | 15593 | 1429 | 9.2 | 2398 | 15.4 |
| **Medium** | 16557 | 1470 | 8.9 | 2465 | 14.9 |
| **high** | 15271 | 1332 | 8.7 | 2217 | 14.5 |
| **Mothers mass-media exposure** | | | | | |
| **No** | 16996 | 1540 | 9.1 | 2538 | 15.0 |
| **Yes** | 35879 | 3215 | 9.0 | 5314 | 14.8 |
| **Vaccination coverage** | | | | | |
| **No immunization** | 4549 | 401 | 8.8 | 643 | 14.1 |
| **Partial immunization** | 32386 | 2836 | 8.8 | 4311 | 15.0 |
| **Full Immunization** | 19503 | 1518 | 7.8 | 2898 | 15.9 |
| | | | | | |
| **Total** | **52845** | **4755** | **9.0** | **7852** | **15.0** |

**Table-2: Variation in prevalence of Diarrhea and fever within two weeks prior to the survey among children under age 5 by different household environmental factors, India, 2005-06.**

| Environmental factors | Total number of children under age 5 | No. of children suffering from Diarrhea | Prevalence of Diarrhea | No. of children suffering from Fever | Prevalence of Fever |
|---|---|---|---|---|---|
| **Main source of drinking water** | | | | | |
| **Tape** | 40684 | 3636 | 8.9 | 6155 | 15.1 |
| **Well** | 5073 | 512 | 8.7 | 841 | 14.0 |
| **River/pond** | 1252 | 112 | 8.9 | 175 | 14.4 |
| **Others** | 520 | 44 | 8.4 | 64 | 10.4 |
| **Portability of drinking water** | | | | | |
| **No** | 6382 | 559 | 8.8 | 897 | 14.1 |
| **Yes** | 41891 | 3743 | 8.9 | 6326 | 15.1 |
| **Type of toilet facility** | | | | | |
| **No facility** | 30710 | 2813 | 9.2 | 4548 | 14.8 |
| **Pit toilet** | 2921 | 279 | 9.6 | 514 | 17.6 |
| **Flush toilet** | 14649 | 1211 | 8.3 | 2156 | 14.7 |
| **Ways of disposal of stool of child** | | | | | |
| **Always use toilet** | 5147 | 367 | 7.1 | 816 | 15.9 |
| **Risen in toilet** | 4438 | 395 | 8.9 | 637 | 14.4 |
| **Risen into drain/ditch** | 4329 | 472 | 10.9 | 662 | 15.3 |
| **Throw into garbage** | 15633 | 1564 | 10.0 | 2306 | 14.8 |
| **Not disposed** | 22845 | 1931 | 8.9 | 3395 | 14.9 |
| **Type of fuel used for cooking** | | | | | |
| **Bio-mass fuel** | 38420 | - | - | 5919 | 15.4 |
| **Kerosene/LPG/Electricity** | 9901 | - | - | 1305 | 13.2 |
| **Separate room used for kitchen** | | | | | |
| **No** | 12664 | - | - | 1936 | 15.3 |
| **Yes** | 27888 | - | - | 4134 | 14.8 |
| **Presence of chimney in the house** | | | | | |
| **No** | 36416 | - | - | 5597 | 15.4 |
| **Yes** | 2789 | - | - | 441 | 14.7 |
| **Household density** | | | | | |
| **2** | 20018 | 1080 | 5.1 | 2879 | 14.4 |
| **3-4** | 22427 | 1334 | 5.6 | 3409 | 15.2 |
| **5+** | 10423 | 644 | 5.8 | 1564 | 15.4 |

**Table 3: Logistic Regression analysis to identify the risk factor of Diarrhea and Fever of children under age five in India**

| | Diarrhea | | Fever | |
|---|---|---|---|---|
| **Risk factor** | **B** | **Exp(β)** | **B** | **Exp(β)** |
| **Age of the child** | | | | |
| **<1 year®** | | | | |
| **1-5 year** | .606 | .524*** | .109 | .855** |
| **Sex of the child** | | | | |
| **Male®** | | | | |
| **Female** | .072 | .810*** | .012 | .891*** |
| **Age of mother** | | | | |
| **<20** | | | | |
| **20-30** | .685 | .701*** | .363 | .811 |
| **>30** | .242 | .503*** | .094 | .821** |
| **Birth order** | | | | |
| **1®** | | | | |
| **2-3** | -.302 | 1.231*** | -.007 | .993 |
| **4 and above** | -.233 | 1.689*** | -.011 | 1.011 |
| **Place of residence** | | | | |
| **Urban®** | | | | |
| **Rural** | .065 | .937 | -.069 | 1.140** |
| **PSU altitude in meter** | | | | |
| **<1000®** | | | | |
| **>1000** | -.069 | 1.439** | .248 | .927 |
| **Mothers occupation** | | | | |
| **Not working®** | | | | |
| **Working** | -.059 | 1.099** | -.036 | 1.133*** |
| **Mothers education** | | | | |
| **No®** | | | | |
| **Primary** | -.149 | .977 | -.102 | 1.149** |
| **Secondary and above** | -.088 | 1.142** | -.017 | 1.067 |
| **Type of house** | | | | |
| **Made of puccha®** | | | | |
| **Sami puccha** | .070 | .897 | .104 | .959 |
| **Puccha** | -.012 | .987 | .102 | .859** |
| **SLI** | | | | |
| **Low®** | | | | |
| **Medium** | .013 | .999 | .015 | .980 |
| **High** | -.003 | .989 | -.012 | .944 |
| **Mothers exposure of mass-media** | | | | |
| **No®** | | | | |
| **Yes** | -.020 | .926 | -.013 | .888** |
| **Vaccination Coverage** | | | | |
| **No®** | | | | |
| **Partial** | -.052 | 1.048 | .370 | 1.134 |
| **Fully Immunized** | .028 | .875** | .585 | 1.136 |
| **Main source of drinking water** | | | | |
| **Tape®** | | | | |
| **Hand pump** | - | - | .050 | .957 |
| **Well** | - | - | .045 | .923 |
| **River/pond** | - | - | .039 | .740* |
| **Portability of drinking water** | | | | |
| **No®** | | | | |
| **Yes** | -.020 | 1.145 | .058 | 1.062 |
| **Type of toilet facility** | | | | |
| **No facility®** | | | | |
| **Pit toilet** | .103 | .929 | -.104 | 1.267*** |
| **Flush toilet** | .182 | .749** | .137 | 1.114** |
| **Ways of disposal of stool of child** | | | | |
| **Always use toilet®** | | | | |
| **Risen in toilet** | - | - | .034 | .970 |
| **Risen into drain/ditch** | - | - | -.028 | 1.050 |
| **Throw into garbage** | - | - | .041 | .927 |
| **Not disposed** | - | - | -.039 | .947 |

**Note *** <0.01, ** p<0.05, * P<0.1**

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## Pop-Envis Website (http://iipsenvis.nic.in)

# CONFERENCE

**1. 3rd National Conference on Environment and Biodiversity**

**Conference Date :** 6th October 2013

**Conference Venue:** Pune, Maharashtra, India

**Website:** http://www.ebiconference.com/2013/01/call-for-abstracts-ebi-2013.html

**Contact person:** Khuraijam JS

**Deadline for abstracts/proposals:** 15th July 2013

Check the event website for more details.

**2. AGSE 2013: The Geospatial Momentum for Society and Environment**

An interdisciplinary, international forum for sharing knowledge about the application of Geoinformatic with focus on application and on developing countries.AGSE 2013, "The Geospatial Momentum for Society and Environment", will take place at the revised date 16-19 December, 2013,Center for Environmental Planning and Technology University (CEPT University), Ahmedabad, India, chaired by Prof Dr Anjana Vyas, Dean, FGSA, CEPT University, and Prof. Dr. Franz-Josef Behr, Stuttgart University of Applied Sciences.

Last date of abstract submission: 20 June 2013

Last date of full paper submission: 07 September 2013

End of Early Bird Conference Registration: 31 September 2013

The brochure can be downloaded from CEPT's AGSE conference website.

**3. 6th International Congress of Environmental Research**

**Conference:** 19th December 2013 to 21st December 2013, India , Aurangabad

**Website:** www.icer13.jerad.org

**Contact Person:** Professor Dr. Subhash C Pandey

Original quality research articles of technology, Life sciences , Physical Sciences , Social sciences, Law and Management related to environment are invited for its presentation in the congress and publication in the journal JERAD.

**Deadline for abstracts/proposals:** 30th June 2013

**Organized By:** G.SEED

**4. 2014 Tenth International Conference on Environmental, Cultural, Economic & Social Sustainability**

**Conference:** 22nd to 24th January 2014,Split, Croatia (Hrvatska)

**Website:** http://onsustainability.com

**Contact person:** Conference Director

The 2014 Tenth International Conference on Environmental, Cultural, Economic & Social sustainability will be held 22 - 24 January 2014 , at The University of Split, Split, Croatia.

**Organized by:** Common Ground Publishing

**5. 2nd National Seminar on Water & Sanitation in relation to Public Health**

**Seminar:** 22nd to 23rd March 2014, Dharmshala, District: Kangra, Himachal Pradesh , India

**Website:** http://gsaindia.org.in/index.php/environment-gsa

**Contact person:** Dr. Anil Pratap Singh

Please refer our website and send your abstract(s) latest by Friday 28th February 2014. A maximum of two papers will be accepted from individual authors. Kindly feel free to contact us whilst making submission.

**Organized by:** GLOBAL SCIENCE ACADEMY

**Deadline for abstracts/proposals:** 28th February 2014

**6. International Conference of Environmental and Occupational Health 2014**

**Conference:** 7th to 9th April 2014, Kuala Lumpur, Malaysia

**Website:** http://www.iceoh2014.org/iceoh2014

**Contact person:** Associate Professor Dr Shamsul Bahri

ICEOH 2014 is the International Conference of Environmental and Occupational Health. The theme of this conference is professionals and practitioners collaboration: a window for sustainable future in environmental and occupational health.

**Organized by:** Universiti Putra Malaysia

**7. Second Contemporary Challenges of International Environmental Law Conference**

**Conference:** 5th to 6th June 2014,Ljubljana, Slovenia

**Website:** http://www.environmentlawconference.com

**Contact person:** Dr Vasilka Sancin

The scientific onference is set up as an interdisciplinary debate between environmental scientists and legal experts, offering a new forum for critical debate and innovative thinkining in search of new international environmental law solutions.

**Organized by:** Faculty of Law, University of Ljubljana

**Deadline for abstracts/proposals:** 5th September 2013

**8. First International Online Conference of Environmental pollution and Protection**

**Online conference:** 7th to 7th June 2014, Online, United Arab Emirates

**Website:** http://conferences.oscij.com/index.php/EPP/1EPP

**Contact person:** Executive manager

First Online Conference of Environmental pollution and Protection (1stOCEPP2014) to be held, as an online conference on June 7, 2014, is one of the special tracks as online within the 2014 on the Environmental pollution and Protection.

**Deadline for abstracts/proposals:** 28th November 2013

# NEWS

**1. It's official: Chennai is getting hotter, also wetter**

**The Times of India | PTI | Jun 11, 2013, 12.00 PM IST**

CHENNAI: Blame it on urbanization or climate change, a compilation of weather data over the years proves what Chennaiites have always known - that the city is getting hotter. But, believe it or not, it's also getting wetter.

An analysis of temperatures in summer and winter months through 42 years shows the city had an almost equal number of hot days (above 40 degrees Celsius) and cold days (below 19 degrees Celsius) between 1969 and 1990. In the last 21 years, however, there have been almost four times more hot days (220) than cold days (58).

The study conducted by the India Meteorological Department (IMD) says the number of hot days has gone up by 27% and the cold days down by 69% over the last four decades. Rapid urbanisation, increase in vehicular population and effects of global warming have been cited as the reasons for the rise in the city's average temperature.

Surprisingly, the average annual rainfall has increased by 11.2cm in the last two decades. "People say groundwater level has gone down because of weak monsoon. But, that is not true. We have had only a handful of years when the annual rainfall was below 100cm," said YEARAJ, deputy director general of IMD in Chennai.

**2. What's Behind the New Warning on Global Carbon Emissions?**

**Source: news.nationalgeographic.co.in/news/energy/2013/06/130611**

If the world waits until 2020 to take action on global climate change, it will undoubtedly be too late, the International Energy Agency (IEA) warns in a new report.

These efforts could keep the world on track while nations work toward a more comprehensive 2020 agreement to limit the rise in global temperature to no more than 2°C above preindustrial levels, IEA said. Without such steps, the agency said, the prognosis is dire. (See related story: "IEA Outlook: Time Running Out on Climate Change.")

"The path we are currently on is more likely to result in a temperature increase of between 3.6 degrees Celsius to 5.3 degrees Celsius," with most of that warming happening within this century, said IEA Executive Director Maria van der Hoeven at a London press conference. Already, the report noted, global temperatures have increased 0.8°C beyond preindustrial levels.

The IEA said that, under its four-point plan, greenhouse-gas emissions in 2020 would be 8 percent, or 3.1 metric gigatons, lower than levels they are otherwise likely to hit. In May, it was reported that the carbon dioxide ($CO_2$) concentration in the atmosphere at the Mauna Loa Observatory in Hawaii hit 400 parts per

million, a high in human history, and the IEA's goal is to help ensure that the level does not exceed 450 ppm by 2020. (See related story: "Climate Milestone: Earth's CO2 Level Passes 400 ppm.") But even if that goal is met, it said, there is still only a 50 percent chance of keeping to the 2°C limit.

IEA's four recommendations are:

- Strengthen or introduce energy-efficiency measures in buildings, industry, and transportation.
- Cut back on the construction and use of inefficient coal-fired power plants.
- Take action to halve the release of methane into the environment from the oil and gas industry.
- Start the phaseout of fossil-fuel consumption subsidies.
- **Q: Why is it important not to exceed the 2°C limit?**

A: Even at the 2°C level, the Earth is likely to experience "extreme changes in its climate system that it has not seen in more than 200,000 years," said Corinne Le Quere, director of the Tyndall Center for Climate Change Research at East Anglia University. There will, she said, be "more heat waves, extreme rainfall events and rising sea levels." Severe weather, like the storms that caused the Danube and Elbe rivers in Central Europe to overflow in recent weeks, is expected to become more frequent. (See related: "Pictures: Worst Floods in European History?") Climate change will also place stresses on food production. Temperature increases greater than 2°C will be much harder to adapt to, Le Quere said, because there will be complete shifts in vegetation and water patterns.

### 3. Punjab targets to increase forest cover from 7 to 15 per cent

**The Times of India | PTI | Jun 10, 2013, 12.17 PM IST**

CHANDIGARH: Punjab government has chalked out an ambitious Rs 1,900 crore plan for the implementation of the " Greening Punjab Mission" with the target to increase the forest area from 7 to 15 per cent in next seven years.

Under this ambitious mission, 40 crore saplings are to be planted on various places across the state, forest and wildlife preservation minister, Surjit Kumar Jyani, said in a release here. Under the 'Greening PunjabMission,' 40 crore saplings would be planted in all available vacant farm lands in Punjab.

Punjab aims to enhance the forest and tree cover from the existing 7 per cent to 15 per cent of the geographical area of the state, he said. The National Forest Policy envisages 33 per cent of the country's area under forest and tree cover for safeguarding the environment and ecology of the nation, the Minister said.

"Punjab being a predominantly agricultural state has less than 7 per cent of its area under forest/tree cover, resulting in severe environmental and ecological degradation and also leads to rapidly rising pollution levels in the air, water and soil," he added.

## 4. Renowned urban planner bats for green building movement

**The Times of India | PTI | Jun 6, 2013, 02.53 PM IST**

KOLKATA: Inclusive city planning is imperative for the planned growth of any 'green' township, American urban planning expert Robert Brosnan has said. Preserving the character of a city was the most critical factor of urban planning, but when the old facade of dilapidated buildings cannot be retained, it would make sense to tear them down, he said here last evening at an interactive session organised by the USIS.

He further asked the city fathers to consider the "Arlington Model" of urban planning. Arlington is a township adjacent to Washington DC which was built not just taking into consideration the inhabitants, available land, water, power utility services and sewerage, but also the need to conserve energy and avoid wastage.

“You must look for conserving energy to the extent possible; just planting saplings on the boulevards will not help," he said."Where ever it is possible, replace the old buildings with new structures but retain the look of the original," Brosnan, said adding such a practice would make enough sense for Kolkata.

He advocated the need for putting equal stress on connectivity by introducing a better public transport network to take the load off private transport. "Think of how people can be dissuaded from having their own vehicles. Make public transport faster, user-friendly and comfortable. That will be an energy-efficient move helping to decrease pollutants in the air, especially in a tropical country of yours," Brosnan, the Director of Department of Community Planning, US, said.

Stressing the need for putting in place a mass transit system, he said that MRTS projects like underground rails could be the only alternative in addition to a large fleet of buses on dedicated feeder routes."Rainwater harvesting is also a must to save the depleting ground water table," Brosnan said. He also disfavoured giving people the right to walk on kerbs, saying jay-walkers crossing the road and not being very careful about traffic signals were slapped fines in the US.

Brosnan came to the city to participate in an interactive session on 'Green Building - Impact on our community at the American center in association with CII where city-based architects, real estate developers, businessmen, entrepreneurs and officials from the state department of urban development took part.

He said it is time urban planners in India considered the green building movement which, he felt, would put a lid on industrial units proliferating in residential hubs."I am happy to note that the Green Building Movement in India is advancing at a brisk pace with over 1608 registered projects covering a green footprint of 1.15 billion sq ft," he said.

# DATA

## Census 2011 Results: Population Growth, Sex-Ratio and Literacy Rate

### Population growth

The **demographics of India** are remarkably diverse. India is the second most populous country in the world, with over 1.21 billion people (2011 census), more than a sixth of the world's population. Already containing 17.5% of the world's population, India is projected to be the world's most populous country by 2025, surpassing China, its population exceeding 1.6 billion people by 2050. However, its population growth rate is only 1.41%, ranking 93rd in the world.

**Population and its Growth, India: 1901-2011**

| Census Years | Population | Decadal growth | |
|---|---|---|---|
| | | Absolute | Percent |
| 1 | 2 | 3 | 4 |
| **1901** | 23,85,96,327 | - | - |
| **1911** | 25,20,93,390 | 1,36,97,063 | 5.75 |
| **1921** | 25,13,21,213 | -7,22,177 | (0.31) |
| **1931** | 27,89,77,238 | 2,76,56,025 | 11.00 |
| **1941** | 31,86,60,580 | 3,96,83,342 | 14.22 |
| **1951**[1] | 36,10,88,090 | 4,24,27,510 | 13.31 |
| **1961**[1] | 43,92,34,771 | 7,81,46,681 | 21.64 |
| **1971** | 54,81,59,652 | 10,89,24,881 | 24.80 |
| **1981**[2] | 68,33,29,097 | 13,51,69,445 | 24.66 |
| **1991**[3] | 84,64,21,039 | 16,30,91,942 | 23.87 |
| **2001**[4] | 1,02,87,37,436 | 18,23,16,397 | 21.54 |
| **2011**[5] | 1,21,01,93,422 | 18,14,55,986 | 17.64 |

**NOTES**

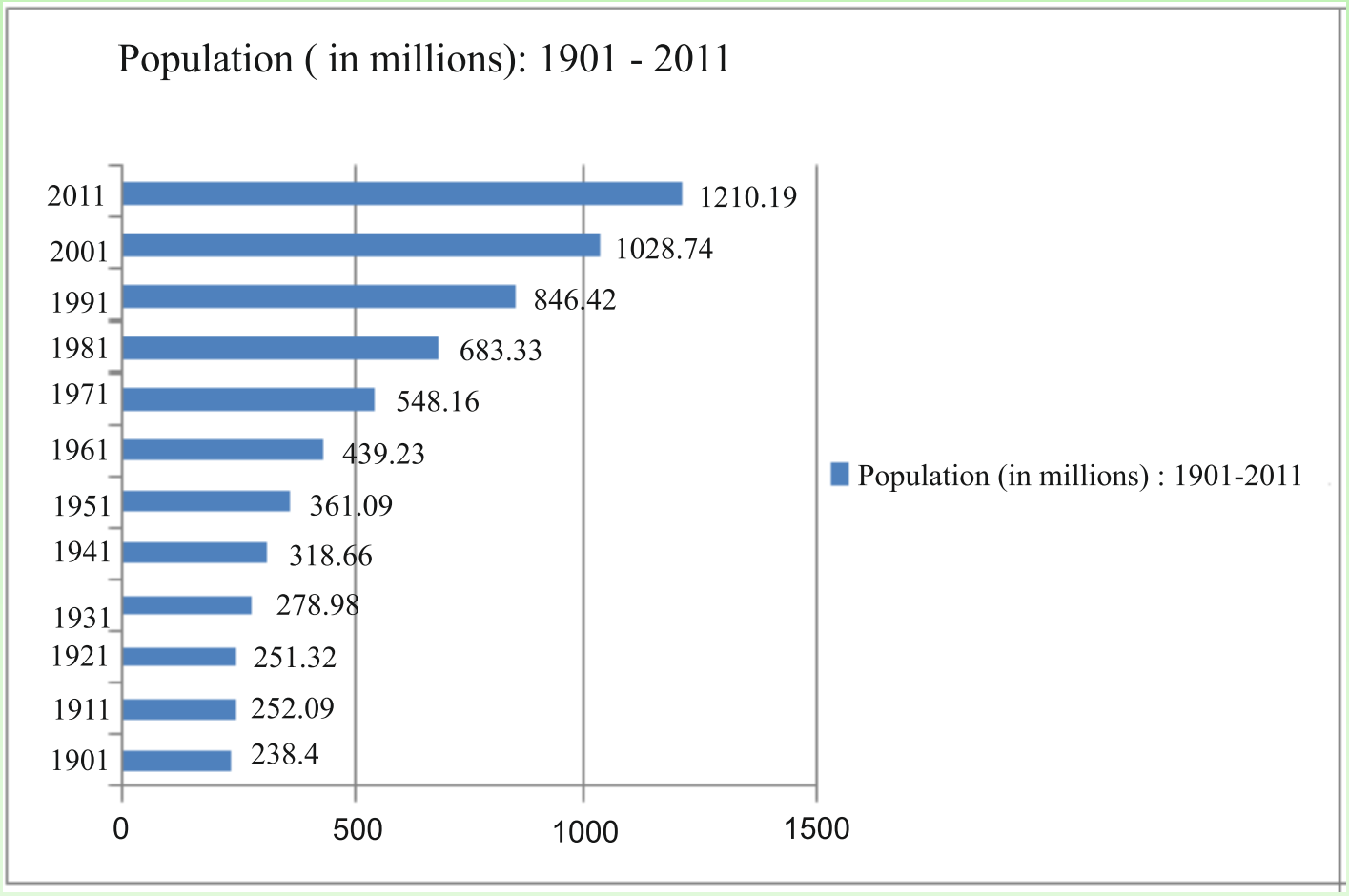
1. In working out "Decadal Growth" and 'Percentage Decadal Growth' for India 1941-51 and 1951-61 the population of Tuensang district for 1951 (7,025) and the population of Tuensang (83,501) and Mon (5,774) districts for 1961 Census of Nagaland state have not been taken into account as the areas were censused for the first time in 1951 and the same are not comparable.

2. The 1981 Census could not be held owing to disturbed conditions prevalling in Assam. Hence the population figures for 1981 Census of Assam have been worked out by 'interpolation'.

3. The 1991 Census could not be held owing to disturbed conditions prevailing in Jammu and Kashmir. Hence the population figures for 1991 Census of Jammu and Kashmir have been worked out by 'interpolation'.

4. Includes estimated population of Paomata, Mao Maram and Pural sub-divisions of Senapati District of Manipur for 2001.

5. Includes estimated population of Paomata, Mao Maram and Pural sub-divisions of Senapati District of Manipur for 2011.




Demographic transition is a global phenomenon; population growth is inevitable in the initial phases of the transition. For India the current phase of the demographic transition is both a challenge and an opportunity. The challenge is to ensure human development and optimum utilization of human resources. The opportunity is to utilize available human resources to achieve rapid economic development and improvement in quality of life.

**Population, Percentage Decadal Growth and Average Annual Exponential Growth Rates, 1991-2001 and 2001-2011**

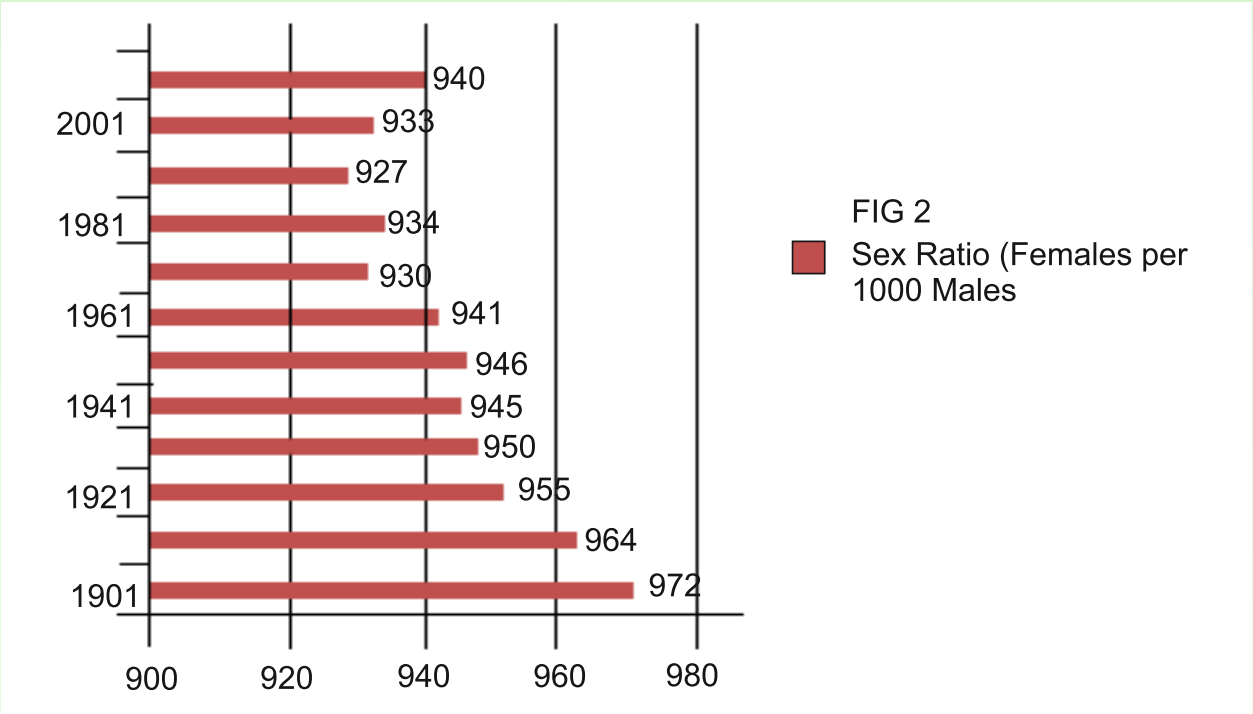
| State/ UT Code | India/State/Union Territory* | Total Population | | Percentage decadal growth | | Average annual exponential growth rate | |
|---|---|---|---|---|---|---|---|
| | | 2001 | 2011 | 1991-2001 | 2001-2011 | 1991-2001 | 2001-2011 |
| | **INDIA** | **1,02,87,37,436** | **1,21,01,93,422** | **21.54** | **17.64** | **1.97** | **1.64** |
| **01** | Jammu & Kashmir | 1,01,43,700 | 1,25,48,926 | 29.43 | 23.71 | 2.61 | 2.15 |
| **02** | Himachal Pradesh | 60,77,900 | 68,56,509 | 17.54 | 12.81 | 1.63 | 1.21 |
| **03** | Punjab | 2,43,58,999 | 2,77,04,236 | 20.10 | 13.73 | 1.85 | 1.30 |
| **04** | Chandigarh* | 9,00,635 | 10,54,686 | 40.28 | 17.10 | 3.44 | 1.59 |
| **05** | Uttarakhand | 84,89,349 | 1,01,16,752 | 20.41 | 19.17 | 1.87 | 1.77 |
| **06** | Harayana | 2,11,44,564 | 2,53,53,081 | 28.43 | 19.90 | 2.53 | 1.83 |
| **07** | NCT of Delhi* | 1,38,50,507 | 1,67,53235 | 47.02 | 20.96 | 3.93 | 1.92 |
| **08** | Rajasthan | 5,65,07,188 | 6,86,21,012 | 28.41 | 21.44 | 2.53 | 1.96 |
| **09** | Uttar Pradesh | 16,61,97,921 | 19,95,91,477 | 25.85 | 20.09 | 2.33 | 1.85 |
| **10** | Bihar | 8,29,98,509 | 10,38,04,637 | 28.62 | 25.07 | 2.55 | 2.26 |
| **11** | Sikkim | 5,40,851 | 6,07,688 | 33.06 | 12.36 | 2.90 | 1.17 |
| **12** | Arunachal Pradesh | 10,97,968 | 13,82,611 | 27.00 | 25.92 | 2.42 | 2.33 |
| **13** | Nagaland | 19,90,036 | 19,80,602 | 64.43 | -0.47 | 5.11 | -0.05 |
| **14** | Manipur | 22,93,896 | 27,21,756 | 24.86 | 18.65 | 2.25 | 1.72 |
| **15** | Mizoram | 8,88,573 | 10,91,014 | 28.82 | 22.78 | 2.57 | 2.07 |
| **16** | Tripura | 31,99,203 | 36,71,032 | 16.03 | 14.75 | 1.50 | 1.39 |
| **17** | Meghalaya | 23,18,822 | 29,64,007 | 30.65 | 27.82 | 2.71 | 2.49 |
| **18** | Assam | 2,66,55,528 | 3,11,69,271 | 18.92 | 16.93 | 1.75 | 1.58 |
| **19** | West Bengal | 8,01,76,197 | 9,13,47,736 | 17.77 | 13.93 | 1.65 | 1.31 |
| **20** | Jharkhand | 2,69,45,829 | 3,29,66,238 | 23.36 | 22.34 | 2.12 | 2.04 |
| **21** | Orissa | 3,68,04,660 | 4,19,47,358 | 16.25 | 13.97 | 1.52 | 1.32 |
| **22** | Chhattisgarh | 2,08,33,803 | 2,55,40,196 | 18.27 | 22.59 | 1.69 | 2.06 |
| **23** | Madhya Pradesh | 6,03,48,023 | 7,25,97,565 | 24.26 | 20.30 | 2.20 | 1.87 |
| **24** | Gujarat | 5.06,71,017 | 6,03,83,628 | 22.66 | 19.17 | 2.06 | 1.77 |
| **25** | Daman & Diu* | 1,58,204 | 2,42,911 | 55.73 | 53.54 | 4.53 | 4.38 |
| **26** | Dadra & Nagar Havel* | 2,20,490 | 3,42,853 | 59.22 | 55.50 | 4.76 | 4.51 |
| **27** | Maharashtra | 9,68,78,627 | 11,23,72,972 | 22.73 | 15.99 | 2.07 | 1.49 |
| **28** | Andhra Pradesh | 7,62,10,007 | 8,46,65,533 | 14.59 | 11.10 | 1.37 | 1.06 |
| **29** | Karnataka | 5,28,50,562 | 6,11,30,704 | 17.51 | 15.67 | 1.63 | 1.47 |
| **30** | Goa | 13,47,668 | 14,57,723 | 15.21 | 8.17 | 1.43 | 0.79 |
| **31** | Lakshadweep* | 60,650 | 64,429 | 17.30 | 6.23 | 1.61 | 0.61 |
| **32** | Kerala | 3,18,41,374 | 3,33,87,677 | 9.43 | 4.86 | 0.90 | 0.48 |
| **33** | Tamil Nadu | 6,24,05,679 | 7,21,38,958 | 11.72 | 15.60 | 1.11 | 1.46 |
| **34** | Puducherry* | 9,74,345 | 12,44,464 | 20.62 | 27.72 | 1.89 | 2.48 |
| **35** | Andaman & Nicobar Islands* | 3,56,152 | 3,79,944 | 26.90 | 6.68 | 2.41 | 0.65 |

**Note:** * Union Territories

## Sex Ratio

The reported decline in the sex ratio during the current century has been a cause for concern (Fig 2).The factors responsible for this continued decline are as yet not clearly identified. However, it is well recognized that the adverse sex ratio is a reflection of the gender disparity. Higher childhood mortality in girl children is yet another facet of the existing gender disparities and consequent adverse effect on survival.

### Sex Ratio in India : 1901-2011




## Sex Ratio of Total Population and Child Population in the age group 0-6 and 7+ years: 2001-2011

| State/ UT Code | India/States/Union Territory* | Sex ratio (females per 1000 males) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Total Population | | Child Population 0 - 6 | | Population aged 7 and above | |
| | | 2001 | 2011 | 2001 | 2011 | 2001 | 2011 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | **INDIA** | **933** | **940** | **927** | **914** | **934** | **944** |
| **01** | Jammu & Kashmir | 892 | 883 | 941 | 859 | 884 | 887 |
| **02** | Himachal Pradesh | 968 | 974 | 896 | 906 | 980 | 983 |
| **03** | Punjab | 876 | 893 | 798 | 846 | 888 | 899 |
| **04** | Chandigarh* | 777 | 818 | 845 | 867 | 767 | 812 |
| **05** | Uttarakhand | 962 | 963 | 908 | 886 | 973 | 975 |
| **06** | Harayana | 861 | 877 | 819 | 830 | 869 | 885 |
| **07** | NCT of Delhi* | 821 | 866 | 868 | 866 | 813 | 866 |
| **08** | Rajasthan | 921 | 926 | 909 | 883 | 923 | 935 |
| **09** | Uttar Pradesh | 898 | 908 | 916 | 899 | 894 | 910 |
| **10** | Bihar | 919 | 916 | 942 | 933 | 914 | 912 |
| **11** | Sikkim | 875 | 889 | 963 | 944 | 861 | 883 |
| **12** | Arunachal Pradesh | 893 | 920 | 964 | 960 | 878 | 913 |
| **13** | Nagaland | 900 | 931 | 964 | 944 | 890 | 929 |
| **14** | Manipur | 974 | 987 | 957 | 934 | 977 | 995 |
| **15** | Mizoram | 935 | 975 | 964 | 971 | 930 | 976 |
| **16** | Tripura | 948 | 961 | 966 | 953 | 945 | 962 |
| **17** | Meghalaya | 972 | 986 | 973 | 970 | 971 | 989 |
| **18** | Assam | 935 | 954 | 965 | 957 | 929 | 953 |
| **19** | West Bengal | 934 | 947 | 960 | 950 | 929 | 946 |
| **20** | Jharkhand | 941 | 947 | 965 | 943 | 935 | 948 |
| **21** | Orissa | 972 | 978 | 953 | 934 | 976 | 985 |
| **22** | Chhattisgarh | 989 | 991 | 975 | 964 | 992 | 995 |
| **23** | Madhya Pradesh | 919 | 930 | 932 | 912 | 916 | 933 |
| **24** | Gujarat | 920 | 918 | 883 | 886 | 927 | 923 |
| **25** | Daman & Diu* | 710 | 618 | 926 | 909 | 682 | 589 |
| **26** | Dadra & Nagar Havel* | 812 | 775 | 979 | 924 | 779 | 752 |
| **27** | Maharashtra | 922 | 925 | 913 | 883 | 924 | 931 |
| **28** | Andhra Pradesh | 978 | 992 | 961 | 943 | 981 | 997 |
| **29** | Karnataka | 965 | 968 | 946 | 943 | 968 | 971 |
| **30** | Goa | 961 | 968 | 938 | 920 | 964 | 973 |
| **31** | Lakshadweep* | 948 | 946 | 959 | 908 | 946 | 951 |
| **32** | Kerala | 1058 | 1084 | 960 | 959 | 1072 | 1099 |
| **33** | Tamil Nadu | 987 | 995 | 942 | 946 | 993 | 1000 |
| **34** | Puducherry* | 1001 | 1038 | 967 | 965 | 1006 | 1047 |
| **35** | Andaman & Nicobar Islands* | 846 | 878 | 957 | 966 | 831 | 868 |

**Note:** * Union Territories

The top three States recording the highest value of overall sex ratio are in Kerala (1084), Tamil Nadu (995) and Andhra Pradesh (992). Among the UTs, the top three are Puducherry (1038), Lakshadweep (946) and the Andaman & Nicobar Islands (878). The lowest sex ratio among the states has been recorded in Haryana (877), Jammu & Kashmir (883) and Sikkim (889). Among the UTs the lowest sex ratio has been recorded in Daman & Diu (618), Dadra & Nagar Haveli (775) and Chandigarh (818).

## Literacy Rate

In earlier censuses up to 1981, it was customary to work out the literacy rate taking into account the total population. Since literacy rate is more meaningful if the sub-population in the age group 0-6 is excluded from the total population, it was decided in 1991 to calculate literacy rate for the population seven years and above.

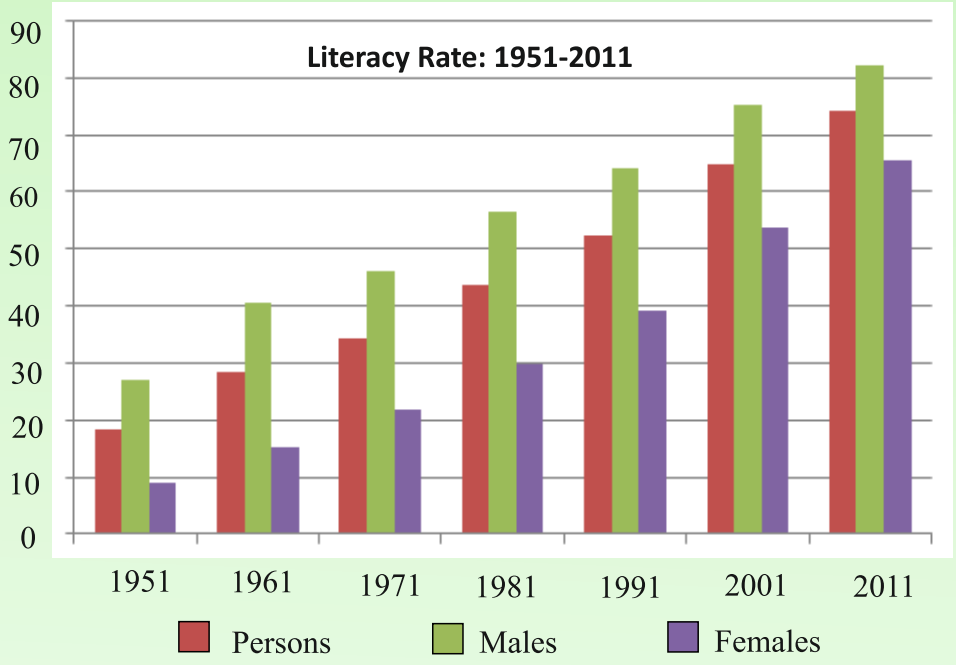
India's effective literacy rate has recorded a 9.2 percent rise to reach 74.04 percent, according to provisional data of the 2011 census. Effective literacy rate in the 2001 census was 64.83, which improved to 74.04.Interestingly, literacy rate improved sharply among females as compared to males. While the effective literacy rate for males rose from 75.26 to 82.14 per cent marking a rise of 6.9 percent, it increased by 11.8 per cent for females to go from 53.67 to 65.46 percent.

**Number of Literates and Illiterates among Population aged 7 years and above and their change- India :2001 and 2011**

| Literates and Illiterates | Person | Males | Females |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| **Population (aged 7 and above)** | | | |
| 2001 | 86,49,00041 | 44,72,14,823 | 41,76,85,218 |
| 2011 | 1,05,14,04,135 | 54,07,72,113 | 51,06,32,022 |
| Increase in 2011 over 2001 | 18,65,04,094 | 9,35,57,290 | 9,29,46,804 |
| **Literates** | | | |
| 2001 | 56,07,53,179 | 33,65,71,822 | 22,41,81,357 |
| 2011 | 77,84,54,120 | 44,42,03,762 | 33,42,50,358 |
| Increase in 2011 over 2001 | 21,77,00,941 | 10,76,31,940 | 11,00,69,001 |
| **Illiterates** | | | |
| 2001 | 30,41,46,862 | 11,06,43,001 | 19,35,03,861 |
| 2011 | 27,29,50,015 | 9,65,68,351 | 17,63,81,664 |
| Increase in 2011 over 2001 | -3,11,96,847 | -1,40,74,650 | -1,71,22,197 |

**Literacy Rate in India : 1951-2011**

| Census Year | Person | Male | Female |
|---|---|---|---|
| **1** | **2** | **3** | **4** |
| **1951** | 18.33 | 27.16 | 8.86 |
| **1961** | 28.30 | 40.40 | 15.35 |
| **1971** | 34.45 | 45.96 | 21.97 |
| **1981** | 43.57 | 56.38 | 29.76 |
| **1991** | 52.21 | 64.13 | 39.29 |
| **2001** | 64.83 | 75.26 | 63.67 |
| **2011** | 74.04 | 82.14 | 65.46 |




According to provisional totals of the latest census, literates constitute 74 percent of total population aged seven and above. It was encouraging to note that out of total 217,700,941 literates added during the decade, females at 110,069,001 outnumbered males at 107,631,940. A significant milestone reached in 2011 census was the decline of illiterates by 31,196,847. Ten states and union territories, including Kerala, Lakshadweep, Mizoram, Tripura, Goa, Daman and Diu, Puducherry, Chandigarh, National Capital Territory of Delhi and the Andaman and Nicobar Islands, have attained literacy rate of above 85 percent, the target set by the Planning Commission to be achieved by 2011-12.

The gap of 21.59 percentage points recorded between male and female literacy rates in 2001 census reduced to 16.68 percentage points in 2011. The Planning Commission had set up a target of reducing this gap to 10 percentage points by 2011-12. Kerala has the highest literacy rate at 93.91 percent followed by Lakshadweep at 92.28 percent. Bihar is at the bottom of the ladder with literacy rate of 63.82 percent followed by Arunachal Pradesh at 66.95percent.

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