

Statistics Day 2011

June 29th, 2011

HOMAGE TO

**Professor Prasanta Chandra Mahalanobis
(1893 – 1972)**



“The fundamental aim of statistics being to give determinate and adequate knowledge of reality with the help of number and numerical analysis, the ancient Indian word Sankhya embodies the idea adequately”



सत्यमेव जयते

Government of India

Ministry of Statistics and Programme Implementation

National Statistical Organisation

Website: www.mospi.gov.in





सत्यमेव जयते

राष्ट्रपति
भारत गणतंत्र
**PRESIDENT
REPUBLIC OF INDIA**

MESSAGE

I am happy to learn that the Statistics Day, under the stewardship of the Ministry of Statistics and Programme Implementation (MOSPI) is being celebrated on June 29, 2011 on the theme "Gender Statistics", to coincide with the birth anniversary of the economist and development planner and eminent statistician Late Prof. Prasanta Chandra Mahalanobis.

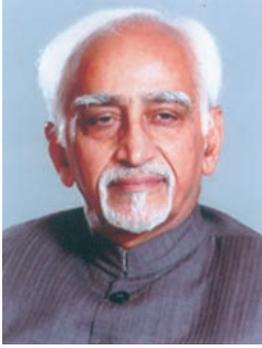
Gender related issues have assumed tremendous importance in our development process. The observance of this Day gives opportunity to young researchers and professionals working in these domains to take stock of trends and development in Statistics. The theme chosen for this 5th Statistics Day 'Gender Statistics' is very significant in the present scenario, where there has been a disturbing decline in child male to female ratios in some parts of the country.

I extend my greetings and felicitations to all those associated with the Celebrations and wish the Day every success.

Pratibha Patil
(Pratibha Devisingh Patil)

New Delhi
June 3, 2011





सत्यमेव जयते

उप-राष्ट्रपति, भारत
VICE-PRESIDENT OF INDIA

VPS/M-1/2011

MESSAGE

I am glad to know that the Central Statistical Organization, Ministry of Statistics and Programme Implementation is organizing the 5th Statistics Day on the theme 'Gender Statistics' on 29th June, 2011 to mark the birth anniversary of Prof. P.C. Mahalanobis.

A sound and reliable statistical base is the essential pre-requisite for socio-economic planning, policy formulation and for performance assessment of government programmes and schemes in various sectors of the economy.

I extend my greetings and good wishes to all those associated with the Central Statistics Organization and wish the 'Statistics Day' celebrations all success.

(M. HAMID ANSARI)

New Delhi
26th May, 2011



प्रणब मुखर्जी
PRANAB MUKHERJEE



सत्यमेव जयते

वित्त मंत्री, भारत
FINANCE MINISTER
INDIA



Message on the Occasion of the 5th Statistics Day

I am very pleased to know that the Ministry of Statistics and Programme Implementation is celebrating the Statistics Day on June 29, 2011, which also coincides with the birth anniversary of Prof. P.C.Mahalanobis. I understand that the theme for the 5th Statistics Day is "Gender Statistics", an issue of significant relevance in the larger agenda of our country's development priorities.

The contribution of Professor Mahalanobis in building and refining the institutional framework for development planning in India are well known. He played a significant role in laying the foundations of a modern statistical system for the country. He straddled the twin worlds of academia and policy making like a colossus, leaving an indelible mark on the post-independence history of India's development.

Statistics is the bed rock of modern evidence based analysis and policy making. It is an area where our endeavour should be to constantly improve the relevant institutional practices and methodologies for data collection, compilation and analysis, as well as the knowledge and skill base of the professionals engaged in the subject.

The celebration of the Statistics Day on the birth anniversary of Prof. Mahalanobis is a befitting honour to his memory. I hope this event helps in creating interest in the subject and building the statistical capacity for more effective policy making in the country. I wish the organisers the very best for the success of this event.


(Pranab Mukherjee)



डा० एम. एस. गिल
DR. M.S. GILL



सत्यमेव जयते

सांख्यिकी और कार्यक्रम कार्यान्वयन मंत्री
भारत सरकार
नई दिल्ली-110001
MINISTER OF STATISTICS AND PROGRAMME IMPLEMENTATION
GOVERNMENT OF INDIA
NEW DELHI-110001

MESSAGE

I am happy to be part of the celebrations for 5th Statistics Day on 29th June, 2011.

Prof. Prasanta Chandra Mahalanobis, in whose memory the day celebrated, was a visionary. His contribution to development of Statistics as a tool of governance, is pathbreaking. He created the Indian Statistical Institute; founded and edited "Sankhya"; organised the Indian statistical system; pioneered the application of statistical techniques to practical problems; promoted the Statistical Quality Control movement for improvement of industrial products; and was the architect of India's Second Five Year Plan. The day is celebrated at the national level, for creating public awareness among the people, and for drawing inspiration from his contribution, in the role of statistics in social-economic planning and policy formulation.

The theme for the Statistics Day-2011, i.e. Gender Statistics, is very important and relevant today, when Government is committed to the advancement, development and empowerment of women and to create an environment through positive economic and social policies, for development of women, to enable them to realize their full potential. Statisticians play an important role in the process by making available timely, reliable and credible statistics, for objective decision-making.

The 'Statistics Day' will be celebrated throughout India, by organizing events like essay/debate competitions, seminars and lectures on Statistics at the national and regional level, besides a main function at Delhi.

I convey my best wishes to the statistical fraternity throughout India, on this occasion.

(Dr. M.S. Gill)





सत्यमेव जयते

डॉ. सी. रंगराजन
Dr. C. RANGARAJAN

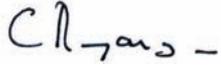


अध्यक्ष
प्रधानमंत्री की आर्थिक सलाहकार परिषद्
विज्ञान भवन सौध 'ई' हाल
मौलाना आज़ाद रोड
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CHAIRMAN
Economic Advisory Council to the Prime Minister
Vigyan Bhavan Annexe, 'E' Hall
Maulana Azad Road
New Delhi-110 011

June 10, 2011

Message

June 29, the birthday of Prof. P.C. Mahalanobis, is being celebrated as the Statistics Day. He was the guiding spirit behind the Indian statistical system in the formative years after Independence. Needless to say, a good statistical system is indispensable for policy formulation and to monitor the progress of various sectors of the economy. The Indian statistical system needs improvement in terms of timeliness, credibility and adequacy. Steps are being taken to restructure our statistical system and making it more useful. India is a leader in many ways in the evolution of statistical systems in the developed economies. Large scale sample surveys originated in India. Prof. Mahalanobis is a legendary figure in Indian statistics. The celebration of the Statistics Day should not only remind us of the contributions made by Prof. Mahalanobis to the Indian statistical system but also strengthen our resolve to modernize statistical system in response to the changing circumstances.


(C. Rangarajan)





सत्यमेव जयते

Prof. R. Radhakrishna
Chairman



राष्ट्रीय सांख्यिकीय आयोग
National Statistical Commission

भारत सरकार / Government of India
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MESSAGE

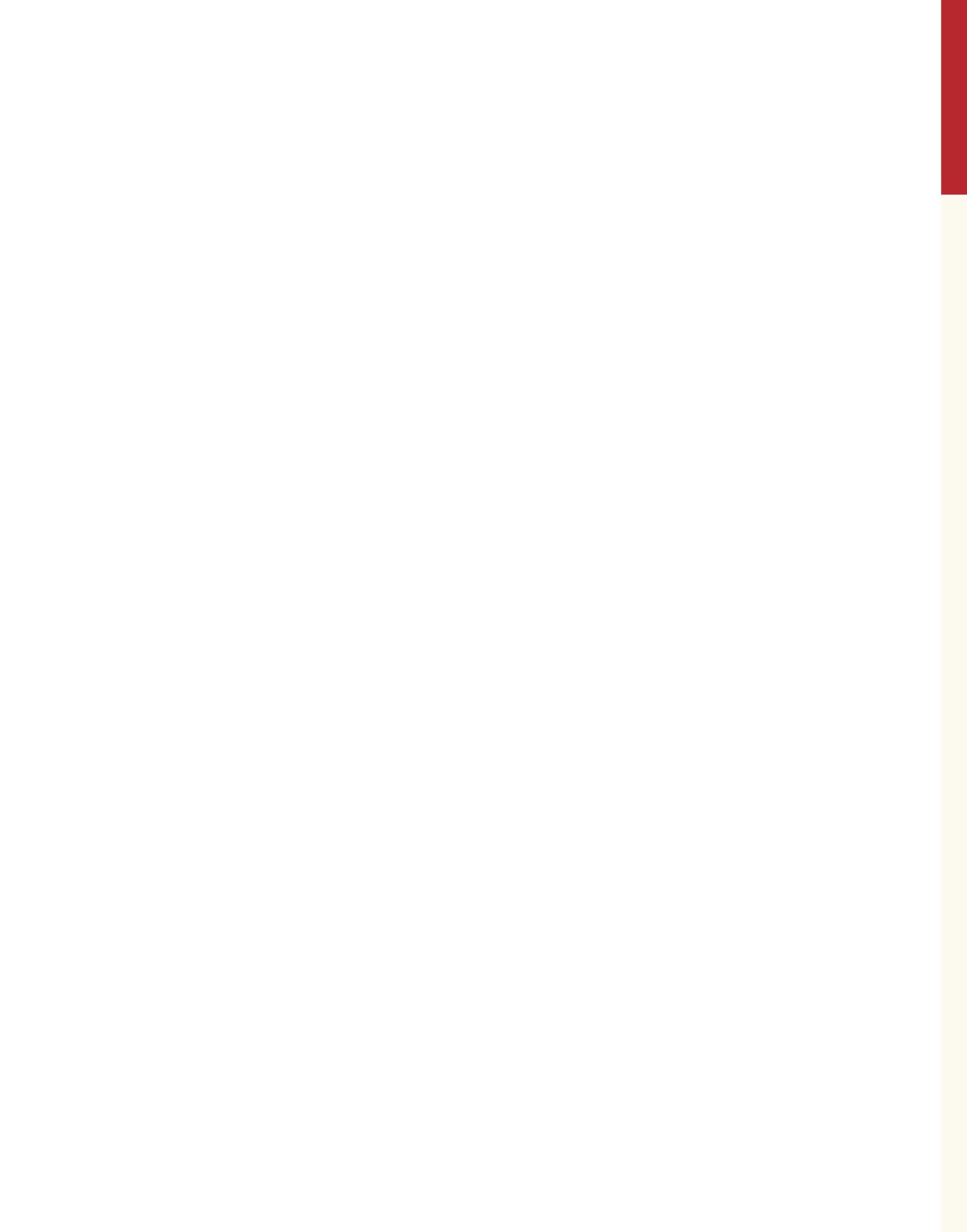
I am glad that the Ministry of Statistics and Programme Implementation is celebrating the day 29th June, 2011 as the fifth Statistics Day in recognition of the pioneering contributions made by Late Prof. P.C. Mahalanobis coinciding with his birth anniversary.

Prof. Mahalanobis was a legendary figure, a great statistician and promoter of talent. He made pioneering and lasting contributions in the fields of large scale sample surveys, anthropometric studies and India's Five-year plans. As the first statistical adviser to the Government of India, he played a key role in developing statistical architecture of India. I hope the present generation of statisticians would draw great inspiration from the life and works of the Late Professor.

The theme chosen for the Statistics Day, "Gender Statistics" is extremely relevant in the context of our endeavour to build sustainable, equitable and developing society. Availability of statistical data on gender issues can help policy analysis to address gender concerns.

I wish the program a grand success.

R. Radhakrishna
(R. Radhakrishna)



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Prof. C. R. Rao Award

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प्रो. टी. सी. ए. अनन्त
सचिव, भारत सरकार
PROF. T.C.A. ANANT
Secretary, Government of India



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PREFACE

This year we are for the fifth time, celebrating "Statistics Day" on 29th June 2011. For me, Statistics day is a great occasion not only for remembering Prof. P. C. Mahalanobis on his birth anniversary, and taking lessons from his outstanding contributions in the field of statistics and economic planning but also for recognizing and reviewing the achievements made by Statistical Fraternity in the country.

Statistics has, since beginning, been regarded as one of the most important tool for making decisions in the midst of uncertainty. There has been a phenomenal development in the use of statistics in several varied fields. The physical sciences, especially astronomy, geology and physics were among the fields in which statistical methods were first developed and applied. It is for these reasons that Prof. Mahalanobis, though a Physics graduate, shifted to Statistics. In fact in 1920, at the Nagpur Session of Indian Science Congress, Nelson Annandale, the then Director of Zoological Survey of India asked Prof. Mahalanobis to analyse anthropometric measurements of Anglo-Indians in Kolkata and this led to his first scientific paper in 1922. This resulted in the famous statistical measure D^2 known as Mahalanobis Distance. Thereafter, his contributions to 'Statistics' were innumerable.

The basis for an effective planning is realistic estimates of various parameters of the economy. Such estimates are possible provided the data base is sound and reliable. The official statistical system in India has a sound foundation mainly due to Prof. Mahalanobis's vision. However, remembering the contributions of Prof. Mahalanobis by celebrating his birth anniversary as Statistics Day is not enough. It would be a true tribute to him if we follow his footsteps, take his works further, and contribute to strengthen the statistical system. It has, therefore, been decided since 2009 to select a theme of importance for deliberations on Statistics Day, so as to take a stock of the present availability of data, identify gaps, recent steps taken to improve the situation, and make efforts throughout the year to strengthen the data base for bringing improvements in the system.

The theme for the year 2011 "Gender Statistics" is very crucial and important in today's scenario. The ten broad areas of priority for the Government, outlined by the President of India for the next five years in her budget speech 2009, include concerted efforts for the welfare of women. The principle of gender equality is enshrined in the Indian Constitution in its Preamble, Fundamental Rights, Fundamental Duties and Directive Principles. The Constitution not only grants equality to women, but also empowers the State to adopt measures of positive discrimination in favor of women. Within the framework of a democratic polity, our laws, development policies, plans and programmes have aimed at women's advancement in different spheres. However, there still exists a wide gap between the goals enunciated in the Constitution, legislation, policies, plans, programmes, and related mechanisms on the one hand and the situational reality of the status of women in India, on the other. Gender disparity manifests itself in various forms, the most obvious being the trend of continuously declining female ratio in the population in the last few decades. Discrimination against girl children, adolescent girls and women persists in parts of the country.

The Statisticians need to gear up to improve the Gender Statistics to enable the Government to take informed decisions. The data produced should be reliable and made available within the minimum time lag. Data gaps need to be filled. This can be achieved by ensuring that statistics related to individuals are collected, compiled, analyzed and presented by sex and age so as to reflect issues related to women and men in society. A gender perspective is needed in all traditional statistical fields. This implies that gender statistics cannot be produced and improved in isolation. Such work must be integrated with the development of overall data collection system. Improvement of contents, methods, classifications and measurements should be made part of the on-going efforts to improve the sources of statistics, namely, censuses, surveys and administrative system. Indicators of gender disparity in various aspects of education, health and employment are required to be brought out. I suggest that the Central Statistics Office and Ministry of Women and Child Development should work together in the next one year to develop a standard methodology for the purpose of generating these indices to reflect the status of women in the country. I hope that when we celebrate the Statistics Day 2012 next year, atleast a methodology to develop such indices would be in place, if not the indices.

June 9, 2011


(T. C. A. Anant)



Prof. Prasanta Chandra Mahalanobis

Born : 29th June 1893

Died : 28th June 1972

A biographer has described him as a “renaissance man and scientist”. He could also be described as a child of renaissance. In spirit, if not quite in time, his roots may be traced to the Bengal Renaissance, a social and cultural awakening that shook the province of Bengal in nineteenth century India. Prasanta Chandra Mahalanobis’s grandfather founded, with others, an organization called the Sadharan Brahma Samaj, which was to become a torch-bearer of the Bengal Renaissance. His father, Prabodh Chandra, was an active member of this organization. His mother, Nirodbasini, belonged to a family of considerable academic achievements. Into this family, Prasanta Chandra was born on 29 June, 1893.

Prasanta Chandra completed his schooling in Calcutta in 1908. In 1912, he graduated with honours in Physics from Presidency College, Calcutta. He went to England in 1915 and completed Tripos in Mathematics and Physics from King’s College, Cambridge. In Part II of the Tripos, he was the only candidate to get a first class in Physics. King’s College awarded him a senior research fellowship. Before starting his research, he came to Calcutta for a short vacation, but never

returned to England. The war intervened. Also, he had found a teaching job and plenty of other interesting things to do in Calcutta.

Just before Mahalanobis left Cambridge, his tutor, W.H. Macaulay, drew his attention to Biometrika. Mahalanobis found the articles interesting, purchased the whole set of available volumes and brought these back to Calcutta. A window was opened to a new area of science, permanently changing the direction of his life.

Among his mentors in Calcutta was Acharya Brojendranath Seal, a philosopher and an encyclopedist, who was also interested in Statistics. Seal was to have a lasting influence on Mahalanobis’s life and work. In 1917, Seal, who held the Chair of Philosophy in Calcutta University, sought the help of Mahalanobis in analyzing examination results of the University. Soon thereafter, Mahalanobis met Nelson Annadale, the then Director of Zoological and Anthropological Survey of India, who had collected anthropometric measurements on Anglo-Indians of Calcutta. Annadale requested Mahalanobis to Analyze the data. The results of statistical analyses

of a portion of these data resulted in Mahalanobis's first paper on statistics entitled 'Anthropological Observations on Anglo-Indians of Calcutta, Part I: Male Stature', published in Records of the Indian Museum in 1922. This paper attracted the attention of Sir Gilbert Walker, Director General of Observatories, who requested Mahalanobis to undertake a systematic study of some meteorological problems. This resulted in an important discovery by Mahalanobis that the region of highest control for changes in weather on the surface of the earth is located about 4 kilometers above sea-level. Subsequently, he was appointed Meteorologist in the Alipore Observatory and he held this post from 1922 to 1926.

Some of the early statistical studies he undertook were on experimental designs in agriculture. In 1924, he made some important discoveries pertaining to the probable error of results of agricultural experiments, which put him in touch with R.A. Fisher. Later in 1926, he met Fisher at the Rothamsted Experimental Station and a close personal relationship was immediately established which lasted until Fisher's death.

At the request of the Indian Government, Mahalanobis undertook some work on prevention of floods in various regions of the country. His findings and recommendations, though often contrary to engineering wisdom of the time, were accepted by the Government and resulted in alleviation of the problem of flooding to a large extent.

In 1927, Mahalanobis spent a few months in Karl Pearson's laboratory in London, during which period he performed extensive statistical analyses of anthropometric data and closely examined Pearson's Coefficient of Racial Likeness (CRL) for measurement of biological affinities. He noted several shortcomings of the CRL and in 1930 published his seminal paper on the D-square statistic entitled 'Tests and Measures of Group Divergence'. Mahalanobis's interest in anthropometry remained strong and two large-scale anthropometric surveys were carried out under his direction in the United Provinces and Bengal. Based primarily on the D-square statistic, many of the important anthropological inferences drawn from the data collected in these surveys have stood the test of time. For example, the conclusion that Bengal Brahmins resemble other castes of Bengal more closely than they resemble Brahmins from elsewhere in India has been corroborated by many subsequent studies.

Mahalanobis's contributions to large scale sample surveys are among his most significant and lasting gifts to statistics. He started his work on sample surveys with estimation of area and yield of jute crop in Bengal in 1937. However, it was not easy for him to get these estimates accepted; controversy between him and the advocates of complete enumeration continued for over a decade. Ultimately he was able to demonstrate that estimates based on sample surveys were often more accurate than those based on complete enumeration, and that sample surveys could yield estimates with small margins

of error within a short time and at a smaller cost than complete enumeration. He made many methodological contributions to survey sampling that included optimal choice of sampling design using variance and cost functions, and the technique of interpenetrating network of subsamples for assessment and control of errors, especially non-sampling errors, in surveys. The concept of pilot surveys was a forerunner of sequential sampling developed by Abraham Wald, as acknowledged by Wald in his book. In addition to introducing these concepts, Mahalanobis raised important and difficult philosophical questions on randomness and representativeness of a sample, which remain relevant and challenging even today. He was elected Chairman of the United Nations Subcommittee on Statistical Sampling in 1947, and held the post till 1951. His tireless advocacy of the usefulness of sample surveys resulted in the final recommendation of this subcommittee that sampling methods should be extended to all parts of the world. Mahalanobis received the Weldon Medal from Oxford University in 1944 and was elected a Fellow of the Royal Society, London, in 1945, for his fundamental contributions to Statistics, particularly in the area of large-scale sample surveys.

Mahalanobis believed that statistics should be an integral part of the dynamics of national planning. He was acutely aware of national problems and national resources. He took a keen interest and played a key role in formulating India's second five-year plan based on the four-sector model developed by him. Broad

sectoral allocations of employment, capital investment and increment in national income were worked out and then split into detailed targets. Even though national planning seems to have now gone out of fashion, the need for planning in the initial stages of a nation's development is still acknowledged and Mahalanobis's contributions to Indian national planning continue to be held in high esteem by economists. During the last decade of his life, he devised a statistical method, fractile graphical analysis, for comparison of socio-economic conditions of groups of people. This technique has now been used in many other branches of science.

The year 1931 marks a watershed in the development of statistics in India. From the fledgling Statistical Laboratory formed in the early 1920s by Mahalanobis within the Physics department of Presidency College, he founded the Indian Statistical Institute on 17 December, 1931. He persuaded many bright young physicists and mathematicians to join the Institute. They included Raj Chandra Bose, Samarendra Nath Roy and C. Radhakrishna Rao. 'Professor', - as he was referred to by everyone in the Institute, - and his wife, Nirmalkumari, poured in all they possessed to establish the Institute on a firm footing. In 1959, by an act of the Indian Parliament, the Institute was declared as an 'Institution of National Importance'.

Mahalanobis's role as a planner prompted him to play a pioneering role in the organized collection of official statistics.

He established the National Sample Survey in 1950 with the objective of providing comprehensive statistics relating to all economic and social aspects on an all-India basis. He also helped in setting up of the Central Statistical Organization in India, an apex body for coordination of statistical activities in India. He was instrumental in the establishment of formal teaching of statistics in many Indian universities and also in the Indian Statistical Institute. In collaboration with the International Statistical Institute, he established an International Statistical Education Centre at the Indian Statistical Institute.

As a scientist Mahalanobis was, above all, a great applied statistician. Statistics was to be used for better understanding and reporting of scientific and engineering data and decision making for the welfare of the society. In Mahalanobis's work on prevention of floods, both aspects of statistics, namely, understanding and decision making, come together. On the other hand, in his pioneering work on anthropometric variation in India, it is the first aspect that dominates.

In his work as an applied statistician, Mahalanobis was very innovative, often introducing new concepts or methodologies or systemizations. His work

on flood control combined innovative data analysis, understanding and modeling natural phenomena, and a systematization of the whole complex analysis which made his recommendations so readily acceptable to the government. The same gift for innovation and systemization are apparent in his work on large-scale sample surveys and planning. For him, theory grew out of a practical need and this influenced subsequent practical work. Innovation and very concrete applications are the hallmark of the sort of applied statistics that Mahalanobis practiced. He had nothing but contempt for irrelevant, poorly conceived abstraction which he would dismiss as 'aerodynamics in a viscous fluid.'

As a science organizer (and a thinker on organization of science), Mahalanobis was one of the very best of the twentieth century. The fact that Indian contributions to statistics have been so noteworthy is due to him, more than to anything else. In spite of being close to India's first prime minister, Jawaharlal Nehru, and many other national leaders, Mahalanobis was never a part of any establishment. He disliked all forms of bureaucracy in science. He was an organizer with vision who loved innovation and adventure and was ready to take risks.



*National Award for Outstanding and Meritorious
Research Work in Statistics
Constituted in the Honour of*

Dr. C. R. Rao







Prof. C. R. Rao A Life Sketch

Significant contributions

C R Rao is among the world leaders in statistical science over the last six decades. His research, scholarship and professional services have had a profound influence on theory and applications of statistics. Technical terms such as, *Cramer-Rao inequality*, *Rao-Blackwellization*, *Rao's Score Test*, *Fisher-Rao and Rao Theorems*, *Rao distance*, *orthogonal arrays (described by Forbes Magazine as "new manthra" for industries)*, *Analysis of Dispersion (MANOVA)* and *Canonical Variate analysis and G-inverse of matrices* appear in all standard books on statistics. *Cramer-Rao bound* and *Rao-Blackwellization* are the most frequently quoted key words in statistical and engineering literature. Special uses of *Cramer-Rao bound* have appeared in *Quantum Physics*. *Rao-Blackwellization* has found applications in adaptive sampling, particle filtering in high-dimensional state spaces, dynamic Bayesian networks etc. Other technical terms bearing his name appearing in specialized books are Rao's F and U tests in multivariate analysis, Rao-Rubin, Lau-Rao, Lau-Rao-Shanbhag and Kagan-Linnik-Rao theorems in characterization of probability distributions. Two of his papers which had a high impact on the

development of statistical theory appear in the book *Breakthroughs in Statistics :1889-1990*. He is the author of 14 books and about 350 research papers. Three of his books have been translated into several European and Chinese and Japanese languages.

Times of India dated 31 December 1988 chose C R Rao as one of the 10 top scientists of India considering all disciplines; the list includes the outstanding scientists, all Fellows of Royal Society, J.C. Bose, S.N. Bose, S Ramanujan, Harishchandra, G.N.Ramachandran and Nobel Laureates H. Khurana, C.V. Raman and S. Chandrasekhar .

Academic qualifications

Rao received MA degree in mathematics with a first class and first rank from Andhra University (1941) and MA degree in statistics from Calcutta University (1943) with a first class, first rank and a record of marks unbeaten till now, and a gold medal. He started working in the ISI at Calcutta as a research scholar from 1943. He was invited to work on a project at the Cambridge University, UK, which required the statistical methodology developed at the Indian Statistical Institute. Based on the work he did he earned his Ph.D. in 1948 from

Cambridge University. A few years later, the university awarded him the prestigious Sc.D. degree based on a peer review of his research contributions to statistics. Up to date he has received 31 Honorary Doctoral Degrees from universities in 18 countries in 6 continents.

Positions held

He held several important positions, as the Director of the Indian Statistical Institute, Jawaharlal Nehru Professor and National Professor in India and University Professor, University of Pittsburgh and Eberly Professor of Statistics and Director of the Center for Multivariate Analysis, Pennsylvania State University in USA.

Development of statistics in India

As the Head and later Director of the Research and Training School at the Indian Statistical Institute for a period of over 40 years, Rao developed research and training programs and produced outstanding students which *“put India not far from the center of the statistical map of the world”*, and earned for ISI the name of Indian School of Statistics. During this period he also directed the training programs at the International Statistical Educational Center (ISEC) which led to the development of (statistics in the South East Asian region. Rao was the Chairman of a UN Committee, which examined the demand for statistical personnel in Asian countries and recommended the establishment of an Institute for statistical development in South East Asia. On the basis of his recommendation ASI (The Asian Statistical Institute) now known as

Statistical Institute for Asia and Pacific was established in Tokyo to provide training to statisticians working in government and industrial organizations.

C.R. Rao played an important role in setting up state statistical bureaus in different states of India and developing a network of statistical agencies at the district level for collection of data. Together with the Central Statistical Organization and the National Sample Survey in planning of which, C.R. Rao played a significant role, India has one of the best national statistical systems. He Founded The Indian Econometric Society which has been active in promoting quantitative studies in economics for planning purposes.

Work in USA

C.R. Rao accepted University Professorship at the University of Pittsburgh after he took mandatory retirement from the Indian Statistical Institute (ISI) in India at the age of 60. He worked for 8 years at the University of Pittsburgh and moved to the Pennsylvania State University as Eberly Professor of Statistics, where he continues to work as the Director of the Center for Multivariate Analysis (CMA). The CMA established at his initiative serves as a meeting place for research workers from all over the world. He directed the research work of several students for the Ph.D. degree in USA. He edits a series of Handbooks on Statistics in various fields of applications for the benefit of research workers and consultants, and continues to be active in research at the age of 87.

National and International awards

For his pioneering contributions to statistical theory and applications, Rao received numerous awards. He has been elected to the National Academy of Sciences, USA, American Academy of Arts and Science, Fellowship of Royal Society (UK Academy of Sciences, FRS), Indian National Science Academy, Lithuanian Academy of Sciences and Third World Academy of Sciences. He was made an Honorary Member of the International Statistical Institute, International Biometric Society, Royal Statistical Society (UK), Finnish Statistical Society, Portuguese Statistical Society, Institute of Combinatorics and Applications and World Innovation Foundation, and Honorary Life Fellow (limited to 11 persons at any time) of King's College, Cambridge, UK. He has been the President of all prestigious statistical associations, the International Statistical Institute, Institute of Mathematical Statistics, USA and the International Biometric Society. He was inducted into the Hall of Fame of the National Institution for Quality and Reliability, Chennai Branch, for his contributions to industrial statistics and the promotion of quality control programs in Indian industries. At the Berlin conference of the International Statistical Institute held in 2003, Rao received the prestigious *International Mahalanobis Prize for lifetime achievement in statistics and the promotion of best statistical practice*.

He received numerous medals: Gold Medal of Calcutta University, Wilks Medal of the

American Statistical Association, Wilks Army Medal, Guy Medal in Silver of the Royal Statistical Society(UK), Megnadh Saha Medal and Srinivasa Ramanujan Medal of the Indian National Science Academy, J.C.Bose Gold Medal of Bose Institute and Mahalanobis Centenary Gold Medal of the Indian Science Congress.

He received Bhatnagar award of the Council of Scientific and Industrial Research, India. (He donated the entire prize money to Prime Minister's Defense Fund saying that country's need is greater than that of an individual scientist in fighting unprovoked aggression).

The Government of India honored him with the second highest civilian award, *Padma Vibhushan* for "outstanding contributions to Science and Engineering / Statistics", and also instituted a cash award in honor of C R Rao, "to be given once in two years to a young statistician for work done during the preceding 3 years in any field of statistics".

For his outstanding achievements, Rao has been honored with the establishment of an institute named after him, C.R.Rao Advanced Institute for Mathematics, Statistics and Computer Science, in the campus of the University of Hyderabad, India.

National Medal of Science Laureate (USA)

Rao was honored by the President of the USA with the prestigious National Medal of Science "as a prophet of new age" with the citation, "for his pioneering

contributions to the foundations of statistical theory and multivariate statistical methodology and their applications, enriching the physical, biological, mathematical, economic and engineering sciences". This honor is given only to five or six scientists from all disciplines every year. He is the fourth Indian to receive the medal since its inception 50 years ago.

A product of India

C.R. Rao is purely an Indian product having received all his education in India and making original contributions to statistics while working in India at the Indian Statistical Institute for 40 years before he took mandatory retirement on attaining the age of sixty. In reply to a query put to him as to what particular achievement he is most proud of, C.R. Rao replied, "It is the outstanding contributions my students are making to statistical theory and practice." C.R. Rao supervised the research work of 50 students, who in turn produced over 300 Ph.D.'s

Faces of Science

C.R. Rao's photo with a write up of his work is included in the recent book on *Faces of Science* by Marianna Cook, featuring the work of scientists of the last century who made fundamental contributions to science, published by W.W. Norton & Company. His portrait was exhibited for the public in the Gallery of Arts and Science of the New York Academy of Sciences during the period Sept 9-Oct 14, 2005.

Faces from the History of Probability and Statistics

C.R. Rao is the only Indian included in the above publication (available on web site, faces from the history of probability and statistics) by John Aldrich, University of Southampton, UK, describing the work of 35 major contributors to the development of probability and statistics since 1650 AD.

Peer reviews of Rao's research contributions to statistics

1. S. Amari, a renowned mathematician from Japan: *"Dr. Rao is a great scholar beyond the framework of statistics, which he himself has founded. It is a big surprise to see that his influence has been effective and has played a great role for more than half a century to produce fruitful developments in several scientific disciplines"*.

"The idea of connecting statistics and differential geometry was too early at that time (1945). However, after nearly half a century, Rao's idea has been developed to become one of most active and important topics in information sciences, connecting statistics, information theory, control and statistical physics."

2. In an article entitled *The Statistical Century* published in the *Royal Statistical Society News* (Vol 22, Jan 1995), the Distinguished American Statistician Bradley Efron stated:

"Karl Pearson's famous chi-square paper appeared in the spring of 1900, an auspicious beginning to a wonderful century for the field of statistics. The first half of the century was the golden age of statistical theory, during which our field grew from ad hoc origins, similar to the current state of computer science, into a firmly grounded mathematical science. Men of the intellectual calibre of Fisher, Neyman, Pearson, Hotelling, Wald, Cramer and Rao were needed to bring statistical theory to maturity."

3. A review of C.R. Rao's book, Linear Statistical Inference and its Applications, by the famous statistician, W.G. Cochran in the *Journal of the Franklin Institute* states the following:

"C.R. Rao would be found in almost any statistician's list of the five outstanding workers in the world of Mathematical Statistics today. His book represents a comprehensive account of the main body of results that comprise modern statistics theory."

4. Professor B. Efron, President of the American Statistical Association mentions in the Issue 327, September 2004, of AMSTAT while introducing the article by C.R. Rao on *Reflections on the past and visions for the future* :

"C.R. Rao, Eberly Professor Emeritus in the Stat. Dept. at Penn State is a towering figure in the postwar development of statistical theory. Among his great many honors, he was recently awarded

the National Medal of Science, the government's highest scientific prize."

5. S. Karlin, Mathematician who won President's medal:

"C.R. Rao is among the worldwide leaders in statistical science over the last five decades. His research, scholarship, and professional service have had a profound influence in the theory and applications of statistics and are incorporated into standard references for statistical study and practice. C.R. Rao is not only a highly creative theoretician but was attracted and labored with many data sets in health, biology, psychology and social sciences."

6. Citation while awarding Hon. D.Sc. by the Ohio State University

"Among the international community of scholars, you are widely acknowledged as one of the world's foremost statisticians. In the complex realms of statistics and higher mathematics, your research and scholarly writing have opened new doors of understanding. The statistical theories and applications, which bear your name, attest to the fundamental contributions you have made to your field and to the larger body of man's knowledge. Numerous honors and awards have followed, in tribute to an unusually distinguished and productive life of inquiry. You have earned the highest accolade of all, the esteem of your peers throughout the world of scholarship."

7. Press release by Government of India on appointment as National

Professor (limited to 12 at any time)

"Government has appointed C.R. Rao, an eminent statistician, as National Professor. Professor Rao is an outstanding and creative thinker in the field. He was appointed by Professor Mahalanobis as full-fledged professor of the Indian Statistical Institute at the early age of 29 in recognition of his creativity."

8. The Institute of Combinatorial Mathematics and its Applications elected C.R. Rao as an Honorary Member with the citation:

"as the world's leading expert in statistical design theory."

9. P. Armitage, Professor of Statistics, Oxford University, UK, writes in a

review of *Statistical Analysis and Inference* (Ed. Y. Dodge):

"C. Radhakrishna Rao is a polymath amongst statisticians. ...Rao's research interests include social, industrial and economic applications. He has been (and still is) an influential teacher especially in third world countries. ... The group of papers are interspersed with quatrains from Rubaiyat of Omar Khayyam of Naishapur, whose hedonistic nihilism seems to accord ill with C.R. Rao's outlook: " Myself when young did eagerly frequent/ Doctor and Saint ,and heard great Argument/ About it and about: but evermore/ came out by the same door as I went". Those of us who have frequented C.R.'s company have invariably found new doors open."



Dr. Shalabh

*Prof. C. R. Rao Awardee for the year 2010-11-
Career Sketch*

Dr. Shalabh completed his higher education from University of Lucknow (India). He completed his B.Sc. in 1990, M.Sc. in Mathematical Statistics in 1992 and Ph.D. in Mathematical Statistics in 1996 from University of Lucknow (India). He received the Junior Research Fellowship from the Council of Scientific and Industrial Research (C.S.I.R.), India to do the Ph.D. in 1993. He joined as Lecturer in the Department of Statistics at Jammu University, Jammu in 1995 and moved to Department of Statistics, Panjab University, Chandigarh in 1998. Later he joined the Indian Institute of Technology Kanpur in 2003 where he is continuing his professional career as a faculty and researcher.

Dr. Shalabh has received several prestigious fellowships and awards from national as well as international organizations. He received the BOYSCAST fellowship of Department of Science and Technology, Government of India and successfully completed his post doctoral research work at University of Pittsburgh (U.S.A.) during 2000-2001 under Professor Leon Gleser. Later he received the prestigious Humboldt fellowship from Alexander von Humboldt Foundation, Germany and completed the post doctoral research work at University of Munich (Germany) during 2006-07 under

Late Professor Dr. Dr. Helge Toutenburg He is a recipient of Jan Tinbergen Award for Young Statistician from the International Statistical Institute (The Netherlands) in 1995, Young Scientist Award from the Indian Science Congress Association (India) in 1997 and Mahalanobis Memorial Gold Medal for his contribution in quantitative economics from The Indian Econometric Society in 2010. He was also offered the prestigious Mercator Professorship from the German Science Foundation (D.F.G., Germany) to work at the University of Munich (Germany) in 2007.

Dr. Shalabh has produced about seventy research papers in national and international refereed journals of high repute besides twenty one technical reports and eighteen book-reviews. He is actively participating in different academic services. He is associated with editorial boards of several journals and has reviewed research papers for many journals. A noteworthy point is that he is an Associate Editor of the Journal of Multivariate Analysis (published by Elsevier) since 2002 and is continuing in the third term as Associate Editor. This journal was established by Professor C.R. Rao himself. Dr. Shalabh has co-authored and co-edited three books on the topics of linear models and design of experiments

which are all published from Springer (Heidelberg and New York). A remarkable feature to be mentioned is that he has co-authored one of the books with Professor C.R. Rao besides Professors H. Toutenburg and C. Heumann.

Dr. Shalabh has established himself in the community of statisticians at national and international fronts at a very young age due to his contributions in several areas of statistics. He has worked with established and renowned statisticians in India as well as abroad. One of the key features in his work is that he has tried to reduce the gap between the theoretical and applied statistics. His ideas and tools are based on strong statistical theory but generally easy to implement in real life data applications. He has worked in the areas of regression analysis, linear models, econometrics, measurement error models, restricted regression models, missing data models, shrinkage estimation, forecasting techniques, sampling theory etc. More specifically, he floated the concept of simultaneous prediction of actual and average values of study variable in linear regression model based on which several research papers and Ph.D. thesis have been produced. He is one among very few Indians who are working in the area of measurement error models and he has established himself as an authority in this area at international front. He has solved several complicated issues related to the modelling of measurement error ridden data. Generally, all the usual statistical tools fail to give correct statistical inferences when data is contaminated with measurement errors and correct

inferences can be drawn only when some additional information is available from outside the sample which is very hard to get in practice. In particular, he evolved a technique about how to obtain the consistent estimators of regression coefficients in linear measurement error models with measurement error ridden data without using any additional information from outside the sample. More recently, he suggested several approaches about how to incorporate the prior information available in various forms for obtaining efficient consistent estimators of parameters in linear measurement error models. This work has significant role in economics and gained popularity very quickly at national and international levels among researchers and several research papers and Ph.D. thesis have been produced. He has successfully utilized statistical tools in engineering sciences. This has helped several colleagues in various engineering departments at IIT Kanpur in making meaningful statistical conclusions from the data of their experiments.

Dr. Shalabh has successfully accomplished many visiting research assignments in several countries. He has guided the students for Ph.D. program and projects. He has completed projects sponsored by various government agencies. He has received the travel grants from various national and international organizations. He has delivered the invited talks at national and international institutions. He is a member, life member and fellow of various national and international statistical societies.



Dr. Rajender Parsad

*Prof. C. R. Rao Awardee for the year 2010-11 -
Career Sketch*

Born on November 10, 1966, Dr. Rajender Parsad obtained his M.Sc. and Ph.D. degrees in the discipline of Agricultural Statistics from Indian Agricultural Research Institute, New Delhi in 1988 and 1992, respectively. Presently he is working as Head, Division of Design of Experiments at Indian Agricultural Statistics Research Institute, New Delhi.

Dr. Parsad started his research career in 1992 as a Scientist at Indian Agricultural Statistics Research Institute. He has been Senior Scientist during 2001-2005 and ICAR National Fellow during 2005-2009. He has been a Consultant Biometrician at International Center for Agricultural Research in Dry Areas, Aleppo, Syria three times.

Dr. Parsad has made important and useful research contributions to both theoretical and applied aspects of Agricultural Statistics in general and Design of Experiments and Sampling Theory in particular. His research has received wide acceptance and appreciation both at National and International level. Dr. Parsad also takes very keen interest in human resource development in Agricultural Statistics and dissemination of advanced statistical techniques to stakeholders. This effort has led to the

adoption of modern efficient designs for experimentation and sophisticated analytics of the data generated by the researchers in the National Agricultural Research System, which has helped in improving the quality of agricultural research. For dissemination of advances in design of experiments, he has taken a lead in developing a Design Resources Server (www.iasri.res.in/design) which is being viewed throughout the globe.

Dr. Parsad has published 102 research papers in International and National Journals of repute; has produced two electronic books on Design of Experiments in Agricultural Experiments and Advances in Data Analytical Techniques; 7 book chapters; 2 research monographs on alpha designs and Hadamard matrices; 17 technical reports; and 16 papers in the conference proceedings/souvenirs; 13 reference manuals, 3 workshop proceedings and 4 research journals as Guest Editor. He has also produced 3 Ph.D. and 3 M.Sc. research students as Chairman Advisory Committee, 13 {9 M.Sc. and 4 Ph.D.} students as Co-chairman Advisory Committee. He has provided leadership in developing four commercial software viz. (i) Statistical Package for Balanced Incomplete Block Designs (SPBD Release 1.0), (ii) Statistical Package for Factorial

Experiments (SPFE 1.0), (iii) Statistical Package for Augmented Designs (SPAD) and (iv) Statistical Package for Agricultural Research (SPAR) 2.0. Dr. Parsad is the Principal Investigator of a mega project which involves strengthening statistical computing environment in the National Agricultural Research System.

Dr. Parsad had been selected as 'Associate of National Academy of Agricultural Sciences' in 2007 and now he has been elected as 'Fellow of National Academy of Agricultural Sciences' in 2011. He is an elected as Member of 'International Statistical Institute, Netherlands. Dr. Parsad received 'Young Scientist Award for Social Sciences' from National Academy

of Agricultural Sciences for the biennium 1999-2000. He has received the 'IARI Best Teacher Award, 2002' for excellence in teaching in the discipline of Agricultural Statistics. Dr. Parsad is also a recipient of 'Professor PV Sukhatme Gold Medal Award, 2010', 'Dr. D.N. Lal Memorial Lecture Award-2005' from Indian Society of Agricultural Statistics and 'Best Paper Award' thrice for his publications in the Journal of Indian Society of Agricultural Statistics in the field of Applied Statistics and Design of Experiments respectively. He is Coordinating Editor, Journal of Indian Society of Agricultural Statistics and Managing Editor, Statistics and Applications.



Theme - Statistics Day 2011 Gender Statistics



Statistical Evidences for Causality Factors underlying Gender Issues

[Theme Paper by Social Statistics Division, CSO, MOSPI]

1. Introduction

As a general practice, gender inequality in the society is measured through various outcome indicators which essentially demonstrate the effect of various societal causes behind the gender related problems in the society. Not much effort is spared to statistically measure such causal factors. However, in the last 2 decades a number of statistical exercises have been carried out at the instance of the Union Government of India to capture information on some of the background characteristics alongside the outcome indicators showing gender inequality or discrimination against women. This paper attempts to use results of surveys and censuses on the causal variables to produce them in linkage with some of the major gender problems as statistical evidences. With the existing gender perspective in view the paper identifies some of the critical areas of causality such as- sex ratio aberration, preference for the son, neglect of the girl child in various areas like nutrition, immunization, literacy and education, healthcare, marriage, childbirth and employment of women.

2. Sex Ratio Aberration

Sex ratio aberration is a man made phenomenon. The decade 1991-2001

witnessed an overall population growth rate of 21.5% and a change in all India sex ratio from 927 to 933 (females per 1000 males). This marked a trend reversal for the consistently declining sex ratio ever since 1901. 11 states/UTs showed a decline in the sex ratio over the decade despite significant population growth rate. These were namely: Chandigarh, Dadra & Nagar Haveli, Daman & Diu, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Madhya Pradesh, Punjab and Sikkim, the greatest decline has been exhibited by Daman & Diu (-26.72%) and the maximum improvement being showed by Arunachal Pradesh (3.99%).

In the decade 2001-2011 the decadal population growth rate is observed to be 17.64% and the sex ratio has increased from 933 (2001) to 940 (2011) thus showing a 0.76% improvement. 6 states/UTs have shown in a decline in sex ratio as compared to 11 in the previous decade. These being namely: Dadra & Nagar Haveli, Daman & Diu, Lakshadweep, Jammu & Kashmir, Bihar and Gujarat, the state with largest fall in the sex ratio being Daman & Diu (-12.97%) and the maximum improvement is shown by Delhi (5.52%).

2.1 Key features of sex ratio:-

Comparing the 3 years 1991, 2001 and 2011 it is observed that there is a shift in the modal class¹ and its frequency (no. of states belonging to the modal class). In 1991 the modal class was 900-925 with 7 States in it. 2001 had the modal class 950-975 with again 7 states in it. 2011 showed a change with the modal class broadening to 925-1000 with 20 states belonging to this class.

Looking at the graphical representation of the distribution of sex ratio over the states, a common feature observed amongst the 3 censuses is the leptokurtic²

nature of the distribution (steep slope). It is also observed that the dispersion was the least in the year 1991, 51.89 about the mean which increased in 2001 to 66.83 and further to 78.55 in 2011 signifying increasing sex ratio disparity over the states. There are 3 outlying states beyond the 2σ limits in 1991 and 2001 as against only 1 outlying state in 2011 due to the increasing trend in dispersion from 1991 to 2011. However, the year 2011 shows improvement in the sense that the right tail of the curve is longer as compared to those for the earlier 2 censuses, which signifies that more states have a sex ratio greater than the mean (all India) sex ratio of the year.

Figure 2.1: State Wise Sex Ratio Curve For The Year 1991

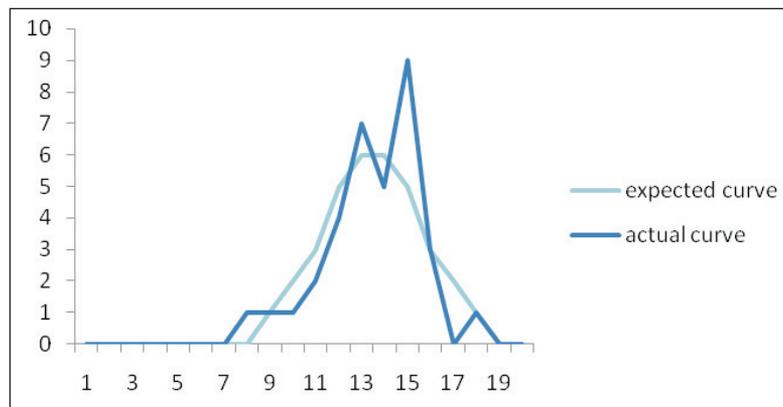


Figure 2.2: State Wise Sex Ratio Curve For The Year 2001

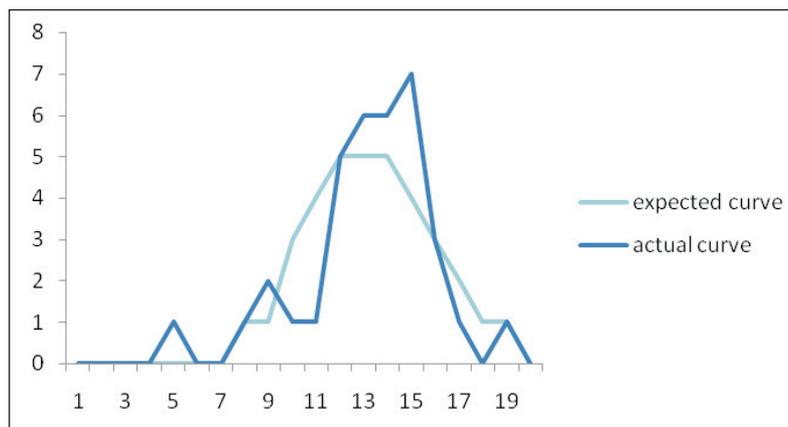
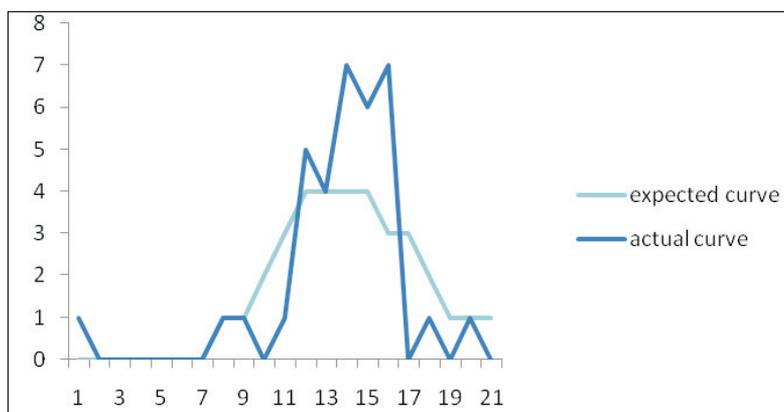


Figure 2.3: State Wise Sex Ratio Curve For The Year 2011



Note: expected sex ratio of the states is found on the basis of the normal probability distribution.

3. Son preference

The most dominant factor influencing the sex ratio aberration is preference for a son which is prevalent over entire India. Studying the preference trend from 1998-99 to 2005-06, it is observed that rural India shows a pronounced preference for the boy child over the girl child as 37% of 1998-99 rural Indian women preferred sons to daughters against 26.6% in 2005-06. In case of urban Indian women, 22.6% preferred sons to daughters in 1998-99, which came down to 14% in 2005-06. It is evident that there is a decline in the proportion of women preferring sons to daughters in both years, the drop in percentage being 8.6 points in urban India from 1998-99 to 2005-06 as compared to 11.6 points in rural India from 1998-99 to 2005-06. This trend can be graphically observed from comparison histograms (Figure 3.1 to 3.3) showing 'mean ideal number of boys, girls and either sex', 'percentage of women who want more sons than daughters and more daughters than sons' and 'percentage of

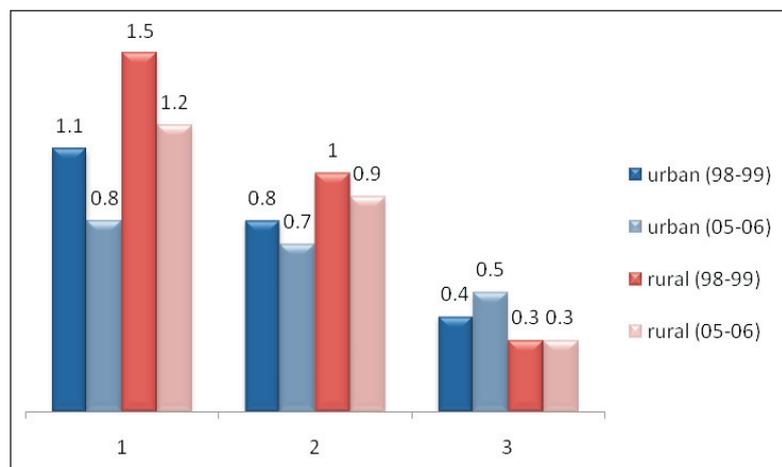
women who want at least one son and percentage of women who want at least one daughter'.

State wise histograms (Figure 3.4) showing percentage of women who want (i) at least one son and (ii) at least one daughter in each of the years 1998-99 and 2005-06 show a marked shift in the preference patterns. It is observed for the states of: Haryana, Rajasthan, Uttar Pradesh, Bihar, Arunachal Pradesh, Gujarat, Kerala as well as for India as a whole that a considerable preference gap exists between boys and girls in both the years 1998-99 and 2005-06 as compared with the rest of the states belonging to the corresponding regions of India (viz. Northern, Central, Eastern, Northeastern, Western and Southern India). However, the gaps between the percentage of women preferring at least one son and the percentage of women preferring at least one daughter are significantly high for the before said states. For the country as a whole, percentage of women who want at least one son and percentage of women who want at

least one daughter were 85.1% and 80.1% respectively in 1998-99, whereas, in 2005-06 the corresponding percentages were 22.4% and 2.6% respectively. In the all India context this particular feature may be further examined in conjunction with the percentages of women preferring more sons to daughters for which both the rural

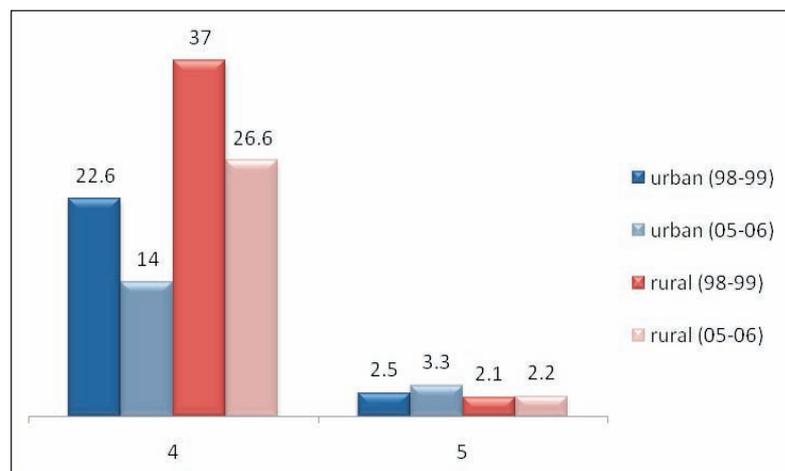
and urban women show significant drop from 1998-99 levels to 2005-06 levels. At the same time the percentage of women preferring more daughters to sons has not improved and tends to be much lower than the percentages of women preferring more sons to daughters in both rural and urban areas.

Figure 3.1: Urban-Rural Women: Mean Ideal No. of Boys, Girls and Either Sex in the years 1998-99 and 2005-06



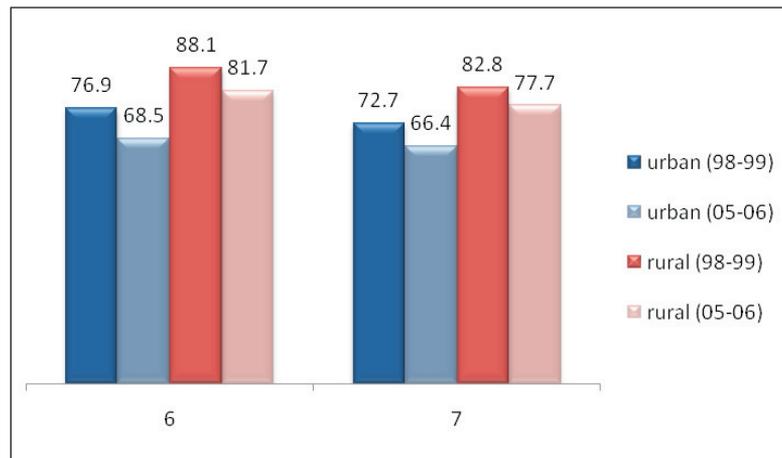
1: mean ideal no. of boys
 2: mean ideal no. of girls
 3: mean ideal no. of children of either sex

Figure 3.2: Urban-Rural women: percentage of women who want more sons than daughters and more daughters than sons in the years 1998-99 and 2005-06.



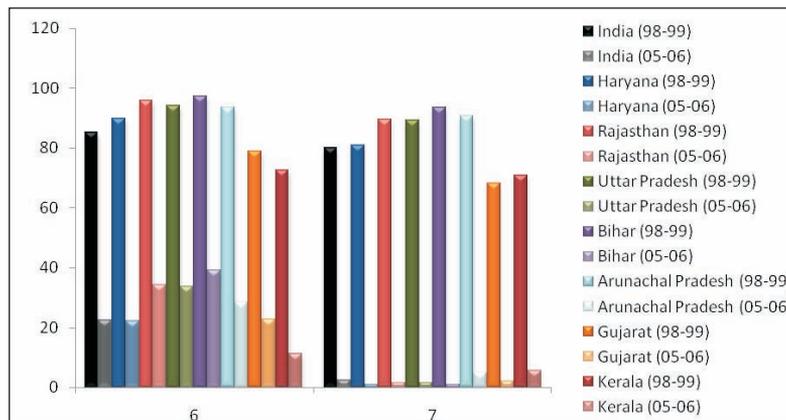
4: percentage of women who want more sons than daughters.
 5: percentage of women who want more daughters than sons.

Figure 3.3: Urban-rural women: percentage of women who want at least one son and at least one daughter in the years 1998-99 and 2005-06.



6: percentage of women who want at least one son
7: percentage of women who want at least one daughter

Figure 3.4: State wise: percentage of women who want at least one son and at least one daughter in the years 1998-99 & 2005-



6: percentage of women who want at least one son
7: percentage of women who want at least one daughter

4. Neglected Daughter

Statistical evidences in support of neglect of the girl child, right from the stage of natality till its adulthood show the predominance of this feature throughout the Indian society in general. The indicating factors may be studied under the main heads of- infancy deaths of girl children, their status of malnourishment as measured by underweight, wasting

or stunting and incidence of anaemia, their status of immunization against life threatening diseases and their development process through the stages of education.

4.1 Survival risk of the Girl Child

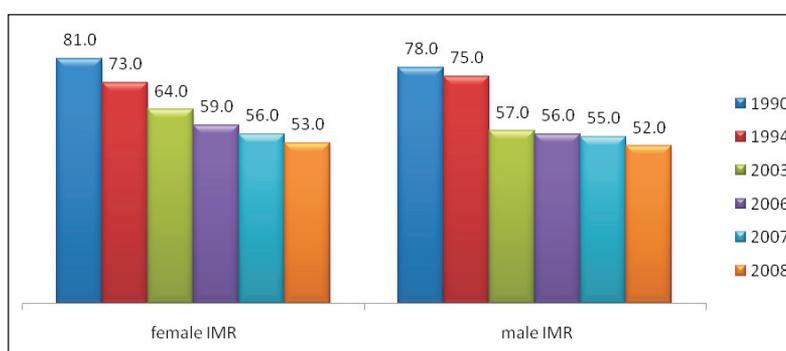
The incidence of mortality amongst children under 5 years of age is significantly high in India as compared

to the developed countries and many other developing countries. The under 5 mortality rate in 1990 was approximately 125 per 1000 live births which dropped to 74.6 per 1000 live births in 2005-06 thus showing a decline of approx. 40% in 15 years and is aimed at to obtain a decline of 67% (two thirds) by 2015 with respect

to 1990 to comply with the MDGs.

The first evident indicator of the neglect of the girl child is the neonatal mortality rate and Infant mortality rate of the female newborns showing a significantly deviated trend as compared to these rates corresponding to the male newborns.

Figure 4.1: Male and Female Infant Mortality rates over the years 1990-2008



As can be seen in the histogram above the IMR for females has been consistently higher than that of males in the past 2 decades with exception for a couple of years only. However, this is contrary to the better natural survival capacity of girl children. The existing neonatal³ mortality rates suggest that girl infants offer higher resistance to death as compared to male infants. In 1998-99 neonatal mortality rate of the male children was observed to be 50.7 per 1000 live births as compared to 44.6 per 1000 live births for the female children and in 2005-06 the neonatal mortality for male children was recorded as 40.9 per 1000 live births as against 36.8 per 1000 live births for female children. Thus, this suggests human intervention in the sex selection of the child takes place in the post neonatal stage as revealed

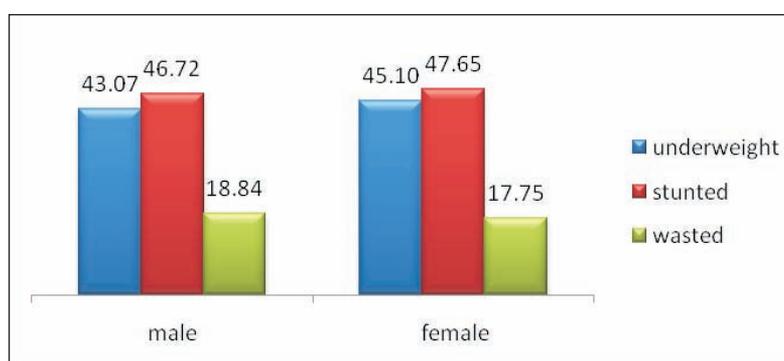
from the post neonatal mortality of girl infants being 20.9 per 1000 live births in 2005-06 against 15.4 per 1000 live births for male infants in the same year. The corresponding figures for 1998-99 were 26.6 per 1000 live births and 24.2 per 1000 live births respectively. Though there was a decline in the post neonatal mortality of infants, the male - female gap has increased, which is matter of concern from gender point of view. The Under 5 mortality rates (U5MR) of 1998-99 and 2005-06 show that the U5MR gap in males and females has increased from 7.3 in 1998-99 to 9.5 in 2005-06 (per 1000 live births) but shows improvement in terms of deceleration in the overall U5MR which declined from 97.9 in 1998-99 to 69.7 in 2005-06 for males and from 105.2 in 1998-99 to 79.2 in 2005-06 for females.

The states which show consistently higher female IMR as compared to male IMR are: Uttar Pradesh, Punjab, Haryana, Himachal Pradesh, Rajasthan, Gujarat and states which have regularly shown a reverse trend (male IMR higher than that of females) are Sikkim, Manipur, Assam and Goa. The states with consistently high Infant Mortality rates are: Madhya Pradesh,

Uttar Pradesh and Orissa. However,, there is an improvement observed in the female - male IMR difference in various states such that the highest differences between female-male IMRs were within 15-20 (female IMR-male IMR) in 1990 which uniformly declined over the years and the maximum difference amongst all states dropped to 3 - 4 by 2008.

4.2 The undernourished Girl Child

Figure 4.2: male female comparisons in being underweight, stunted and wasted



Another area of concern suggesting that there is a significant neglect in the attitude towards the girl child as revealed from the status of nutrition of girl child below 5 years compared to a boy child below 5 years of age. The percentage of female children underweight under 3 categories namely: underweight (less weight for age), stunting (less height for age) and wasting (less weight for height) are considerably higher than that of male children. The measure for these phenomena used is the percentage of children (male and female) lying below the 2 standard deviation⁴ limits about the mean for each of the 3 categories, underweight, stunted and wasted. Thus, a general trend

observed is that the percentage of children lying below -2 standard deviation limits is significantly high for female children in all the 3 categories of being underweight: underweight, wasting and stunting as compared to that for male children. By children we mean individuals between 0-5 years of age. The percentage below -2 SDs for underweight children shows a higher incidence for the female children to deviate more from the average (normal) as compared to that for the male children. In 1998-99: 45.3% male children and 48.9% female children fell short of the 2 SD limits for underweight children showing a gap of 3.6% which is substantial. This also demonstrates an unnatural pattern of the incidence of

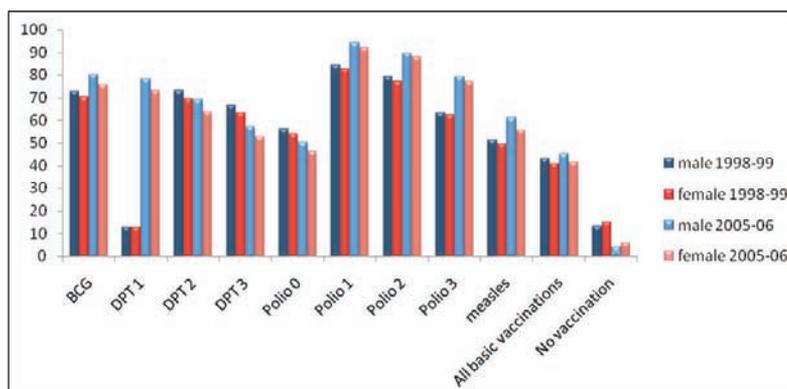
malnourishment among girl children, probably pointing to the prevalent practice of neglect of the girl child. In 2005-06 : 41.9% male children and 43.1% female children lie below the -2 SD limits for underweight children showing a reduction in the gap to 1.2% which is an improvement compared to 1998-99. But, it is a matter of concern that the proportion of children who are underweight for age is still very high, particularly for female children. The percentage below -2 SD for stunted children also shows a higher incidence of stunting among girls below 5 years as compared to stunting of boys. In 1998-99: 44.1% male children and 47% female children were below the -2 SD limits for stunted children showing a female-male gap of 2.9% and in 2005-06: 48.1% male children and 48% female children lie below the -2 SD limits for stunted children showing a gap of 0.1% only which shows marked improvement in terms of the female-male difference but the overall condition signifies a diminishing concentration around the average (normal) . Since, stunting | the same way as anaemia, in the first 2 years of life not only impact child survival and growth but also results in diminished cognitive development, school performance and physical development having an inter-generational effect in terms of decreased productivity, higher risk of pregnancy related complications and low birth weight babies leading to a

repetitive cycle of under nutrition. However, the percentage below -2 SDs for wasted children shows more male children with less weight for height as compared to female children as from 1998-99: 15.7% male children and 15.2% female children lie below the 2 SD limit for wasted children showing a gap of 0.5% (female-male) and in 2005-06: 20.5% male children and 19.1% female children lie below the 2 SD limit for wasted children showing a gap of 1.4%. This is partly explained by the fact that this phenomenon has little to do with gender differentials. However, the difference between male and female children has shown an increase and also an increase in the percentage falling short of desirable limits of wasted children (both males and females) is observed.

In 1998-99, 75.1% male children were anaemic as compared to 73.3% female children. Whereas, in 2005-06 69% male children were found to be anaemic as compared to 69.9% female children being anaemic, thus showing reduction in the proportion of anaemic children overall. In spite of this improvement the simple fact of very high incidence of anaemia among girl children poses a high risk for girls in terms of their physical growth, mental development, energy level and in subsequent reproductive health, which do not matter for the male children.

4.3 Restrictive Immunization

Figure 4.3: Male Female Gap For Various Vaccines For The Years 1998-99 And 2005-06



In the histograms above (Figure 5) shows the situation of male and female children getting various vaccines and their subsequent dosages namely: BCG⁵, DPT⁶ 1, 2, 3, Polio 0, 1, 2, 3 and measles, and also proportion of children (males and females) getting all vaccines and no vaccines at all., indicates that the status of girl children being vaccinated in the country is poorer compared to male children. It was observed that in 1998-99- 43.1% male children got all basic vaccinations as against 40.9% female children and in 2005-06, 45.3% male children got basic vaccinations as compared to 41.5% female children which shows improvement in the vaccination coverage but the male female child vaccination gap has increased. From 1998-99 to 2005-06 the proportion of children who received no vaccinations of either sex has declined , as it is seen that in 1998-99- 13.5% male children were not vaccinated at all which dropped to 4.3% in 2005-06 and for female children it was observed to be 15.3% in 1998-99 which declined to 6% in 2005-06, however the gap in boys and girls not being

vaccinated did not show any significant improvement as in 1998-99 it was a 1.8% gap which became 1.7% in 2005-06. It is also observed as a uniform trend in vaccines: BCG, DPT 1, DPT 2, DPT 3, Polio 0, Polio 1, Polio 2, Polio 3 and measles that the percentage of male children receiving the respective vaccines is consistently higher than their female counterparts. The overall proportion of children receiving DPT 2, DPT 3 and Polio 0 have decreased from 1998-99 to 2005-06, and the proportional coverage of the vaccines: BCG, Polio 1, Polio 2, Polio 3 and measles has increased. A fall is observed in the subsequent dosages of certain vaccines as seen in DPT 1, DPT 2, DPT 3 and Polio 1, Polio 2, Polio 3 above with exceptions in DPT 1 in 1998-99 and Polio 0 for 1998-99 and 2005-06 which are considerably lower proportion holders in the population as compared to their subsequent dosages. The gender differential in immunization contributes to the higher survival risk of girl children (which is also reflected in the higher and U5MR for girl children) apart from higher risk of disability due polio.

4.4 Feed Deficit

- Breastfeeding being the initial most source of nutrition for an infant holds significant importance in the growth of a child, thus incomplete or improper breastfeeding can lead to malnourishment in children. In the pattern observed in breastfeeding of infants, it is observed that there is presence of neglect of the girl child when compared to male infants. In the year 1998-99 it was observed that 26.4% male infants received breastfeed as compared to 24.6% female infants showing that 1.8% female infants were not breastfed. In 2005-06 the condition deteriorated in terms of the percentage of boy and girl infants receiving breastfeeding reduced to 25.4% for boy infants and 23.6% for girl infants again showing a gap of 1.8% girl infants without any breastfeed and an overall reduction in the percentage of infants receiving breastfeed. Also, from 2005-06 it is observed that the initiation of breastfeed differs for male infants and female infants (for females being lower) showing a difference of 0.3% in the percentage of women who started breastfeeding within half hour of birth of males - that of females, this difference in initiation of breastfeed increased to 0.4% in the percentage of women who started breastfeeding within one hour of birth for male infants - female infants and the difference further increased to 0.5% in the percentage of women who started breastfeeding within one day of birth to male infants- female infants. However, the percentage of infants ever breastfed are 95.6% male infants and 95.9% for females.

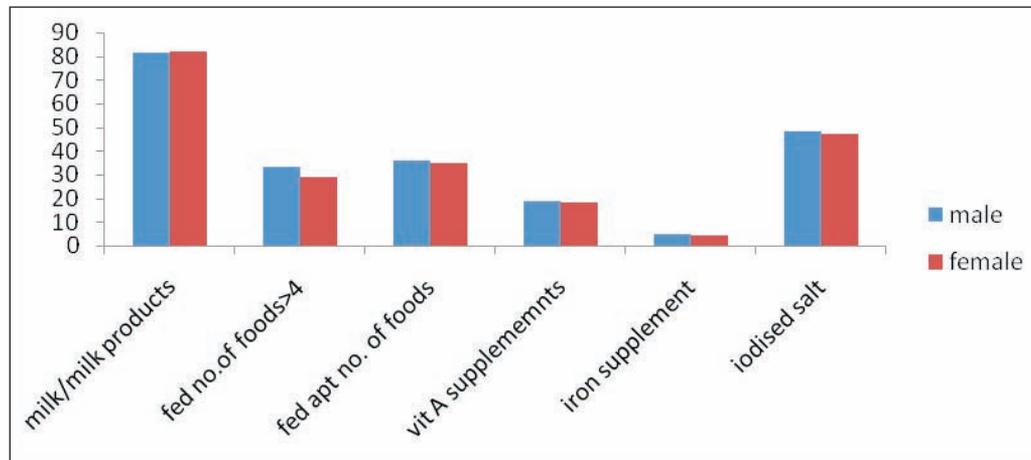
- Along with breastfeeding, as the infant grows, equally important is supplementation with other essential food products. NFHS-3 (2005-06) shows a gap in supplementation of food in the age group 6-23 months for male infants and female infants with a visible bias towards male children as compared to female infants. For non-breastfed children the percentage of male children fed with milk or milk products is 81.5% while for female children it is 82% while in percentage of children fed 4 or more food groups listed for infants is 33.3% for males and 28.8% for females. Amongst all children in the age 6-23 months 35.8% male infants are fed appropriate number of food groups as against 34.8% female infants. In the age of 6-59 months 18.5% male children got vitamin A supplements (within 6 months before the survey) while 18% female children got vitamin A supplements (in the same period), and 4.9% male children got iron supplementation (in the week before the survey) as against 4.4% female children. 48.1% male children in the age 6-59 months lived in households using adequately iodized salt as compared to 46.9% female children. In the age group 6-23 months amongst non-breastfed children the percentage of children who were fed with 3 IYCF⁷ practices varied for boys and girls as it was observed to be 13.5% for boys as against 10.5% for girls which is a significant difference.

The feeding of girl children as evident from the paragraph above has direct bearing on the food security status of the women in the families in general and the

girl children in particular. This in turn contributes to feminization of poverty. In poor families, the female members are poorer going by the calorific norm

of food and energy intake. Much of this depends on the practice of under feeding the girl children as compared to the boy children.

Figure 4.5: Male female gap in categories of food supplementation

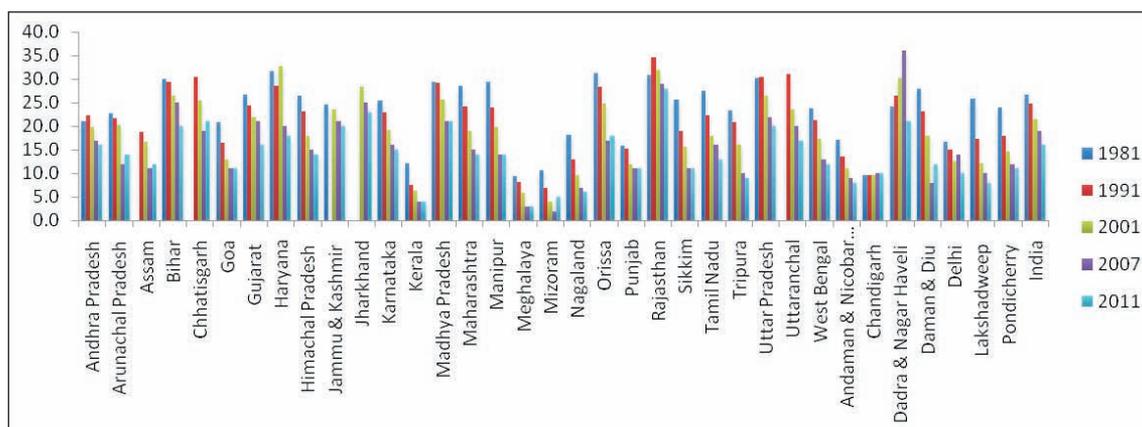


4.5 Inhibited Education

India as a whole has shown steady improvement in the literacy rates over the past 3 decades for both males and females, but the difference in proportion of literate females and literate males has consistently been present, although exhibiting steady improvement. In 1951 the difference between male and female literacy was observed as 18.29% which

increased to 20% difference in 2004-05 and declined in 2007-08 to 19% and further to 16% in 2011. States/ UTs which have consistently shown a high difference in male-female literacy rates are: Haryana, Uttar Pradesh, Madhya Pradesh, Bihar, Rajasthan, Dadra & Nagar Haveli and Orissa from 1981 to 2011 each state showing a decline in the difference in the male - female literacy over time.

Figure 4.6: Male female literacy gap of states of India in the years 81, 91, 01, 07, 11



Percentage literates of either sex have consistently increased in all age groups from 1961 to 2001. Particularly high literacy is observed in the age group 10 to 20 for both males and females. The gap in the percentage literates between males and females has shown no significant growth or decline as it was 21.5% (1961), 20.8% (1971), 22.1% (1981), 24.8% (1991) and 21.6% (2001) but a significant decline has been observed in the 2011 census as the male-female literacy gap dropped to a difference of 16% covering all age groups. The decomposition of the overall population of the country according to the levels of attainment of education as revealed from the last 4 population censuses when analyzed in respect of male-female gaps shows discernable improvement over time till the last census (2001) as indicated below:-

- For population that completed primary education, the difference between males and females has shown a declining trend being 6.6% (1971), 5.5% (1981), 4.29% (1991) and 2.97% (2001).
- For population that completed middle school education the gap in males and females has shown a fluctuating trend from 1971 to 2001 as it was 4.5% in 1971, 4.2% in 1981, 4.64% in 1991 and 3.59% in 2001.

However, the trend observed for middle school level education and below doesn't remain valid for secondary level

and above as the trend is reversed. This reversal in trend shows an imbalance in empowering women for better participation in labor market for industry and services.

- For population that completed Matriculate/ Secondary level shows an increasing gap in the percentage of males and females getting this level of education from 1971 to 2001. In 1971 the gap was 3.4%, 3.6% in 1981, 3.98% in 1991 and 3.97% in 2001.
- For population that completed higher secondary/ Pre university level education, again the gap between males and females shows an increasing trend from 1.4% in 1981, 1.79% in 1991 to 1.96% in 2001.
- For population that completed education level of Graduation and above the gap between males and females attending higher education shows an increasing trend from 0.61% (1971), 1.4% (1981), 1.96% (1991) and 2.36% (2001).

The observed phenomenon of increase in male-female gap (females' being lower than that of males) in attainment of higher education as indicated above is not supported by the fact that the gender parity indices in Gross enrollment and Gross attendance in secondary and tertiary grades of education have improved over time as shown below.

Figure 4.7: Gross / Net Attendance Ratios and Enrolment Ratios in Primary Education

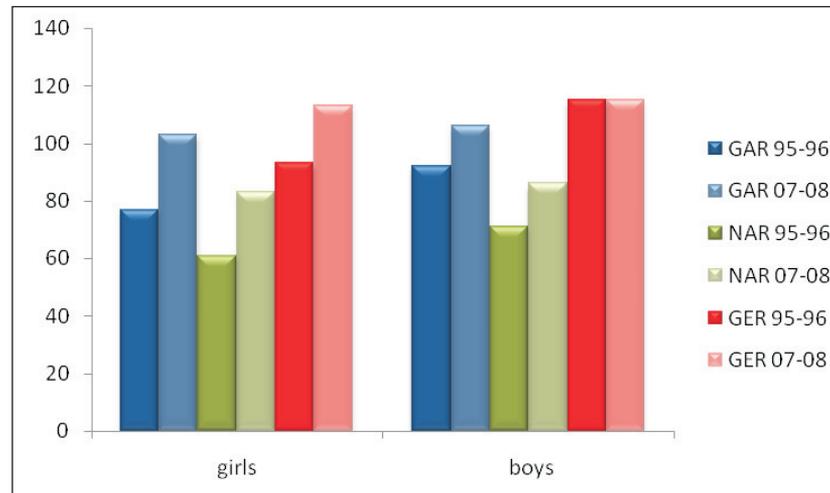
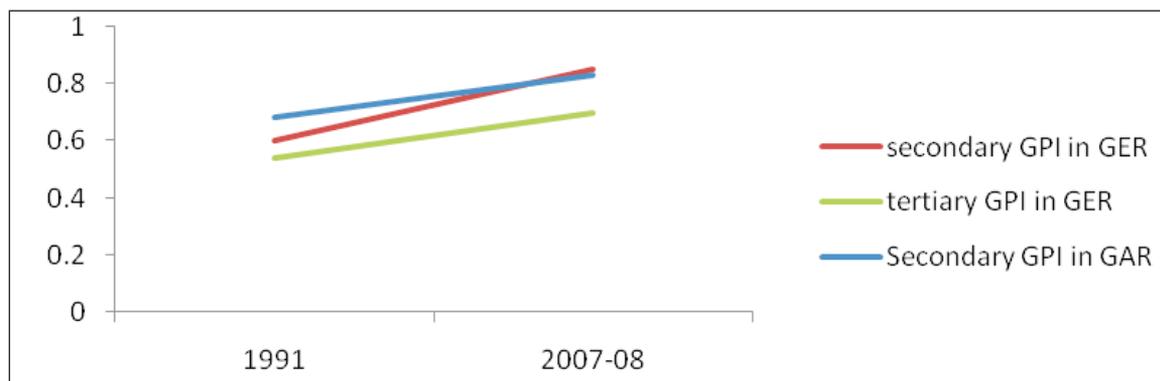


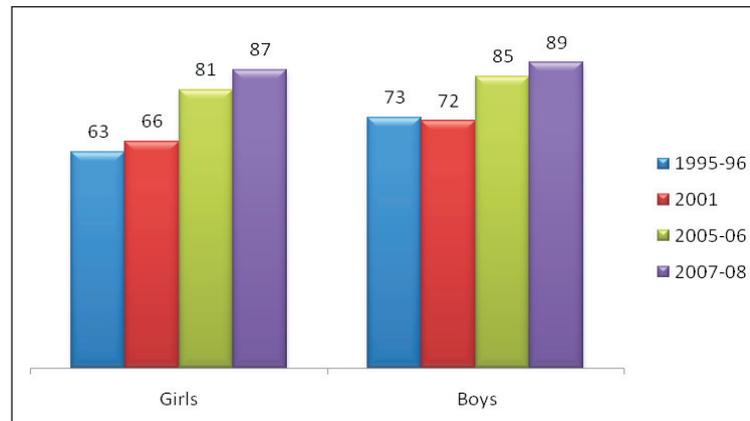
Figure 4.8: Gender parity index in GER and GAR in secondary and tertiary education



Gross attendance ratio (GAR⁸) in general has shown improvement from 1995-96 to 2007-08 in the sense that GAR has increased considerably. The difference between males and females attending primary school (male-female difference of 15 in 95-96 to 3 in 07-08) has shown a decline. A similar declining trend in the male-female gap in NAR (Net attendance ratio) is observed from being 10 in 1995-96 to 3 in 2007-08. Gross enrolment ratio (GER⁹) of females is significantly lower than that of males over all years observed from 1961 to 2005-06 but has shown a

significant improvement over the same span increasing from 62.4 (1961) to 112.4 (2005-06) and the male-female gap has shown a consistent decline from 41.2 (1961) to 22 (95-96) to 6.58 (2005-06) and 2 (07-08) in Primary classes. In Middle classes the average GER of India increased from 22.5 (1961) to 71 (2005-06) and the male-female gap in GER declined from 21.9 (1961) to 7.9 (2005-06). In senior classes the average GER of India increased from 10.6 (1961) to 40.62 (2005-06) and the male-female gap in GER reduced from 12.6 (1961) to 8.01 (2005-06).

Figure 4.9: Percentage of children of age 6-10 years attending education

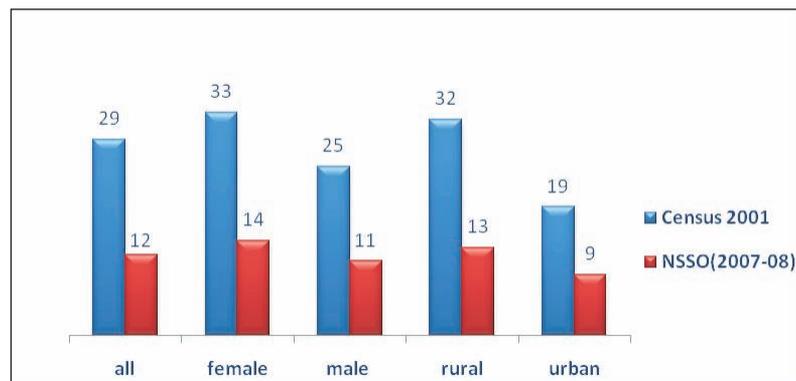


The Net attendance rates (NAR¹⁰) in Grades I to V (primary classes) for various states of India in the years 1995-96 and 2007-08 shows that states which have had a consistently low NAR are: Bihar (41 in 95-96 and 72 in 07-08), Rajasthan (55 in 95-96 and 75 in 07-08), Uttar Pradesh (59 in 95-96 and 75 in 07-08), Arunachal Pradesh (60 in 95-96 and 79 in 07-08), Manipur (60 in 95-96 and 82 in 07-08), Orissa (61 in 95-96 and 82 in 07-08), Madhya Pradesh (63 in 95-96 and 83 in 07-08), wherein the overall NAR of India was 66 in 1995-96 and 84 in 2007-08, thus the states mentioned showed NARs below the all India average.

The number of females enrolled in each of the streams of Arts, Commerce, Science, Engineering & Technical and Medicine

has increased significantly from the year 1950-51 to 2006-07. In the arts stream of study the number of women enrolled were 15.4 in 1950-51 which increased to 87.3 in 2004-05 and dropped to 76.9 in 2006-07. In the stream of Commerce the number of women enrolled was 0.5 in 1950-51 which showed an increase up to 60.9 in 2006-07. Science stream shows an increase in the number of women enrolled from being 21 in 1970-71 to 84.3 in 2004-05 and a drop to 71.2 was observed in 2006-07. In the engineering and technical field the number of women enrolled in 1950-51 was 0.3 and this enrollment increased to 35.8 in 2006-07. A similar increasing trend is seen in the field of medicine as the enrolled women in 1950-51 were 18.5 and it increased to 89.5 in 2006-07.

Figure 4.10: Percentage of children out of school aged 6-14 years



The percentage of children out of school show that a majority of children out of school are females when compared to males, but, the gap between males and females out of school has shown a sharp decline from 2001 to 2007-08 as can be seen above from being 8% in 2001 to 3% in 07-08 (female drop out - male drop out).

The average female dropout rate has been consistently higher than that of males but has overall decreased in the classes I to X over the years. In 1980-81 the male dropout rate was 79.8 as compared to 86.6 for females. In 2006-07 the male dropout rate was 58.6 as against 61.5 for females, thus showing a reduction in gap from 6.8 (80-81) to 2.9 (06-07). The main reasons for drop outs or not attending school for girls being:

- Required for household work/ care of siblings/ family business (42.5% in 1998-99, 19.2% in 2005-06 and 14.3% in 07-08), the main states/ UTs contributing significantly to this trend are: Dadra & Nagar Haveli, Daman & Diu, Jharkhand, Arunachal Pradesh, Bihar, Delhi and Punjab.
- Cost of education is too much (11.4% in 1998-99, 17.4% in 2005-06 and 18.1% in 2007-08), the states/ UTs with significantly high proportion of females not attending school for this reason are: Jharkhand, Assam, Jammu &

Kashmir, Tripura, Uttar Pradesh, West Bengal, Meghalaya and Manipur.

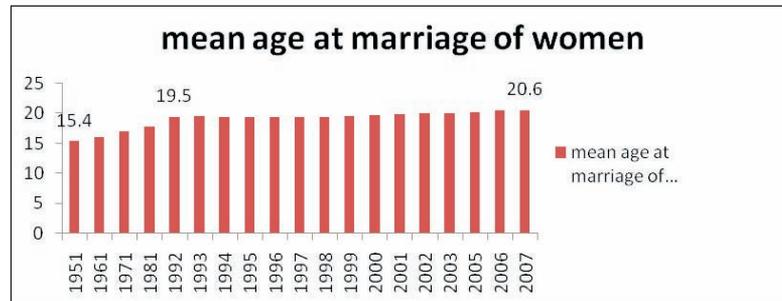
- Not interested in studies (24.8% in 1998-99, 20.5% in 2005-06 16.4% in 2007-08), predominant states/ UTs with this trend are: Chhattisgarh, Gujarat, Haryana, Delhi, Sikkim, Lakshadweep and Rajasthan.
- For reasons like unfriendly atmosphere at school, non availability of lady teacher, non availability of ladies toilet, no proper facilities available (4.8% in 2005-06 and 4.9% in 2007-08) states like: Gujarat, Haryana, Bihar, Arunachal Pradesh and Uttarakhand are ahead of other states in not sending the female child to school for these reasons.

The number of female teachers per 100 male teachers in each Primary, Middle and Secondary/ Intermediate school has increased over the years from 1950-51 to 2006-07. In primary schools the average no. of female teachers per 100 male teachers was 20 in 1950-51 which increased to 67 in 2006-07. In middle schools the average no. of female teachers per 100 male teachers was 18 in 1950-51 which increased to 67 in 2006-07. In secondary/ intermediate schools the average no. of female teachers per 100 male teachers was 19 in 1950-51 which increased to 63 in 2006-07.

5. Unsafe Motherhood

5.1 Early marriage

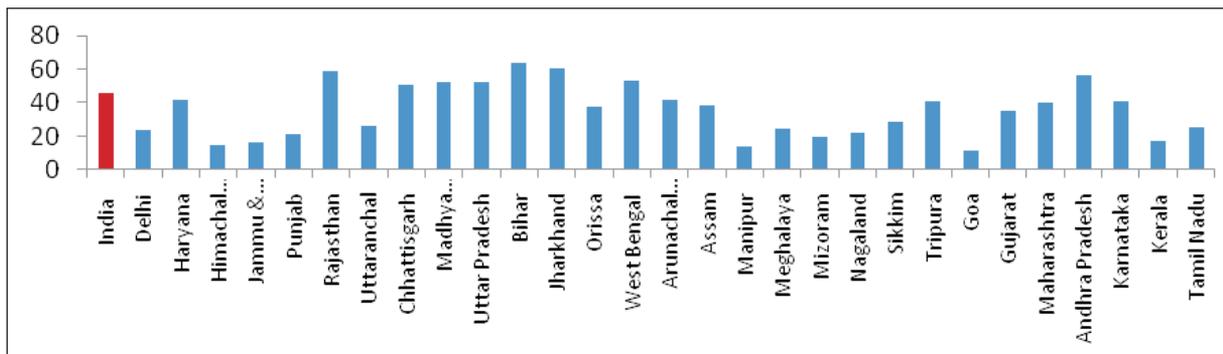
Figure 5.1: Mean age of women at their marriage



Over the years the mean age of women at the time of their marriage has increased consistently from 1951 to 2007 being 15.4 in 1951 and 20.6 in 2007 wherein the first 40 years under observation showed a high rate of increase in age at marriage but further the rate of increase in the age at marriage slowed down significantly. Considering the state wise distribution of mean age at a girl's marriage some states have been consistently backward studying their trends from 2003 to 2007. The mean age at marriage of a girl was 20.1 in 2003 which increased to 20.6 in 2007. States which married off the girls at an age below the national average age are: Andhra Pradesh (18.9), Bihar (19.7), Haryana (19.5), Karnataka (19.8), Madhya Pradesh (19.2), Maharashtra (19.9),

Rajasthan (19.8) and West Bengal (19.6) in the year 2003. This trend showed slight improvement till 2007 where the states in which women were married off at an age below the national average which was 20.6 are: Andhra Pradesh (19.6), Bihar (19.5), Haryana (20.1), Karnataka (20.3), Rajasthan (19.8), Uttar Pradesh (20.2) and West Bengal (20.2). Also, the rural urban mean age at marriage has increased from being 19.8 in 2003 to 20 in 2007 in rural areas and 21.1 in 2003 to 22.2 in 2007 in urban regions but the urban-rural gap has increased from being 1.3 years in 2003 to 2.2 in 2007, however the improvement in the mean age tends to obscure the fact that there is significantly high prevalence of child marriage.

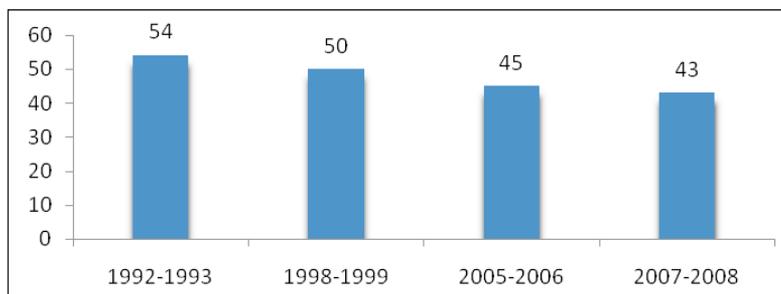
Figure 5.2: Percentage of women who were first married by exact age 18



The above Figure shows the state wise proportion of females married by the exact age of 18. Thus, states with a significantly higher proportion of females married off by 18 years of age

as compared to the national average of 45.6% are: Rajasthan, Chhattisgarh, Madhya Pradesh, Uttar Pradesh, Bihar, Jharkhand, West Bengal and Andhra Pradesh.

Figure 5.3: percentage of females married before attaining the legal age of 18



The ill custom of child marriage¹¹ has a long history in India but exposure to the risks and consequences of this tradition have brought about significant improvement in the proportion of females married before attaining the legal age of marriage in India which is 18 years of age. As can be seen in the Figure above the percentage of girls married before age 18 were 54% in 1992-93 in India which dropped to 43% by 2007-08, thus showing steady improvement in this area but the situation is still a matter of concern.

It is seen that the percentage of girls married before age 15 years had dropped significantly (23.5% in 1998-99 to 18.2% in 2005-06), the incidence girls' marrying between age 15 and 18 has increased (26.7% in 1998-99 to 29.2% in 2005-06). This suggests that a significant number of marriages of girls which otherwise were happening before 15 years earlier have been postponed but only by a few years and remain below 18 years.

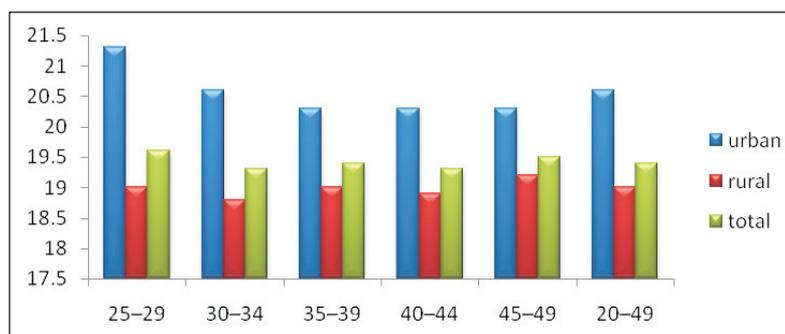
There are 8 major states where more than half the women are reported to have married before age 18. These are: Bihar, Rajasthan, Jharkhand, Uttar Pradesh, West Bengal, Madhya Pradesh, Andhra Pradesh and Karnataka.

The rural urban differential in early marriage is quite significant. While 48% of women aged 20-24 years in rural areas married before attaining the legal age, it was only 29% in urban areas. It is also observed that median age at first marriage among women of age 25-29 years was 15.4 years among women in the lowest wealth quintile, whereas it is 20.9 years among women in the highest quintile as observed in the year 2005-06.

Thus, child marriage, particularly among the socially and educationally backward sections and among the poor, continues to be a major impediment to achieving better maternal health and elevation of like risk for the children. This also contributes to higher incidence of domestic violence and lack of protection against women's abuse.

5.2 Hazardous childbearing

Figure 5.4: Urban rural women's age at first childbirth of different current ages



The age of the mother at first childbirth when asked to women of various ages at the time of survey, no pronounced trend of increase or decrease is observed but the mean age fluctuates around a fixed age of 19-20 all over India. However, there is a significant difference in the urban - rural age at first childbirth trends wherein the mean age of urban women at first childbirth is 20 above and for rural women is 18 above which is a direct consequence of early marriage in rural areas.

Antenatal¹² care of women holds different significance in different parts of the country as urban women are better attended to during this period as compared to rural women, but, this trend has individually shown improvement over time in both areas. The percentage of women who received antenatal care in urban India was 83% in 1992-93 which increased to 87.2% in 2007-08 which when compared to rural Indian women was 59.2% in 1992-93 and increased to 70.7% in 2007-08. Percentage of women who had at least 3 ANC visits for urban women was 66.8% in 1992-93 and 69.8% in

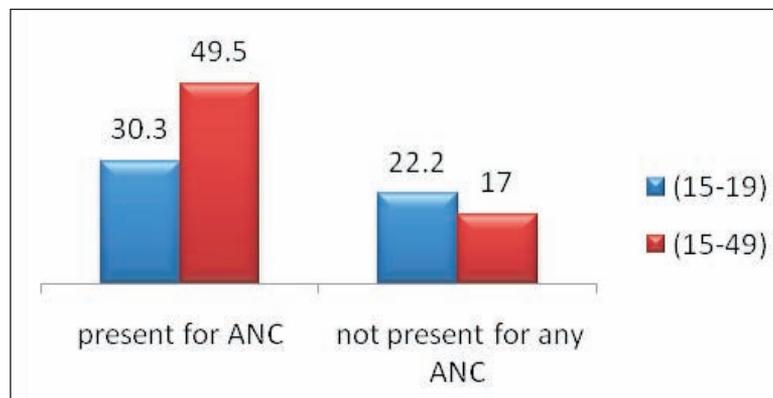
2007-08 as against rural women where it was 37.3% in 1992-93 and 43.9% in 2007-08. One of the major reasons behind poor antenatal care of Indian women is due to lack of participation of men in providing adequate antenatal care to expectant mothers. Percentage observed of urban men present for ANC was 64.9% in urban regions against only 42.8% in rural regions (2005-06). Percentage ever told what to do if mother had any pregnancy complications was 47.3% in urban regions and 32.7% in the rural regions. Thus, the overall condition is a matter of concern with especially in rural parts of India. Antenatal care provision is also to some extent influenced by the number of children already born.

Despite the improvements observed, the most disquieting fact about ANC is the relatively low attendancetoyoungermothers who need to get the maximum advantage of care-giving for the first issues. Since the child marriage is quite prevalent in India and the health factors of young mothers in the age group 15-19 is not conducive to childbearing, the reproductive care to these mothers in terms of ANC in particular

is all the more important. However, the statistical evidences given below are contrary to the expected practice of care-

giving and suggestive of indifference on the part of the husband and other members of the family.

Figure 5.5: Percentage of men present and not present for any ANC in different age groups

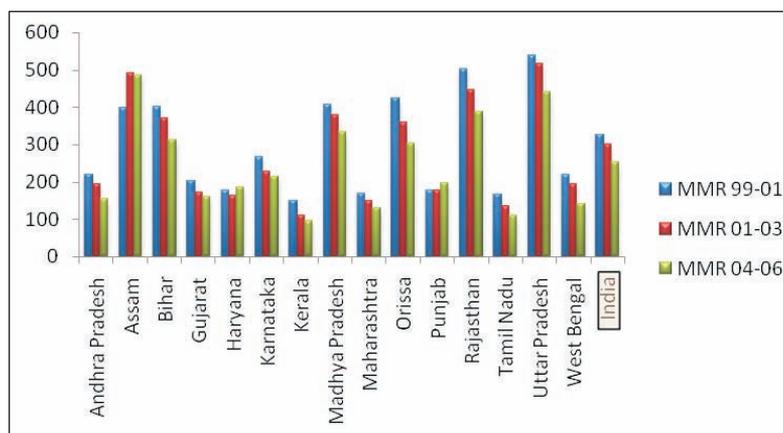


5.3 Maternal Mortality

As can be seen in the figure below (figure 5.6) the states which have shown a high Maternal Mortality are: Assam, Bihar, Madhya Pradesh, Orissa, Rajasthan, and Uttar Pradesh but have shown consistent improvement in the MMRs from 1999 to 2006. The states which have shown a reverse trend are Punjab, Assam and Haryana where the MMR has increased from 1999 to 2006. The overall Maternal Mortality Ratio (no. of maternal deaths

per 1 lac live births) of India has shown improvement as the MMR in 1999-2001 was 327 which declined to 301 in 2001-03 and was recorded as 254 in 2004-06. The MMR has registered a 36% decline between 1997 and 2006 as compared to 25% decline in the preceding 8 years. Despite this impressive improvement, the maternity risk to women may not drastically improve unless the coverage of deliveries attended by skilled personnel and institutional deliveries improve rapidly.

Figure 5.6: Maternal mortality rates in different states of India from the years 1999 to 2006

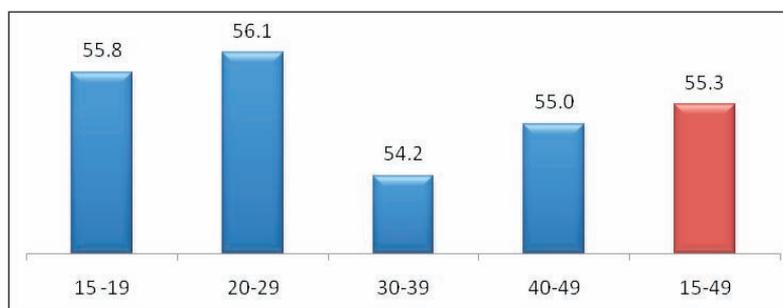


In the percentage of deliveries at a health facility there is observed a significant gap in urban and rural India where the percentage in urban India was 58.4% in 1992-93 which increased to 70.5% in 2007-08 as against rural India where it was 16.7% in the year 1992-93 and 37.8% in 2007-08. In the cases where deliveries are assisted by

health personnel there is again a large gap observed in the urban rural treatment as in urban areas the percentage of deliveries assisted by health personnel were 66.4% in 1992-93 which increased to 75.3% in 2005-06 whereas in rural areas this percentage was recorded as 25.9% in 1992-93 which increased to 39.9% by 2005-06.

5.6 Anaemia amongst women

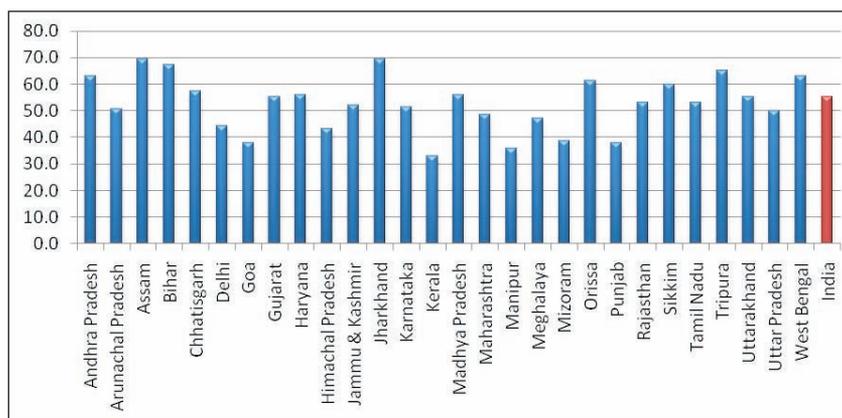
Figure 5.7: Percentage of anaemic women in different age groups



As can be seen above, the highest percentage of anaemic women are found in the age group 20-29 which is the prime childbearing age span, implying a positive correlation between anaemia and childbirth. The second highest age group is of 15-19 in terms of high proportion of anaemic women. Also, there is a higher percentage of anaemic women in rural areas as compared to urban areas (50.9% in urban and 57.4%

in rural). Wealth status is also observed to have an impact on the percentage of women with anaemia, as 64.3% of the women in the lowest income group are anaemic as compared to 46.1% in the highest income group being anaemic and in between, the higher the wealth status, the lower the proportion of anaemic women.. This feature can be related with the nutritional status of the poor women.

Figure 5.8: State wise proportion of women with anaemia

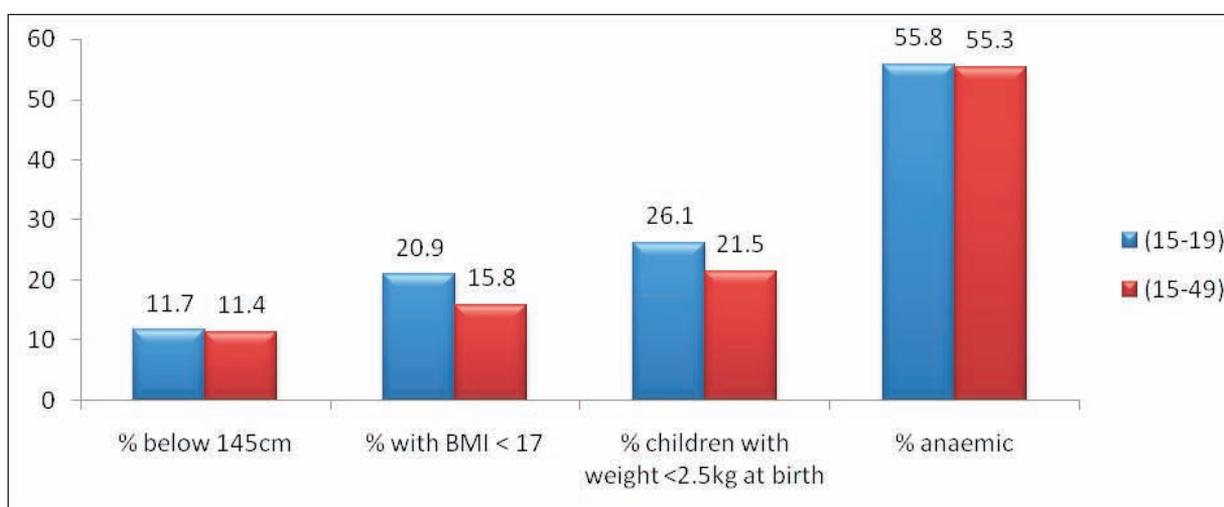


The states with high incidence of anaemia in women are: Assam (69.5%), Jharkhand (69.5%), Bihar (67.4%), Tripura (65.1%), West Bengal (63.2%), Andhra Pradesh (62.9%), Orissa (61.2%), Sikkim (60%), Chhattisgarh (57.5%), Haryana (56.1%), Madhya Pradesh (56%) and Gujarat (56%).

Wherein, the overall percentage of anaemic women over the entire country is 55.3%. Incidentally, most of the states with high prevalence of anaemia among women are also the poorest of the states in terms of poverty head count ratio and absolute poverty burden.

5.7 Deficient Nutrition of women

Figure 5.9: Percentage of women of height below 145cm, BMI<17, with infants born with weight<2.5kg and anaemic

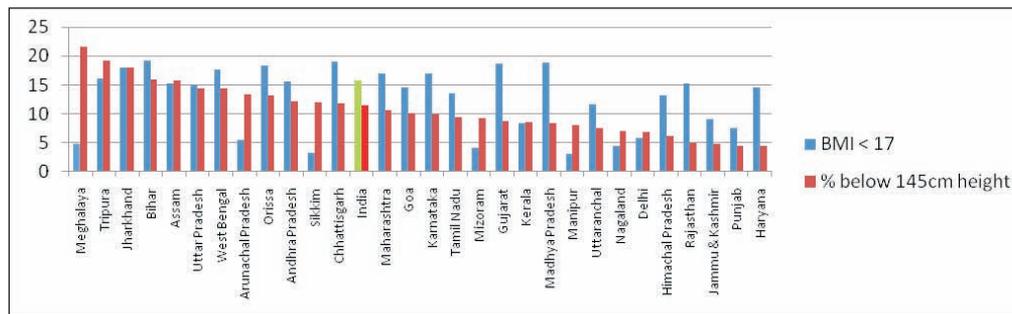


As can be seen in the Figure above, the proportion of females who are of height less than 145 cm (4' 8") are maximum in the age group 15-19 comparing with the wider age group of 15-49 which has shown improvement from 1998-99 to 2005-06 as in 1998-99 the percentage of females below height 145cm was 14.7% in 1998-99 which decreased to 11.7% in 2005-06 and in the overall age group of 15-49 the percentage was 13.2% in 1998-99 which also showed a decline to 11.4% in 2005-06 but the high contribution to the age group 15-19 has stayed. Similarly, for females who are moderately/ severely

thin (BMI¹³<17), the leading age group is of 15-19 as compared to other age groups between ages 15-49.

It is also observed that early marriage and early childbirth affects the health of the new born, as, mothers in the age group 15-19 gave birth to infants of which 26.1% were underweight (weight < 2.5kg) as compared to 20.4% underweight infants born to mothers in the age group 20-34 and 20.1% underweight infants born to mothers aged 35-49. For the age group 15-49 as a whole, the percentages of infants underweight are 21.5%.

Figure 5.10: State wise proportion of women with height below 145cm and BMI < 17



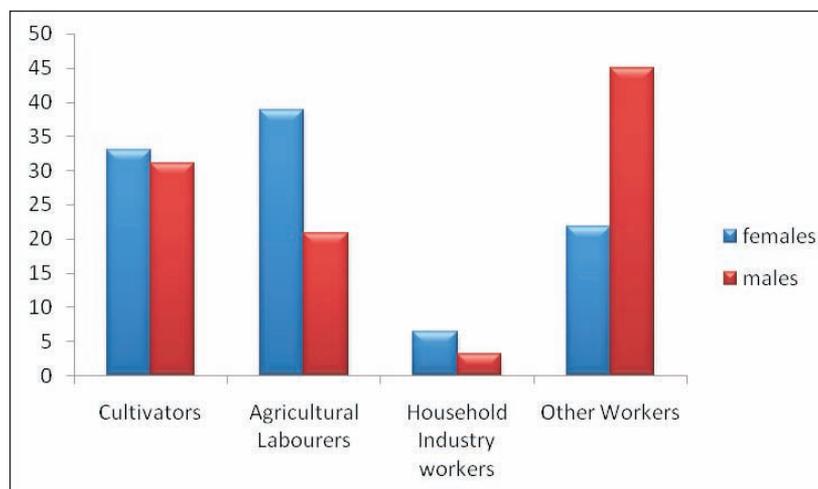
As the Figure above shows the states with a higher proportion of severely/moderately thin females as compared to the national average of 15.8% are: Chhattisgarh, Madhya Pradesh, Bihar, Jharkhand, Orissa, West Bengal, Tripura, Gujarat, Maharashtra and Karnataka. Also, the states which have a higher proportion of females with height less than 145cm on comparing with the national average of 11.4% are: Chhattisgarh, Uttar Pradesh, Bihar, Jharkhand, Orissa, West Bengal, Arunachal Pradesh, Assam, Meghalaya, Sikkim, Tripura and Andhra Pradesh. From the prevalence pattern amongst the states, it is evident that there is a positive correlation between BMI and height, both of which have bearing on early motherhood.

6. Informal Employment

It is a general pattern observed all over India that women are more employed in the unorganized sector as compared to the organized sector as 72% women were in the unorganized sector in 1999-00 and 71% in 2004-05 and overall it was 69.1% people in the unorganized sector in 1999-00 which increased to 74.9% in 2004-05.

As can be seen in the following Figure there are more women as compared to men in the categories of cultivators, agricultural labourers and household industry workers which falls under the informal sector too. Thus females are primarily daily wage earners in majority parts of the country.

Figure 6.1: percentage of women and men in different work categories

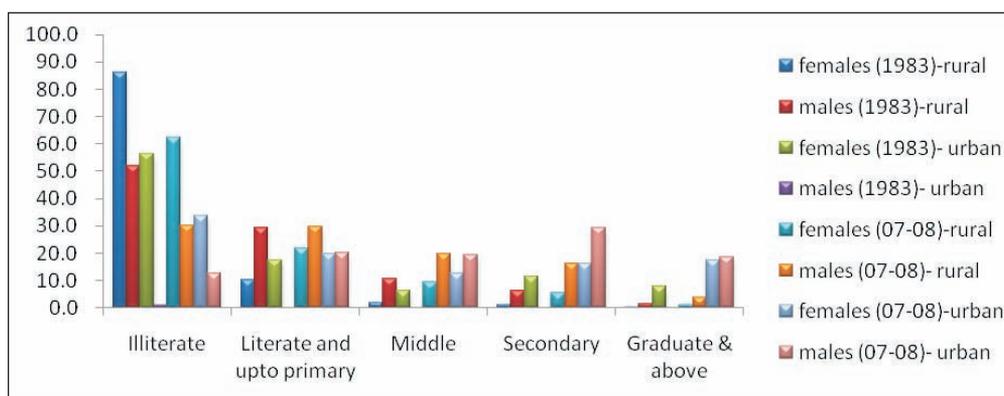


For both males and females, their contribution to the labor force is greatest in the age group 30-44 and least in the age group 60 & above in both rural and urban areas. Over the years the contribution of women to the labor force has shown a declining trend from being 30.5% in 1977-78 to being 24.9% in 2004-05, then increasing to 31.4% in 2005-06 and then falling to 29.2% in 2007-08 in rural India. In urban India it has shown a steady declining trend from 17.1% in 1977-78 to 14.6% in 2007-08 and the participation rate in labor force is consistently lower than that of the rural regions.

The percentage distribution of population Labor force according to educational level has shown consistent improvement

over the years in both rural and urban areas in the sense that the proportion of both female and male labor force who are illiterate has reduced substantially over the years being for rural areas 86.2% females and 52.1% males (1983) to 62.2% females and 30.3% males (2007-08) and in urban areas 56.5% females, 21.7% males (1983) and 33.9% females 12.5% males (2007-08) but the male female gap has persisted over the span of these years. In other education categories like literate up to primary, middle and secondary and graduate and above have shown improvement in the proportion of males and females in the labor force with attainment of these education levels in both rural and urban areas, as shown in the Figure below.

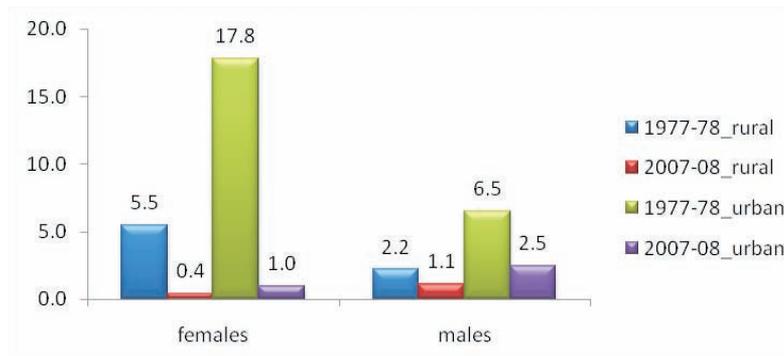
Figure 6.2: Percent Distribution of Population in Labor Force According to Educational Level



As far as unemployment is concerned, in the working age span the age group 15-19 shows maximum unemployment in both rural and urban areas but has shown steady improvement from 1977 to 2007 and least unemployment rates are observed in the age group 60 & above for both females and males over the years. But, the general unemployment rate trend in both rural and urban areas show that women are more unemployed

as against men in all working age groups except that in the years 2002-04, 2005-06 the unemployment rates of men were recorded higher than women in rural areas and in 2007-08 the unemployment rate of men was higher than that of women in urban areas. Also, urban women are on an average more unemployed as compared to rural women (and so are men) but, the unemployment rate gap has been diminishing over years.

Figure 6.3: Unemployment rate by sex.



Looking at female workers in non-agricultural establishments, it is observed as a general pattern in all major activity groups that there are more employees

in each of the establishments as against hired workers but females are more in number as hired workers compared to being employees.

Figure 6.4: Percentage of Female Employees and Hired Workers in Non-Agricultural Establishments

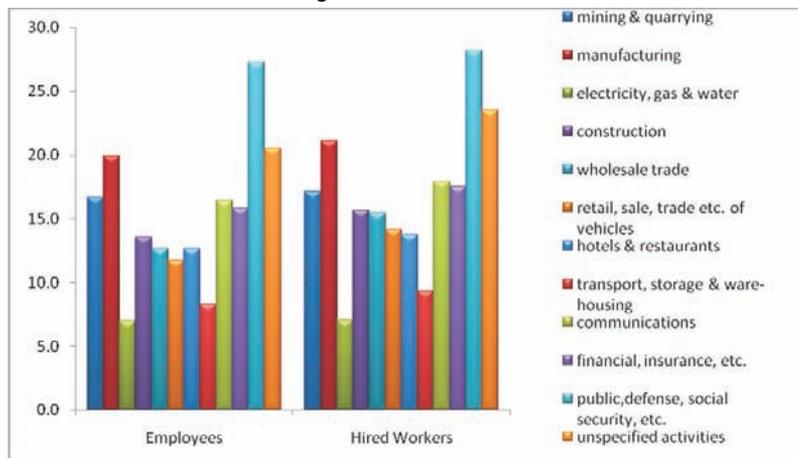
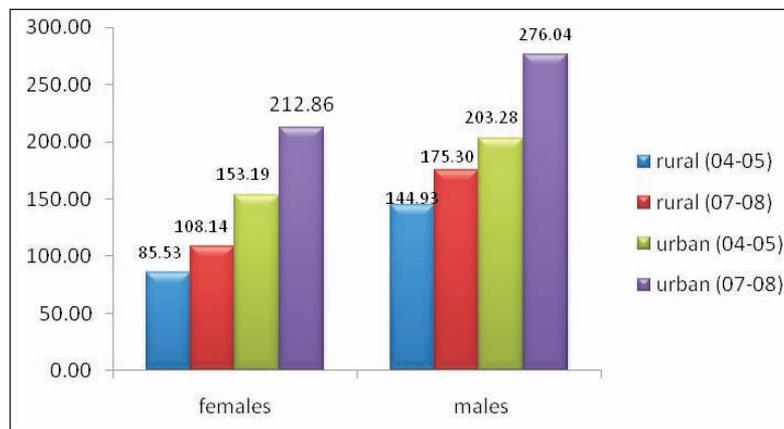


Figure 6.5: Average Wage/Salary (in Rs.) received per day by Regular Wage/Salaried Employees of age 15-59 Years by Sex in 05-06 and 07-08

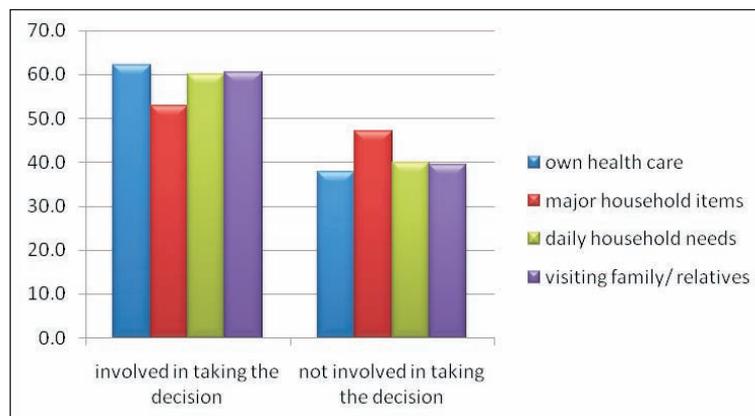


It can be seen as above that females on an average are less paid as compared to males in both rural and urban areas over all industry divisions such as: agriculture, mining & quarrying, manufacturing, electricity gas & water, construction, trade, transport and storage, services and private hhs with employed persons, but urban daily wages are comparatively higher as against rural. Also, females are less paid than males immaterial of whichever education has been attained by both males and females, namely: illiterate, literate up to middle, secondary & higher secondary, diploma / certificate course and graduate and above. This trend is similarly observed in casual laborers as for regular employees.

7. Ignored in Decision Making

As far as decision making is concerned, urban women have more rights to make decisions as compared to rural women in matters concerned with them. Women have maximum involvement in the decision of obtaining healthcare for herself as compared to other decisions like purchase of major household goods in which they have least involvement, purchase of daily household needs and visiting her family or relatives. Involvement in taking decisions is observed to be directly proportional to age, education of the women and standard of living.

Figure 7: Percentage of women involved and not involved in decision making



Modal class: When observations are grouped into class intervals, the interval that contains the most frequently occurring value is known as the modal class.

Leptokurtic: A description of the sharpness of the peak of a curve representing a set of values of a variable when classified into a number of classes according to their magnitude. Leptokurtic distributions have higher peaks around the mean compared to normal distributions, which leads to thick tails on both sides. These peaks result from the data being highly concentrated around the mean, due to lower variations within observations.

Neonatal: An infant in the first month after birth.

Standard Deviation: A measure of the dispersion of a set of data from its mean. The more spread apart the data, the higher the deviation.

BCG is a vaccine against tuberculosis.

DPT: diphtheria, pertussis (whooping cough) and tetanus

IYCF: Infant and young child feeding

GAR: Gross attendance rate is the proportion of students attending a particular grade to the population of students in the official age group corresponding to the grade.

GER: Gross Enrollment rate is the proportion of students enrolled in a particular grade to the population of students in the official age group corresponding to the grade.

NAR: Net attendance rate is the proportion of students of official age for a particular grade who are attending the grade to the population of all students in the age group corresponding to the grade.

Here child marriage has reference to only girl children. The legally accepted lowest age for a girl child to be married is 18 years in India, thus a marriage to a girl below 18 years is referred to as child marriage.

Antenatal: refers to the period before childbirth

Body mass index (BMI) is defined as the individual's body weight divided by the square of his or her height.

Gender Concerns and Schemes for Women Empowerment

- Ministry of Women and Child Development

Gender issues having emerged at the central stage of development process, reducing gender inequalities in the society and empowering women is a major concern of policy makers and planners. Women constitute 48.46 % of India's population. They are a valuable human resource and their socio-economic development is imperative for sustainable growth of the economy. Our laws, development policies, plans and programmes are aimed at women's advancement in different spheres. The principles of gender equality are enshrined in the Indian Constitution. The 73rd and 74th amendments to the Constitution provide 33% reservation for women in rural and urban local bodies. This has enabled women to engage in the mainstream discourse of decision making and development.

Notwithstanding the good intentions of the framers of the Constitution, the efforts of the legislature to make laws and enactments for the welfare of women and the affirmative actions taken by the Government since independence, there is a lot that still needs to be done for improvement of health and general well-being of women. This is borne out by facts some of which are mentioned hereunder.

The Sex ratio (females/1000 males) in the country had been showing a continuous

decline, having come down from 972 in 1901 to 927 in 1991. While there can be some consolation that the ratio increased to 933 in 2001 and to 940 in 2011, the picture gets alarming if one looks at the child front. The sex ratio in the age group 0-6 years has shown a continuous and sharp decline and came down from 976 in 1961 to 927 in 2001. With a further decline during the decade 2001-2011, the ratio now stands at 914.

The Infant Mortality Rate (IMR) in the country is very high, being 53 per 1000 live births (2008). While IMR is 52 for male child, it is 55 for the female child. There is an apparent bias against the girl child, which starts from prenatal stage itself (sex determination, female foeticide and infanticide, being contributing factors) and goes on in the development phases of life cycle of female child.

As regards the Body Mass Index (weight/height²), amongst the males in the age group 15-49 years, on an average, 34.2% have the Body Mass Index below normal while in case of females in the same age group, the proportion is 35.6%. The prevalence of anaemia in the age group 15-49 years among females is much more than in males, being 55.3% and 24.2% respectively. An average female of India suffers from under-nutrition and this

is due to the discrimination faced from childhood through the early stages of development. Maternal Mortality Ratio (MMR) is high, at 254 maternal deaths per 100,000 live births (in 2006).

The female literacy rate continues to be lower than the male literacy rate, 82.14% for the former and 65.46% for the latter (as per provisional results of 2011 Census). But there is reduction in the gender gap in literacy rate (male literacy rate - female literacy rate) of 7+ age group, the gap being 24.8% in 1991, 21.6% in 2001 and 16.7 % in 2011.

Gendering Human Development Indices

- Gender disaggregated data and indices are indicative of the inequalities between males and females. Two important indices viz. Gender Development Index (GDI) and Gender Empowerment Measure (GEM) developed and calculated by UNDP for most of the countries try to explore these differences in different parts of the world.

The Ministry of Women and Child Development, supported by UNDP, had taken an initiative, in 2007, for recasting GDI and GEM to realistically capture the gender gaps in development and empowerment in India. The dimensions used for computing HDI and GDI are the same viz., (i). A long & healthy life, (ii). Knowledge, and (iii). A decent standard of living. For GEM the dimensions are (i). Political Participation and Decision Making Power, (ii). Economic Participation and Decision Making Power and (iii). Power over Economic Resources. All the three

indices, HDI, GDI and GEM have been calculated for 1996 and 2006 for India and all the States/UTs. The indices for India are as indicated in the table below:

Year	Human Development Index	Gender Development Index	Gender Empowerment Measure
2006	0.605	0.590	0.497
1996	0.530	0.514	0.416

The GDI and GEM, which capture gender disparities, in terms of their development and empowerment respectively, do show improvement over the ten year period.

The social and economic conditions of women in any society are a result of social and cultural developments over time. The underlying factors and the issues to be addressed cut across sectors and are far too complex to be addressed by a single agency. Efforts to bring about a change warrant a multi-pronged approach by various agencies, including the Government and NGOs. Various Ministries like the Ministry of Women and Child Development, Ministry of Health and Family Welfare, Ministry of Labour and Employment, Ministry of Social Justice and Ministry of Science and Technology have been implementing a number of schemes for the welfare of women.

Being the nodal Ministry for matters pertaining to development of women and children, the Ministry of Women and Child Development is also implementing a number of schemes for improvement of the socio-economic status of women

and holistic development and protection of children. The empowerment and development of women is sought to be achieved through various schemes aiming at welfare of women, awareness generation among them, training, extending the credit support, increasing opportunities for employment and income generation activities, support services, etc. Some of the important schemes being implemented by the Ministry for women are:-

1. Rajiv Gandhi Scheme for Empowerment of Adolescent Girls (RGSEAG) – SABLA
2. Indira Gandhi Matritva Sahyog Yojana (IGMSY)” – A Conditional Maternity Benefit (CMB) scheme
3. Support to Training and Employment Programme for Women-STEP
4. Rashtriya Mahila Kosh (RMK)
5. SWADHAR – A scheme for Women in Difficult Circumstances
6. Working Women Hostel
7. Ujjawala
8. National Mission for Empowerment of Women

Brief description of the above schemes is given in the following paras.

1. Rajiv Gandhi Scheme for Empowerment of Adolescent Girls (RGSEAG)-SABLA Adolescent girls (11-18 years) are a core resource for national growth. Investment in their

health and development translates to investment in the greater well-being of the country.

According to NFHS-3, the percentage of anaemia among adolescent girls in the age group 15 to 19 years is 55.8% against 30.2 % for boys in the same age group. A large number of girls get married before the age of 18 years which exposes them to risk of early pregnancy, sexually transmitted infections, early child birth, etc. Even though the number of girls marrying before the legal minimum age at marriage of 18 years is on the decline, the number is still sizable.

There is need for influencing health-seeking behavior of adolescent girls and addressing adolescent-specific issues with specific strategies and interventions. For achieving these objectives, Government of India launched on 19.11.2010 the Rajiv Gandhi Scheme for Empowerment of Adolescent Girls - SABLA. The Scheme, which is being piloted initially in 200 districts across the country, has the following **Objectives:**

- Empowering adolescent girls of 11-18 years by improvement in their nutritional and health status and upgrading various skills like home skills, life skills and vocational skills.
- Equipping the girls on family welfare, health hygiene, etc. and information and guidance on existing public services alongwith mainstreaming out of school girls into formal or non-formal education.

The following Services are provided to adolescent girls under the Scheme:-

- Nutrition provision (600 calories and 18-20 gms. of protein and micronutrients, @ Rs. 5/- per beneficiary per day for 300 days in a year) for all out of school girls (11-18 years) and school going girls (14-18 years).
- IFA supplementation,
- Health check-up and Referral services,
- Nutrition & Health Education,
- Counseling/Guidance on family welfare, ARSH, child care practices and home management ,
- Life Skill Education and access to public services,
- Vocational training for girls aged 16 and above under National Skill Development Program (NSDP).

The Scheme is Centrally Sponsored and the State Governments/UTs are the Implementing Agency. Anganwadi Centre is the focal point for delivery of the services. Full financial assistance is to be provided by the Central Government for all inputs other than nutrition provision, for which Central assistance to States/UTs to be provided is 50%. Emphasis will be on convergence of various schemes/programmes viz. health, education, Youth Affairs, Labour, PRIs, etc., so as to achieve the desired impact. Nearly 100 lakh adolescent girls per annum are expected to be benefitted under the scheme, initially.

2. Indira Gandhi Matritva Sahyog Yojana (IGMSY)”: Conditional Maternity Benefit (CMB) scheme

Under-nutrition continues to adversely affect majority of women in India. An undernourished mother almost inevitably gives birth to a low birth weight baby. When poor nutrition starts in-utero, it extends throughout the life cycle, particularly in women. Owing to economic and social distress, many women continue to work to earn a living for their family right up to the last days of their pregnancy. Furthermore, they resume working soon after childbirth, even though their bodies might not permit it; thus preventing their bodies from fully recovering on one hand, and also impeding their ability to exclusively breastfeed their young infant in the first six months.

Approved in October 2010, IGMSY is a new scheme for pregnant and lactating women to contribute to better enabling environment by providing cash incentives for improved health and nutrition to pregnant and nursing mothers. The scheme attempts to partly compensate for wage loss to Pregnant & Lactating (P & L) women both prior to and after delivery of the child. The cash incentives through provision of Conditional Cash Transfer (CCT) would, not only contribute to better enabling environment, but also encourage and promote health and nutrition seeking behaviour. It is being implemented using the platform of ICDS and is initially on pilot basis in 52 selected districts. the scheme aims to improve the health and nutrition status of pregnant, and lactating women and infants by:

- Promoting appropriate practices, care and service utilisation during pregnancy, safe delivery and lactation.
- Encouraging the women to follow (optimal) IYCF practices including early and exclusive breast feeding for six months.
- Contributing to better enabling environment by providing cash incentives for improved health and nutrition to pregnant and nursing mothers

IGMSY is a Centrally Sponsored Scheme under which the grant-in-aid is being released to States/ UTs. The Scheme envisages providing cash directly to P&L women during pregnancy and lactation in response to individual fulfilling specific conditions. The beneficiaries will be paid Rs.4000/ in three installments per P&L woman between the second trimester and till the child attains the age of 6 months on fulfilling specific conditions related to maternal and child health. The conditions for the 3 trenches are as under:-

Cash Transfer	Conditions
Rs. 1500 (at the end of second trimester)	i. Registration of pregnancy within 4 months ii. One Ante Natal Checkup (minimum) iii. Attending Counseling session(minimum one)
Rs. 1500 (three months after delivery)	i. Child birth registration ii. Immunization iii. Attending growth monitoring and counseling sessions
Rs. 1000 (six months after delivery)	i. Exclusive breast feeding for 6 months & introduction of complementary feeding (self certification by mother) ii. Immunisation iii. Attending growth monitoring and counseling sessions.

Anganwadi Worker (AWW) and Anganwadi Helper (AWH) would receive an incentive of Rs.200/- and Rs. 100/- respectively per P & L woman after all the due cash transfers to the beneficiary are complete.

Pregnant Women of 19 years of age and above are entitled to benefits under the scheme for first two live births. Government/PSUs (Central & State) employees are excluded from the scheme as they are entitled for paid maternity leave. According to the baseline survey

conducted by States/UTs, 12.5 lakh Pregnant and Lactating women are expected to avail services under the scheme annually.

3. Support to training and employment programme for women (step)

STEP was launched as a Central Sector Scheme in 1986-87 with a view to ensure employment and income generation of women through training and skill

upgradation. The scheme seeks to provide updated skills and new knowledge to poor and assetless women in 10 traditional sectors namely, Agriculture, Animal Husbandry, Dairying, Fisheries, Handlooms, Handicrafts, Khadi and Village Industries, Sericulture, Waste Land Development and Social Forestry for enhancing their productivity and income generation. The scope and coverage of the scheme has been broadened with the introduction of locally appropriate sectors. The **objectives** of the Scheme are:

- Mobilizing women in small viable groups and making facilities available through training, access to credit and other inputs.
- Provide training for skill upgradation
- Enabling groups of women to take up employment-cum-income generation programmes of their own, or to access wage employment.
- Provide support services for further improving employment conditions of women and for access to health care, literacy, legal literacy, and other information.

The beneficiaries under the project are poor or assetless marginalized women with special focus on SC/ST households, women headed households and families below the poverty line. The scheme is being implemented through NGOs, Federations, Cooperatives, DRDAs, Public Sector Organizations, etc. Ninety percent of the project cost is borne by

the Government of India and 10% by the implementing agency. The maximum permissible per capita cost upto Rs. 8,000/- under the scheme has been enhanced to Rs. 16,000/- as per revised norms of the scheme.

4. Rashtriya Mahila Kosh (RMK)

The National Credit Fund for Women known as **Rashtriya Mahila Kosh (RMK)** was set up by the Government of India in 1993, with a corpus of Rs.31 crore, as a national-level organization under the Ministry of Women and Child Development to meet the credit needs of poor and assetless women in the informal sector. The initial corpus of Rs.31 crore has grown over to Rs.164 crore due to credit, investment and recovery management as well as additional allocation in the last 4 years.

RMK extends micro-credit loans to generally poor women through NGOs by following a client friendly, without collateral and hassle-free manner for acquiring productive assets for carrying out livelihood activities and micro-enterprises etc. The loan amount is repaid with interest in quarterly instalments as per the repayment schedule. Apart from giving micro-credit to the women beneficiaries, RMK builds capacity of SHG / women groups and partner NGOs in micro-finance and income generation activities to empower them and with a view to enable them to train fellow members and prospective beneficiaries.

RMK has taken a number of promotional measures to popularise the concept of

women empowerment through micro financing, thrift and credit, formation and stabilization of SHGs and also enterprise development for poor women.

Credit is disbursed to the poor women beneficiaries both rural and urban, through intermediary organizations (IMOs) working at grass root level such as NGOs, Women Federations, Co-operatives, not for profit companies registered under Section 25 of the Companies Act and other Voluntary / Civil society organizations. As on 31.3.2011, RMK had sanctioned cumulative loans of Rs. 307.52 crores benefitting 6,87,512 women.

RMK is to be restructured and strengthened from a Society to Government owned Non Deposit Taking Systematically Important Non-Banking Finance Company (NBFC - ND-SI) u/s 617 of the Companies Act, with a Pan-Indian office network backed by need based capital. This will enable RMK to respond to the growing need for micro-finance in low-income household on reasonable terms & conditions.

5. SWADHAR: Scheme for Women in difficult circumstances

Swadhar scheme purports to address the specific vulnerability of women in difficult circumstances. Launched in 2001-02, the scheme has the following objectives -

- i) To provide primary need of shelter, food, clothing and care to the marginalized women/girls living in difficult circumstances who are without any social and economic support;

- ii) To provide emotional support and counselling to such women;
- iii) To rehabilitate them socially and economically through education, awareness, skill upgradation and personality development through behavioural training, etc.;
- iv) To arrange for specific clinical, legal and other support for women/girls in need of those interventions by linking and networking with other organizations in both Govt. & Non-Govt. sectors on a case to case basis;
- v) To provide for help line or other facilities to such women in distress; and
- vi) To provide such other services as required for the support and rehabilitation of such women in distress.

The target group/ beneficiaries of the scheme are (i) Widows deserted by their families and relatives and left uncared near religious places where they are victims of exploitation; (ii) Women prisoners released from jail and without family support; (iii) Women survivors of natural disaster who have been rendered homeless and are without any social and economic support; (iv) Trafficked women/girls rescued or runaway from brothels or other places or women/girl victims of sexual crimes who are disowned by family or who do not want to go back to respective family for various reasons; (v) Women victims of terrorist/*extremist* violence who are without any family support and without

any economic means for survival; (vi) Mentally *challenged* women (*except for the psychotic categories who require care in specialized environment in mental hospitals*) who are without any support of family or relatives; and (vii) Women with HIV/AIDS deserted by their family or women who have lost their husband due to HIV/AIDS and are without social/economic support.

The *implementing* agencies can be the Social Welfare/ Women and Child Welfare Department of State Government, Women's Development Corporations, Urban Local Bodies, reputed Public/Private Trust or Voluntary Organisations who are willing to take up the responsibility of rehabilitating such women. The organization must have adequate experience and expertise of taking up such works of rehabilitation.

6. Working Women Hostel Scheme

The objective of this scheme is to promote availability of safe and conveniently located accommodation for working women, with day care facility for their children, wherever possible, where employment opportunities for women exist. To achieve this objective, the scheme assists projects for construction of new hostel buildings, expansion of existing hostel buildings and hostel buildings in rented premises. Since its inception in 1972-73, 890 hostels have been sanctioned under the scheme all over the country benefitting about 66,000 working women.

The scheme has now been revised with following salient features:

- Financial assistance for construction of hostel building (to be given only on public land).
- Financial assistance available for rent of the hostels which are run in rented premises also.
- Provision for maintenance grant of hostel building (maximum Rs.5 lakh) and one-time non-recurring grant for furnishings (@ Rs.7500 per beneficiary).

State Government agencies, Urban Municipal Bodies, Cantonment Boards, Civil Society Organizations, Panchayati Raj Institutions, Self Help Groups, Recognized Colleges/Universities, and Corporate or associations like CII, ASSOCHAM and FICCI have been included under the agencies/organisations which can apply for assistance under the scheme.

7. Ujjawala: Scheme to combat trafficking

The scheme aims to prevent trafficking of women and children for commercial sexual exploitation through social mobilization and involvement of local communities. The Scheme was launched on 4th December, 2007 and is being implemented mainly through NGOs. The Scheme has five components—Prevention, Rescue, Rehabilitation, Re-Integration and Repatriation of trafficked victims for commercial sexual exploitation. Some of the activities envisaged under the Scheme are: -

- Formation of community vigilance groups, adolescents groups,

awareness creation and preparation of IEC material, holding workshops, etc.

- Safe withdrawal of victims from the place of exploitation.
- Rehabilitation of victims by providing them safe shelter, basic amenities, medical care, legal aid, vocational training and income generation activities.
- Re-integration of victims into society.
- Providing support to cross-border victims for their safe repatriation to their country of origin.

The implementing agencies can be:

- i) Social Welfare/Women and Child Welfare Department of State Government
- ii) Women's Development Corporations, Women's Development Centres
- iii) Urban Local Bodies, reputed Public/Private Trust or Voluntary Organisations.

Under the scheme, assistance (90% of the cost) is provided to eligible organisations for undertaking the above activities.

8. National Mission for Empowerment of Women

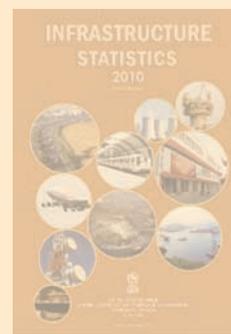
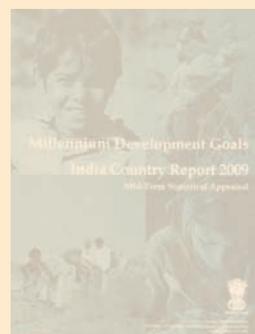
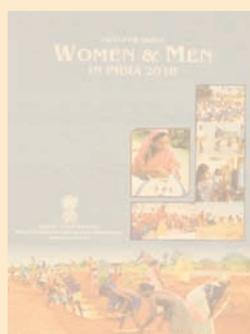
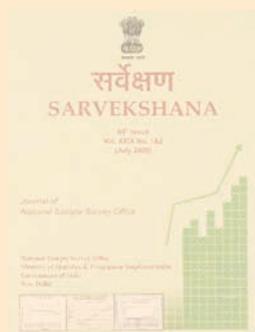
The National Mission for Empowerment of Women (NMEW) was launched on 8th March, 2010 by the Ministry of Women and Child Development for providing the much required fillip for a coordinated assessment of current

government interventions and aligning future programmes so as to translate the convergence of women centric government schemes into reality. The National Mission Authority (NMA) of the Mission is headed by the Hon'ble Prime Minister and has Chief Ministers of the States of Andhra Pradesh & Bihar besides five Civil Society Organizations as members. The NMA is assisted by Central Monitoring Committee headed by Minister of Women and Child Development and Inter-Ministerial Coordination Committee (IMCC) under Cabinet Secretary. The key functions of the National Mission are:

- Economic empowerment of women.
- Convergence of women centric Government Schemes.
- Ensure that violence against women is eliminated progressively.
- Ensure social empowerment of women with particular emphasis on health and education.
- Oversee gender mainstreaming of programmes, policies, institutional arrangements and processes of participating Ministries, institutions and organizations.
- Undertake awareness generation as well as advocacy activity to fuel the demand for benefits under various schemes and programmes and create, if required, structures at district, tehsil and village level with the involvement of Panchayats for their fulfillment.

Sex Disaggregated Data

S. No.	Indicator	Value	
1.	Sex Ratio (0-6) Years	945 927 914	(1991) (2001) (2011)
2.	Sex Ratio Total Population	927 933 940	(1991) (2001) (2011)
3.	Infant Mortality Rate 2008	52 55	(Male) (Female)
4.	Literacy Rate 2011 (census)	82.14% 65.46%	(Male) (Female)
5.	Prevalence of Anaemia 2005-06 (NFHS)	24.2% 55.3%	(Male) (Female)
6.	% whose BMI is below normal 2005-06	28.1% 33.0%	(Male) (Female)
7.	Maternal Mortality Ratio 2004-06 2001-03	254 301	per 1,00,000 Live births per 1,00,000 Live births
8.	Work force Participation Rate 2001 (census)	51.93% 25.68%	
9.	Proportion of women in National Parliament	12.13 % 10.79 % 10.97 %	Lok Sabha (June 2011) Rajya Sabha (June 2011) Lok Sabha+Rajya Sabha
10.	No of Credit Accounts above Rs 2,00,000 in scheduled commercial Banks-2006.	88.3% 11.7%	(Male) (Female)
11.	No of operational landholdings. 2000-01 (in '000)	90.1% 9.9%	(Male) (Female)



Glimpses of Statistics Day 2010



Celebration of Statistics Day 2010 in the Field Offices of NSSO

S. No.	Region	Activity
1.	Ahmedabad	Quiz Contest, Debate
2.	Aurangabad	Lectures by Guest Academicians
3.	Baroda	Quiz Contest, Lectures by Guest Academicians
4.	Mumbai	Quiz Contest, Debate and Essay Writing Competition
5.	Nagpur	Lectures by Guest Academicians
6.	Pune	Lectures by Guest Academicians and Essay Writing Competition
7.	Agra	Lectures by Guest Academicians and Paper Presentations
8.	Allahabad	Essay Writing Competition and Lectures by Guest Academicians
9.	Dehradun	Lectures by Guest Academicians and Paper Presentations
10.	Jabalpur	Documentary Film Presentation and Essay Writing Competition
11.	Lucknow	Lectures Guest Academicians and PPTs on Child Statistics
12.	Ajmer	Lectures by Guest Academicians
13.	Chandigarh	Lectures by Guest Academicians
14.	Jaipur	Lecture Presentations
15.	Jalandhar	Lectures by Guest Academicians
16.	Jammu	Lectures by Guest Academicians
17.	Ludhiana	Lectures by Guest Academicians
18.	Shimla	Lectures by Guest Academicians, Essay Writing Competition and Quiz Competition
19.	Srinagar	Essay Writing Competition
20.	Dibrugarh	Lectures by Guest Academicians
21.	Gangtok	Documentary Film Presentation
22.	Guwahati	Lectures by Guest Academicians
23.	Kohima	Lectures by Guest Academicians

24.	Shillong	Lectures by Guest Academicians and Quiz Cometition
25.	Bangalore	Lectures by Guest Academicians, Crossword Puzzle and Quiz Contest
26.	Chennai	Lectures by Guest Academicians and Essay Competition
27.	Cuddapah	Lectures by Guest Academicians, Quiz Contest and Essay Competition
28.	Hubli	Lectures by Guest Academicians
29.	Hyderabad	Lectures by Guest Academicians and Essay Writing Competition
30.	Madurai	Lectures by Guest Academicians and Quiz Contest
31.	Port Blair	Lectures by Guest Academicians
32.	Trivandrum	Lectures by Guest Academicians, Seminar and Quiz Contest
33.	Goa	Lectures by Guest Academicians
34.	Bhubneswar	Lectures by Guest Academicians and Essay Writing Competition
35.	Malda	Seminar and Essay Writing Competition
36.	Muzaffarpur	Seminar and Lectures by Guest Academicians
37.	Patna	Lectures by Guest Academicians
38.	Ranchi	Lectures by Guest Academicians
39.	Burdwan	Panel Discussion
40.	Kolkata	Essay Writing Competition, Photo Exhibition and Quiz
41.	Sambalpur	Seminar and Paper Presentation by Guest
42.	Bareilly	Seminar and Essay Competition

Celebration of Statistics Day, 2010 by Directorate of Economics and Statistics, Bhubneswar-A Report

A State level function along with one day seminar on Role of Statistics in Socio-economic Planning & Policy Formulation along with the prescribed theme 'Child Statistics' was ecentral by DE&S at Panthnivas, Bhubaneswar on 29.06.2010 to observe the birth anniversary of Prof. P.C. Mahalanobis, the father of modern statistics in India.

A grand celebration was observed where in Hon'ble Minister, P&C and Public Enterprise, Addl. Development Commissioner, Spl. Secy. To Govt. P&C Deptt. Retd. Directors E&S, Professors of Local University, Officers/officials from various line Departments, all officers/officials of DE&S and its subordinate offices (around 300 participants) participated in the function.

By lighting the lamp, Hon'ble Minister, P&C and Public Enterprise, Sri A.U. Singh Deo inaugurated the function. Sri M.K. Nanda, Director E&S in his welcome address focused on various salient points on the activities of DE&S. He emphasized on some Govt. of India schemes like ISSP, BSLLD and new areas of approach as per the recommendations of 13th Finance Commission where in there is a scope for strengthening the Statistical activities across the state vis-s-vis that of District and local level also. Further, he also threw light as to how Prof. Mahalanobis

has set an example of duty and devotion, action and achievement and inspired all to follow his path.

The Spl. Secy to Govt., P&C Deptt. Sri P Dash, ISS in his keynote address emphasized the paramount importance of Statistics in each and every field. He described that Statistics are the eyes of Planners and in the absence of accurate statistics the State / Country would be a back bencher. In many fields there are some reasons to hid the facts. But Statistics adjusts it and makes it presentable before planners and policy makers to proceed ahead. In view of importance of Statistics, various International bodies now initiated to develop the Statistical system of the whole country which will be more ecentralized and responsive to the public needs. Such effectiveness would be realized when ISSP and recommendations of 13th Finance Commission be implemented in full fledged manner. He further highlighted the importance of NSC and advised all to work collectively so that our state can go ahead of other developed States who have proven themselves developed due to their vibrant statistical system. In his concluding speech, he narrated how Mahalanobis had a fascination for Statistics for which he proved himself a real statistician in stead of being a Physicist. He worked for poor for which he got highest civilian award.

The Guest of Honour, Sri B.K. Tripathy, Ex-Director E&S described the 4th Statistics Day as an illuminating day as the day commemorates the birth anniversary of an illuminating star Prof. Mahalanobis in the sky of Statistics. He focused how Prof. had shown light for the official statistician and put forth science of averages and large scale sample survey which are now widely applicable in various Census and Surveys. He described that Statistics is not only a science of average but the weapon in the hands of Planners which helped in shaping the Economic and Development Planning of the State. He expressed State Govt. dignitaries as mini Mahalanobis and requested them to energize DE&S personnel for strengthening the State Statistical System.

The Additional Development Commissioner, Sri RN Senapati, the guest of Honour in his speech described the day as a great day for Statistical fraternity where a luminous personality & renaissance man Prof. Mahalanobis has emerged in the arena of Indian Statistics. He praised his versatile thinking on Mahalanobis model, input output ratio, sample survey technique and establishment of ISI, NSSO and CSO etc. He advised statistician to enjoy themselves while collecting statistics so that it would make statistics more interesting. He narrated how Prof. had nurtured statistics like a kid and very much committed to it. He advised all to learn the sense of commitment and dedication from Professor's life. He further stated that if we would work with utmost zeal and enthusiasm the information would be more reliable,

accurate and qualitative. He opined that sometimes statistics gives a misleading picture tending towards wrong conclusion. So the Statistician should be careful while handling Statistical tools and technique. Last but not least, he advised all to be dedicated in developing strong statistical machinery so that it would help the Govt. in making proper planning.

The Chief Guest of the occasion, Hon'ble Minister P&C and Public Enterprise Sri A.U. Singh Deo in his speech described the pioneering personality of Prof. Mahalanobis in the field of Statistics. Describing a half glass water as glass is half full or glass is half empty depends upon the outlook of a Statistician. He advised all statistician to be informative, work diligently and feed accurate, correct qualitative and timely information to legislators so that they should be sufficiently informed about the status of development programme in their working area, accordingly prioritize the work plan, execute action and spent money in the appropriate field which would go a long way in formulating policies, better planning and good governance.

In the inaugural session a publication on 'gender disparity in Odisha 2010' as inaugurated by the Hon'ble Minister and distributed among the distinguished guests on the dais. The inaugural session was ended with vote of thanks by Sri S. Das, Joint Director, DE&S.

The Technical session began under the chairmanship of Sri LN Sarngi, Ex-Spl. Secy., P&C Deptt. The mind blowing speech delivered by Prof. KB Das, Deptt. Of A&A Economics, Utkal University on the topic

'Future of Indian Economy' had impressed and entertained all participants. He has narrated the present scenario of Indian Economy, how its primary sector has been continuously neglected and how service sector is ballooning day by day. He depicted that labour is being betrayed now a days in the face of mechanization. He opined that service sector is compartment but primary sector is engine. In stead of watering the roots, if water is sprinkled to its branches then the plant would not survive. So is the case of Indian economy where more focus is put to service sector especially IT sector. He further pointed out that we are not encouraging the creativity of our citizen. The creativity of Indians which are unparallel is shattered now. All are running after theoretical knowledge, attracted towards IT sector and aspire for high packages ignoring ones intellectuality or creativity in the field in which one can prove his best performance. If this pervasive trend continues, naturally the future of Indians would be uncertain. So it is the right time for the Politicians, Planners and Policy makers to put vigilant eyes on the issues to find out the solution early by making political reform, educational reform & Bureaucratic reform which are the need of the hour.

Thereafter, 8 Technical Papers were presented viz 1) MIS of ICPS & ICDS for Socio Economic Planning, 2) Role of Statistics in Strengthening Child Development, 3) Shelter for Shelterless under IAY and Mo Kudia, 4) Child malnutrition in Odisha, 5) Demography Profile of Child

Population & changing sex ratio in Tribal Odisha, 6) Elementary Education in Odisha an overview, 7) Status of Children in Odisha, & 8) Impact of Poverty on Child Education of Rural Odisha - A brief Analysis (copies enclosed) in the seminar. Some comments/interactions were exchanged and the chairperson clarified the queries with their valuable suggestions. The chairperson impressed upon DES personnel to maintain the spirit, energies themselves and should focus their thinking from tomorrow onwards so that the ensuing Statistics Day would be the best. He also advised to make wide publicity in Electronic media & News paper for highlighting the next Statistics Day beforehand invite eminent statistician/economist to participate in the function & contribute seminar papers by which the dreams of Godfather of Statistics would be fulfilled.

Dr. D Ray, Deputy Director, DE&S extending vote of thanks to the participants in the technical session, vividly described how importance of Statistics contributed by the legendary Statistician Prof. PC Mahalanobis has gained global recognition and its application is growing both in scope and depth. The inaugural session was highlighted through electronic media. A press note regarding the high lights of the function was published in almost all daily News papers.

The Technical session was concluded with vole of thanks to the chair and all participants for making the function a grand success.

Statistics Day 2010 Celebrations by Directorate of Economics and Statistics, Andhra Pradesh - A Report

At the instances of the Ministry of Statistics and Programme Implementation, Government of India, the Directorate of Economics & Statistics has been celebrating the 'Statistics Day' every year on 29th June since 2007, in the memory Late Prof. Prasanta Chandra Mahalanobis on his birth anniversary in recognition of the notable contribution made by him in the fields of Economic Planning and Statistical development in post independent era.

During 2010, the Directorate of Economics & Statistics celebrated the 'Statistics Day', in a befitting manner. All the Chief Planning Officers in the districts also celebrated the 'Day' duly involving the dignitaries from various academic and administrative background.

The theme of the Statistics Day, 2010 was Child Statistics. The Directorate of Economics & Statistics conducted a workshop on child Statistics on 21.06.2010 in the conference hall of D.E & S. so as to bridge the gaps between the availability of data and the data required for the Government and to the Non Governmental Organizations.

The Director, Women Development & Child Welfare Department, Smt. V. Usha Rani, IAS participated as Chief Guest. The State Programme Manager

of Child Protection, Government of A.P., the M&E Specialist, UNICEF, the Senior Fellow, CESS Hyderabad and officers from many Non-Governmental Organizations participated in the workshop.

The Director, Directorate of Economics and Statistics explained the importance of the Child Statistics and requested the participants from various departments to co-operate in providing the data available with them. He also requested the participants from various Non Governmental Organizations to give the details of the actual data gaps they are facing. While participating in the discussion, the Director, Women and Child Welfare appreciated the steps taken by the Director, D.E &S and efforts made by him for compilation of Child Statistics, which will be very useful to administration especially the Women & Child welfare Department.

The Director, D.E &S requested the participants from the Non Governmental Organizations to spell out the data gaps they are facing in their activities.

On the Day of 'Statistics Day' i.e. 29th June, the DE & S invited the Statistical fraternity working in various departments of the State Government for the celebrations. The former Director, Sri T. Koteswara

Rao, was invited as Chief Guest of the occasion. Sri P. Prakasam, Director, DE & S while giving inaugural address briefed the importance of State Strategic Statistical Plan (SSSP) and the role of Directorate as Nodal Statistical agency and also stressed the need of quality and timely flow of data from gross root level to State Head Quarters for proper utilization of the data in policy formulation.

The Chief Guest of the forenoon session, Sri T. Koteswara Rao, while giving the key note address mentioned about the contributions made by Prof. P.C. Mahalanobis in the fields of Statistics and Economic Planning. He also stressed the importance of Statistics and need for quality and timely flow of data from the departments in estimation of Gross State Domestic Product. He created enough awareness in the officials who attended the celebrations on Utility of GSDP estimates by various policy makers and administrators in financial matters.

Three Publications pertaining to State Domestic Products were released in the morning session.

In the afternoon Session, Prof. S. Galab, Senior Fellow from the CESS was invited as Chief Guest. He made a power point presentation on Child Statistics. Dr. C. Ravi, Director working with CESS was also invited as guest of Honor.

In the afternoon session, two books were released on Annual Survey of Industries and Index of Industrial Production.

Best Service Awards were given to 4 (four) Deputy Statistical Officers and six (6) Assistant Statistical officers, with a Memento and a Certificate in recognition of the significant contribution made by them in day to day administration. The Elocution & Essay writing competitions were also conducted on 'The Role of Statistics in Developmental Economy & Need for Child Statistics in Policy formulation of Child Welfare Programmes' and winners were presented with Certificates and Mementoes.

Improvement in Child Education Since Independence

*[Essay written by
Mr. C.S. Moharana, Superintending Officer, N.S.S.O, Cuttack
at the Essay Competition organized by
NSSO(FOD), Bhubneswar on the Statistics Day 2010]*

1. Introduction

Children are the future of a nation. For an emerging and developing country like India, development of under privileged children holds the key to the progress of the nation itself. As per the Child Rights Charter a Universal definition of “Child” in India includes all persons under the age of 18. 40% of India’s population is below the age of 18 years which at 400 million is the world’s largest Child population.

India has a long history of organized education. The Gurukul system of education is one of the oldest one on earth. Gurukuls were traditional Hindu residential schools of learning typically in the teacher’s house or in a monastery. Education was free (and often limited to the higher castes), but students from well-to-do families paid Gurudakshina, a voluntary contribution after the completion of their studies. The current system of education, with its western style and content, was introduced & funded by the British in the 19th Century.

After independence, education became the responsibility of the States. The Central Government’s only obligation was

to co-ordinate in technical and higher education and specify standards. This continued till 1976, when education was made a joint responsibility of the states and the Centre, through a constitutional amendment. The center is represented by Ministry of Human Resource Development’s Department of Education and together with the States, it is jointly responsible for the formulation of education policy and planning.

National Policy of Education (1986) and revised Programme of Action (1992) envisaged that free and compulsory education should be provided for all children upto 14 years of age before the commencement of 21st century. Government of India made a commitment that by 2000, 6% of the Gross Domestic Product (GDP) will be spent on education, out of which half would be spent on the primary education. The Article 45 of the Directive principles of the State Policy was committed to ensuring free and compulsory education for all. This did not significantly translate into action and school enrolments and participation remained dismally low for decades after Independence. Further, elementary

education being made a fundamental right by the 83rd Constitutional Amendment, and the Supreme Court's insistence on States to provide hot cooked meals in schools, are improving enrolments, especially among girls. The Government of India has assigned high priority to the education sector not only to achieve the Universalization of Elementary Education by 2010 but also to improve the quality of education at all levels. Also due to policy of economic liberalization and globalization it becomes all the more necessary to improve the quality of human capital to face the new challenges and competition in the world of work (Annual Report-National Council of Education Research and Training, New Delhi, 2006).

Because of the initiatives taken by the States and Centre, education system in India has expanded exponentially over the past five decades, but its current achievements are grossly inadequate for the nation to realize its potential greatness. The net enrolment rate in primary schools and in secondary schools is not satisfactory. The dropout rate was 34.9 percent at the primary level, 52.9 percent at the upper primary level and 62.6 percent at High School level in 2002-2003 (Selected Educational Statistics 2002-03, 2005).

2. Schools in India

Due to the initiative of Central and State Governments as well as various NGO and private agencies, the education in India is moving in the right direction. From the report of 7th All India Education

Survey conducted by National Council of Education Research and Training, New Delhi, it has been found that there has been substantial expansion in the number of schools during the period of 6th All India School Education Survey to 7th All India School Education Survey.

According to the report of Seventh All India School Education Survey, it has been found that the total number of schools in the different stages (Primary, upper primary, secondary and higher secondary schools stage) is 10,31,367. Out of this, 8,53,457 schools recorded in rural areas whereas 1,77,910 schools in urban areas with different stages of schooling. It has also been noted that the total growth in the schools at the different stages compared to the last Sixth All India School Education Survey increases 25.40 percent. This picture of growth also found in rural and urban areas. In rural area, the growth has been found 22.57 percent and in urban areas 40.99 percent.

3. Enrolments in Schools

Enrolment means the number of pupils or students enrolled in a particular class (viz. primary, upper primary, secondary and higher secondary stages) of school education, regardless of age.

In 7th All India School Education Survey, it has been noted that the total enrolments to different stages in the school education in the country is 20,08,20,513. Out of this, the girls enrolment at different stages of the schools is 90,99,55,337. The share of

girls' enrolment in the different stage of schools has been analyzed as 45.31 percent of the total enrolment.

The growth in the total enrolment in the school education has taken jump to the 32.31 percent from the last survey whereas girls' enrolment increases to 44.68 percent. The growth has also been seen in the rural and urban areas. In rural areas, this growth has been 33.84 percent and 67.29 percent.

4. Enrolment of Girls in School Education

The Enrolment of Girls in the school is the major problem in the country. Compared to boys, far fewer girls are enrolled in the schools. According to the National Sample Survey Organisation Data of 1997, only the states of Kerala and Mizoram have approached universal female literacy rate. According to a report by

U.S. Department of Commerce, the chief barrier to education of rural women in India is inadequate schooling facilities. According to the study, it has been found that the girls enrolment in rural areas compared to the urban is quite low.

5. Gross Enrolment Ratio (GER)

Gross Enrolment Ratio (GER) is defined as the percentage of the enrolment in the primary stage (Classes I-V) and Upper Primary Stage (VI-VIII) and /or Classes I-VIII to the estimated child population in the age groups 6 to below 11 years and 11 to below 14 and/or 6 to below 14 years respectively. Enrolment in these stages include under age and average children. Hence the percentage may be more than 100% in some cases (Table-I). The Gross Enrolment Ratio (GER) of all children has increased from the Sixth All India School Education Survey to Seventh All India School Education Survey.

Table-I : Gross Enrolment Ratio (GER)

Classes	1993		2002	
	Total	Girls	Total	Girls
GER (I-V)	81.85	73.1	93.92	90.93
GER(VI-VIII)	54.21	45.52	58.42	54.00

Source: Seventh All India School Education Survey - Statistics (2005), National Council of Education Research and Training, New Delhi.

6. Pupil Teacher Ratio (PTR)

The Pupil Teacher Ratio (PTR) has increased during the period of two surveys (Table 2). In the Seventh Survey, the Pupil

Teacher Ratio (PTR) has been recorded as 1:42 for primary stage. This growth has also been observed in rural areas where Pupil Teacher Ratio (PTR) increased from 1:41 to 1:44 in seventh survey (Table 2).

Table-2 : Pupil Teacher Ratio (PTR)

Classes	1993		2002	
	Total	Rural	Total	Rural
Primary Schools	40.00	40.94	42.01	43.75
Upper Primary Schools	36.07	35.84	34.23	35.15
Secondary Schools	30.21	29.33	30.28	31.03

Source: Seventh All India School Education Survey - Statistics (2005), National Council of Education Research and Training, New Delhi.

7. Government Schemes to reduce illiteracy

The Sarva Siksha Abhiyan was launched in 2001 to ensure that all children in the age group 6-14 years attend school and complete eight years of schooling by 2010. Important components of this scheme are the Education guarantee scheme and alternative and innovative education meant primarily for children where there is no formal school within a radius of one kilometer.

The centrally sponsored District Education Programme launched in 1994 has far opened more than 1,60,000 new schools, including almost 84,000 alternative schools. One of the most popular schemes adopted to attract children to schools is the mid-day meals programme launched in 1995.

Better late than never - this is what we can say about the recently approved Right to Education Bill. India got Independence on 15th August 1947 and today is 29th June, 2010. Means it took 63 years for our democratic politicians to introduce a

bill which deserves to be the first bill of Independence India. Anyhow, at least now a positive move has been made and it is highly commendable. The landmark law which makes education a fundamental right for all children between 6 and 14 has come into effect.

8. CONCLUSION

On the basis of above analysis on some key parameters of development of child education in India, a few major conclusions are briefly noted here.

- Less than half of India's Children between the age 6 and 14 go to school.
- A little over one third of all children who enroll in grade one reach grade eight.
- At least 35 million children aged 6-14 years do not attend school.
- 53% of girls in the age group of 5 to 9 years are illiterate.
- In India, only 53% of habitation has a primary school.

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- In India, only 53% of habitation has a primary school.
- In India, only 20% of habitation has a secondary school.
- On an average, an upper primary school is 3 km. away in 22% of areas under habitations.
- In nearly 60% of schools, there are less than two teachers to teach Classes I to V.
- On an average, there are less than three teachers per primary school. They have to manage classes from I to V every day.
- High cost of private education and need to work to support their families and little interest in studies are the reasons given by 3 in every four dropouts as the reason they leave.
- Dropout rate increases alarmingly in Class III to V. It is 50% for boys, 58% for girls.
- 1 to 40, primary school in India is conducted in open spaces to tents.
- In Andhra Pradesh (South India), 52 upper primary schools were operating without a building in 2002 while in 1993, there were none.
- In Maharashtra (West India), there were 10 schools operating without a building in 1993 this has climbed to 33 in 2002.
- More than 50 percent of girls fail to enroll in school; those that do are likely to drop out by the age of 12.

Source: Seventh All India School Education Survey, National Council of Education Research and Training, New Delhi.

Improvement in Child Education from Independence

*[Essay written by
Mr. T. K. Mishra, ASO, N.S.S.O, Cuttack
at the Essay Competition organized by
NSSO(FOD), Bhubneswar on the Statistics Day 2010]*

Children are looked upon by Indians as the gifts of God and they constitute about 36 percent of the Indian population. However, it is a national shame that a considerable number of them still suffer from malnutrition, poverty, disease, cruel exploitation through forced labour and worst of all illiteracy. Large sums of money are allocated and spent every year in India and at international seminars and conferences that focus on the plight of children, but many of them continue to lead a miserable life.

India is home to one in every three illiterate persons in the world. About 30 percent of the population of India are illiterate. According to Global Education Monitory Report of 2005, India ranks 106 out of the 127 countries surveyed.

Over the decades literacy rates have shown a considerable improvement. Total literacy rate in 1947 was 12 percent. It rose to 18.33 percent in 1951, 52.21 percent in 1991, 64.84 percent in 2001 and 67 percent in 2007.

The rate of literacy is the highest among the agricultural labourers. The main cause of illiteracy is poverty. Poor parents

cannot afford to send their children to schools. Also they think that more working hands will add to the family income. These children work in both the organised and unorganised sectors. There is a high incidence of school dropouts in the rural areas. Let us consider some statistical data regarding the child labour in India. Of the 30 million street children of the world, 11 million inhabit the streets of India. In India Government estimates that there are about 12 million child workers but unofficial sources quote a higher number of about 40 million. The share of workers aged 5-14 years in the total workforce of our country is 3.15 percent.

There is discrimination in the upbringing of a girl and a boy in Indian family system. The girls are denied access to medical care, education, childhood privileges and are kept subjugated. The reason attributed to such gender bias is the feeling of people that girls should be confined to the realms of one's house. In many lower middle class families parents feel it unreasonable to first spend for education of girl child and later give a lumpsum amount as dowry in marriage. In some rural areas it is believed that if

a girl is well educated then it becomes difficult to find a match for her.

Before 1976, education was the responsibility of the States. After the 46th Constitutional Amendment of 1976 the Central Government accepted a larger responsibility in this field. The Central Government monitors educational policies and programmes. The most notable of these are the National Policy on Education 1986 and the programme of Action 1986 as updated in 1992. These policies brought about uniformity in education. They laid special emphasis on education of girls, establishment of schools like Navodaya Vidyalaya in each district.

The Parliament passed the Constitution Amendment Act in 2002. This act has made elementary education a fundamental right for children in the age group of 6-14 year. The Sarva Shiksha Abhiyan was launched in 2001. It covers the entire country. It's main objectives are:

1. All children in school education guarantee centre, alternate school, back to school camp by 2003.
2. All children to complete 5 years of primary schooling by 2007.
3. All children to complete 8 years of elementary schooling by 2010.
4. Focus on elementary education of satisfactory quality with emphasis on education for life.
5. Bridge all gender and social category gap at Primary stage by 2007 and an elementary education level by 2010.

6. Universal retention by 2010.

Sarva Siksha Abhiyan realizes the importance of early childhood care and education and looks at the 0-14 years age as a continuum. The Government has planned to achieve the goal by (i) village and urban slum level education committee, (ii) Parent Teacher association, (iii) Tribal autonomous Council and other grass level structure in the management of elementary school. It seeks to open new schools in areas which do not have schooling facilities. It seeks to strengthen the existing school infrastructure and provide additional teachers. It also seeks to provide computer education in rural areas.

The national programme for education of girls at elementary level was launched in 2003. It aims at enhancing education of girls at elementary level under the Sarva Shiksha Abhiyan.

During 2006-07 the Sarva Siksha Abhiyan approved 41656 primary school buildings, 19699 upper primary school buildings which include additional classrooms, drinking water facilities etc. A sum of Rs. 10863.34 crore was released by Central Government to the States and Union Territories. Education Guarantee Scheme and Alternative and Innovative education (EGS & AIE) is an important component of Sarva Siksha Abhiyan to bring out-of-school children in the fold of elementary education. These children may not fit into the right formal system. For them back to school camp bridge courses strategies have been implemented.

In article 24 of the Indian Constitution it is provided that no child below the age of 14 years shall be employed to work in any factory or mine or at any hazardous work place. The ban in child labour has been extended to domestic and hospitality sectors. Government announced plans to expand the National Child Labour Project across the country during the 11th Five Year Plan. The scheme under which children withdrawn from work are sent to special schools is operating in 250 child labour endemic districts over 20 States. Currently there are 7328 special schools in which about 4.2 lakh children are educated. The special schools are kept for a maximum three years to prepare children for the regular education system with vocational training, nutrition, stipend and health care facilities.

The scheme of universal education in our country has miles to go. More than 30 percent of the villages in India do not have a primary school. There are many schools without chalks and blackboards. Even today, single teacher schools exist in many parts of Rajasthan, Bihar, Uttar Pradesh, Orissa and Assam.

The present education system of India was inherited from the British and is predominantly theoretical. The British evolved a system of learning aimed at producing 'Brown Saheb' and clerks. The examination oriented system judges the student on the basis of his performance in the examination. This system initiates them into learning their subjects by heart without applying their mind. This hampers

the physical and mental development of child. Parental and peer pressure to secure good percentage hinders the proper development of child.

The Standard of teaching is deteriorating day by day specially for primary level in Government schools. For this reason even a lower middle class family do not opt to admit his child in Government schools where private schools are available.

The shortcomings in the present educational system can be attributed to the fact that only a few changes have been made in the system since independence. The same regimen of three hour examination emphasis on rote learning and a rigid division between academic and vocational streams are continuing. Ideally the education system should have been overhauled after independence. But unlike Japan or China, Indian academics failed to carry through curriculum or examination reforms in any radical sense. Though some intellectuals helped in improving books in certain subjects the overarching colonial legacy of the classroom text and the final examination remained unaltered.

The obsolete educational system needs to be scrapped and replaced by a reformed one. There have been a few attempts to reform the education system. Many commissions have been constituted to look into the flaws of the existing system. The Mudaliar Commission, the Kothari Commission and the Radhakrishnan Commission have recommended thorough reforms in the

present pattern of education system. According to the recommendations, the judgement of a student's performance should be on the basis of periodical tests and his overall performance. They have also recommended imparting of practical training to the students which would enhance his skills and confidence.

The need of the hour is vocational and technical education right from the primary stage so that student can earn and learn simultaneously. We can hope that education would make the poor children aware of their plight and they would gradually be able to choose other means of learning their livelihood and not to be exploited for money. Satyabadi Vanavidyalaya established by Pandit Gopabandhu Das is a clear example of this type of education.

We are going to celebrate our 64th Independence Day shortly. We cannot afford to be complacent either about our achievements or our ability to meet the challenges. The work is changing rapidly and we must learn to keep pace with the rapid changes. We should pay special attention to education and skill development. India cannot keep pace

with the world unless every Indian is empowered by skills and capabilities that make every person a productive and creative citizen, capable of living a decent life. Each one of us must set our sights higher and aim to be the best in what we do. For this, our aim should be to make our schools, colleges, services and utilities to be best in world. A nation of more than one billion people cannot move forward unless we learn to work together for the common good and for the national interest.

Children are the asset of the nation. They are the citizens of tomorrow. If they are not educated properly from the beginning nothing can be expected from them in future as educated people have a national mind to think. Effective steps in this direction should be taken to improve it. Though Government has taken serious steps in this direction, it will take some time to give tangible results. The people as well as the non-governmental organisations should also collectively assist the Government in carrying out good education system. This will accelerate economic and social development of our country.

Improvement in Child Education Since Independence

[Essay written by Shri Kallol Barman, Investigator(Cont.), Siliguri at the Essay Competition organized by NSSO(FOD), Malda on the Statistics Day 2010]

*“Education is the most powerful weapon which you can use to change the world.”
– Nelson Mandela.*

Education enlightens the soul and helps an individual to understand the world. Indian society has always given high importance to the education. Education in India has a history stretching back to the ancient urban centers of learning at Taxila and Nalanda. Indian governments have given importance to education as a crucial development tool. Since Independence, the education policies of successive governments have been built on the substantial legacies of the Nehruvian period, targeting the core themes of socialism and secularism, with a focus on excellence in child education, and inclusiveness at all levels. Education for all and industrial development were seen as crucial tools to unite a country divided on the basis of wealth, caste and religion, and it formed the main pillar of success. Education in India falls under the control of both the Union Government and the states, with some responsibilities lying with the Union and the States having autonomy for others. The various articles of the Indian Constitution provide for education as a fundamental right. As it is mentioned in the constitution that the state shall provide free and compulsory

education for all children until they complete the age of 14 years (Article 45), it is referred to as Elementary Education in India.

To enable every individual to grow to his/her full potential and become a healthy, productive and responsible member of society, the child's basic needs at this stage must be met and failure to do so can lead to permanent and sometimes irreparable damage. Early childhood Development is an investment for life so for this reason child education is very important. India has made a huge progress in terms of increasing primary education attendance rate and expanding literacy to approximately two third of the population. India's improved education system is often cited as one of the main contributors to the economic rise of India. India Development Gateway Primary Education is a nationwide initiative that seeks to facilitate rural empowerment through provision of responsive information, products and services in local languages. The Indian government has also banned child labour in order to ensure that

the children do not enter unsafe working conditions and get proper child education. For this reason education has also been made free for children for six to 16 years of age or upto class X under the Right of Children to Free and Compulsory Education Act 2009. Significant improvement in staffing and enrollment of girls has also been made as a part of this. However, the statistical data shows that only 31 million of these children were attending schools in 2001-02, which means that two-third of the population remained out of school. Since 1947 the Indian government has tried to provide incentives for economically backward children's school attendance through various programs like midday meals, free books, and uniforms. This welfare thrust raised primary enrollment between 1951 and 1981. In 1986 the National Policy on Education decided to restructure education in tune with the social framework of each state, and with larger national goals. The new policy aimed at social change through revised texts, curricula, increased funding for schools, expansion in the numbers of schools, and policy improvements. Emphasis was placed on expanding girl's occupational centers and primary education. The National Literacy Mission also worked through female tutors in villages. Due to all this initiative of the Government and NGO's, literacy rate in India grew to 66% in 2007 from 12% at the end of British rule in 1947.

But it is unfortunate that despite all the initiatives to improve the child education, there are some loop holes

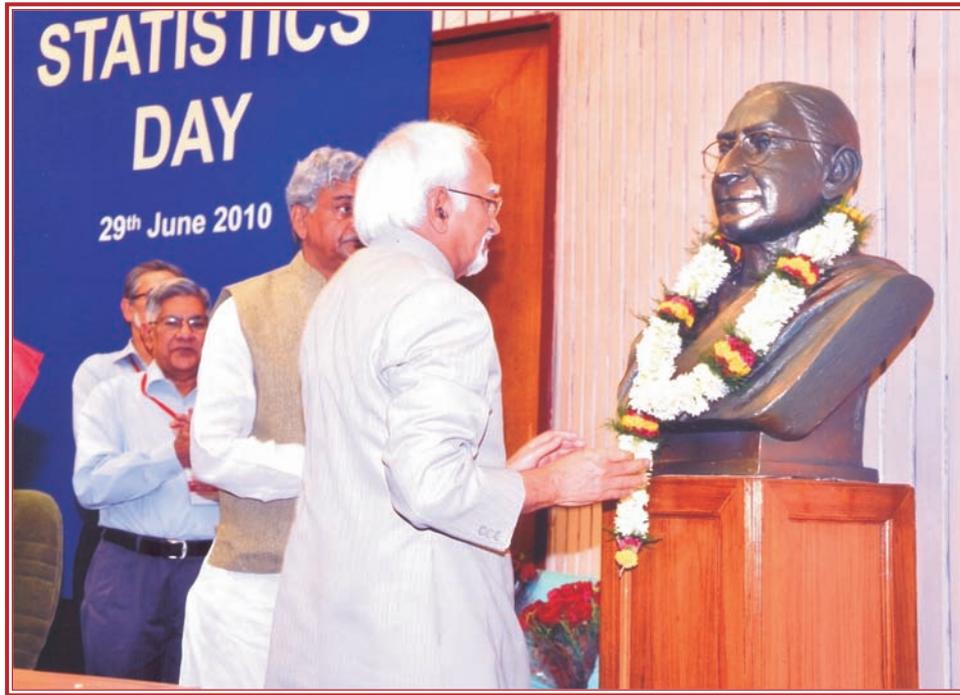
and these happen to be huge drawback and great challenge for India. What happens when a country of the size of India has over 3 million children living on the streets? Or has over 150 million children working as bonded labourers? Or one out of every six girl child does not live to see her 15th birthday? What happens when despite having a national policy for compulsory primary education, only 50% of children have access to education? The statement 'Children are the future of the nation' stops making sense, then! In fact, it sounds like an ominous prophecy. For how can we explain that even after 60 years of independence, half of India's children are illiterate? Despite identifying primary education as a key thrust area and possessing one of the largest networks of schools in the world? Clearly, we have a lot to answer for.

But as concerned citizens do something about it; something meaningful, something concrete, something urgently. No more do we have the luxury of blaming the system or postponing our actions. The time to take collective as well as individual responsibility to remedy the present situation is here. Right now! And also we need many more smiles to cater to the vast (increasing) number of children in our country's population. So being a responsible Indian citizen we must follow our Fundamental Duties and see that each and every child should be educated and India should become a developed nation and flow like a sun in the sky. We are proud to be an Indian and should be prouder to be an Indian forever.



Statistics Day 2010 Photo Gallery





Chief Guest Shri M. Hamid Ansari, Hon'ble Vice-President of India garlanding the statue of Prof. P. C. Mahalanobis at the main function organized at Vigyan Bhavan, New Delhi



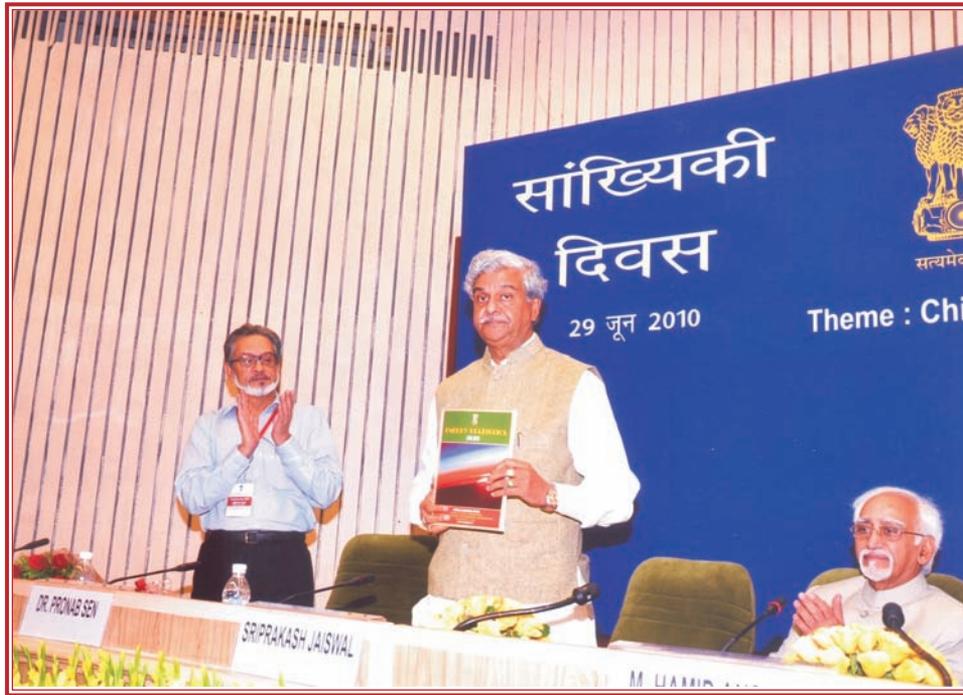
Shri Sriprakash Jaiswal, Hon'ble Minister of Statistics and Programme Implementation addressing the gathering at Main Function at Vigyan Bhavan, New Delhi



Chief Guest Shri M. Hamid Ansari, Hon'ble Vice-President of India conferring the National Award in Statistics in the memory of Prof. P V Sukhatme on Prof. Alope Dey



Shri M. Hamid Ansari, Hon'ble Vice-President of India releasing the publication "Mid-term Statistical Review of Millennium Development Goals (MDG) Report, 2009"



Shri Sriprakash Jaiswal, Hon'ble Minister of State (IC) for Statistics and Programme Implementation releasing the publication "Energy Statistics, 2010"



Chief Guest Shri M. Hamid Ansari, Hon'ble Vice-President of India delivering his inaugural address



Some of the winners of Essay Competition organized for Post Graduate Students of Indian Universities at the main function in Delhi



View of participants at the Main Function organized at Vigyan Bhavan, New Delhi



Hon'ble Minister P.H.E. etc Mr. S. Hiato, Government of Mizoram delivering his inaugural address at the function organized by DES, Mizoram



Hon'ble Minister for Public Health Mr. A. Namassivayam, Government of Puducherry delivering his inaugural address at the function organized by DES, Puducherry. Hon'ble Minister also inaugurated the Trng. Programme on Non-Profit Institutions II Phase on the Day



Participants at the Seminar organized by the Jharkhand Statistical Society at Ranchi on the eve of Statistics Day 2010



Hon'ble Minister, Finance, Planning, Economics and Statistics and Officers of DES, Madhya Pradesh at the function organized by DES, Madhya Pradesh



Release of publication at a function organized by DES, Andhra Pradesh on Statistics Day 2010



Prof. (Ms.) Tapati Chakraborty, Chairperson, Tripura Commission for Women receiving first copy of " 5th Economic Census Report, Tripura" at the function organized by DES, Tripura on the Statistics Day 2010



Celebration of Statistics Day 2010 at the Agra field office of NSSO



Welcoming Chief Guest at the Statistics Day 2010 function at the Aurangabad field office of NSSO



Statistics Day 2010 celebrations at the Cuddapah field office of NSSO



Statistics Day 2010 celebrations at the Dibrugarh field office of NSSO



Dr. A. K. Yogi, Addl. Director General, NSSO(FOD) and others at the function organized by Jaipur Regional Office of NSSO(FOD) on Statistics Day 2010