CHAPTER-I

INTRODUCTION
1.1 Introduction

The health status of the people is the wealth of a nation and nutrition is one of the most important pre-requisites for good health. Child malnutrition is a wide spread public health problem having international consequences because good nutrition is an essential determinant for their well-being. The nutrition of infants and young children are causing great concern among social scientists and planners these days, since child is the chief victim of interplay of nutritional, socio-economic and health factors that cause malnutrition. Health and nutrient investments may be particularly important forms of human capital investments for low-income populations, including those in developing countries (Mincer, 1974; Becker, 1975; Grossman, 1972; Edwards and Grossman, 1978; Behrman, 1988; Behrman and Deolalikar, 1987). The quality of future human resource is determined largely by the investment made for the development of child population. The growing interest on child health and nutrition has been justified on many ways. In most developing countries, child health from a medical point of view, both in absolute terms as well as in relation to the total population, is primarily more resource allocation to meet improved child health status. To the health economist, the areas of child health and nutrition are equally challenging. The three of the eight Millennium development goals (MDGs) emphasize on health which include reduction in child mortality, improved maternal health and combating HIV/AIDS, malaria and other diseases (Chhabra and Rokx, 2004).

Health is important because it is better living and not because it is an instrument for better living. Better health can have interpersonal benefits. There are many externalities of morbidity and malnutrition. In the instrumental sense ‘good health’ has an economic rationale. While good health leads to reduced medical costs of the government and households, ill health leads to loss of income for poor families subsisting on daily income, pushing them to hunger and malnutrition. Improving child health and nutrition is not only a moral imperative but also a rational long term investment. In reality, healthcare is one of the inputs that go in to the generation and maintenance of health. The ‘Health production function’ is symbolically represented as,
**GOOD HEALTH** = \( f \) (nutritious food, pollution free environment, safe drinking water, mental peace, opportunity for work and recreation, genetic endowment, and use of health services)

A healthy and nutritionally well-fed population is indispensable for economic growth and development. Health and nutritional status affect the capacity to learn, which in turn determines productivity and economic growth. Nutrition has major effects on health which enables one to lead a socially and economically active life. On the other hand, malnutrition adversely affects health, which is reflected in the incidence of sickness among children and their life expectancy. Malnutrition during childhood affect growth potential and risk morbidity and mortality in later years of life. Malnourished children are likely to grow into malnourished adults who face heightened risks of disease and death (Haq, 1984; Roberts et al, 1986; Karim et al, 1985; Das Gupta, 1990). An individual’s nutritional level is determined by a number of factors facing directly or indirectly such as, levels of employment, food availability, food consumption pattern, purchasing power of the people, distribution of income, intra-household food distribution, level of nutritional knowledge, literacy, availability of government schemes and awareness, etc. There is much evidence that nutrition and economic development have a two-way relationship. Improved economic development contributes to improved nutrition, but more importantly, improved nutrition drives stronger economic growth (Measham and Chatterjee, 1999).

Keeping the pace of socio-economic and nutritional transition in developing countries, India has also undergone tremendous changes for the last decade but undernutrition remains a public health challenge. India is one of the few countries in the world where poor nutritional status among preschool children is detrimental to their health outcome. According to WHO and NFHS-3; one in three children in India suffers from stunting and one in every two children from underweight. Nutritional status indicators like wasting, stunting, low birth weight, breast feed availability and vitamin A deficiency are also still high in India compared to the USA and China. The poor health of child prevents him to have required food intake, at the same time reduces the absorption capacity of his body, resulting in loss of nutrients faster than before, thereby setting stage for further decline in his health.
Lack of nutritious food, poor hygiene and sanitary practice in the household, poverty, illiteracy among mothers and lack of health care only aggravate the problem. Since in rural India these attributes are widespread, the process of recovering from poor nutritional status in latter life is more difficult for these children. Child nutrition is positively influenced by urbanization, female literacy, access to health care, safe water and sanitation (Osmani and Bhargava, 1998). Almost any ‘summary index’ of the child development indicators would place India at the bottom level of this list (NFHS-3, 2005-06, DLHS-RCH survey, 2002-04).

The convincing performance of Kerala in achieving demographic transition, in spite of low economic development, has received global attention. Kerala, one among the low income states in India, has made remarkable achievements in the field of health status of its population measured in terms of life expectancy at birth, mortality, health transition and utilisation of health services (Kannan et al, 1991; Gangadharan, 2008; Panikar and Soman, 1984; Navaneetham and Thankappan, 1999). Researchers and social scientists have revealed that even in the face of adverse economic conditions some international communities have registered impressive health gain. China, Cuba, Costa Rica and Sri Lanka are examples of such countries and Kerala also had quite a commendable record in these spheres for the past few decades. Kerala’s health care system is moving through a very turbulent period. In spite of having the best indicators on child development, certain disturbing trends have emerged in the state in recent years affecting this status. This includes low birth weight, stunting of growth, wasting, increasing trends of underweight, poor maternal nutritional status and high rate of anaemia among women and children, etc (NFHS-3, 2005-06).

1.2 Investment in Nutritional Development

Nutrition is a fundamental pillar of human life, health and development across the entire life span. The fundamental WHO goals of ‘Health for All’ means that people everywhere, throughout their lives, have the opportunity to reach and maintain the highest attainable level of health. This is impossible to attain in the presence of food insecurity and malnutrition problems. Good health is as essential to nutritional well-being, as good nutrition is crucial for maintaining healthy growth and development. Besides nutritional and vitamin deficiencies, rural and urban populace in the country also face lack of access to safe drinking water as well as sanitation facilities. Children
are the most valuable asset of a nation; their welfare and health is the edifice of sound and sustained economic development. An insufficient food intake and ignorance about nutrition coupled with low immunity ensure that the most vulnerable experience very fragile health.

In this context, the greatest changes can occur only when there is an improvement in children’s health and nutrition status. The health, nutrition, education and development opportunities given to a child at this stage to large extent determine his health and well being for the entire life time. However, the preschool children receive low priority in policies and programmes in India in spite of all indicators showing that greater investments are urgently needed (Planning Commission, 2007).

Investment in health can be considered under various heads i.e. the investment in the preventive and curative measures, and nutrition and population control. The preventive measures consist of routine immunization programmes like anti-cholera inoculation, anti-smallpox, vaccine, malaria eradication programme, tuberculosis campaigns and so on. Health and development are closely interlinked with poverty and hunger. As the National Human Development Report says in its most basic form - as a state of food deprivation and nutritional deficiency- poverty has a direct bearing on the morbidity and longevity of the people. Child malnutrition reflects a number of intermediary processes such as household access to food, access to health services and caring practices. A well-nourished child is more likely to stay in school and become educated, thereby improving lifetime earnings because of increased mental and physical capacity. In the long run, a well-nourished population can enhance the economic development of a country. It has been shown that the higher the levels of malnutrition or clinical indicators such as anaemia, the lower the overall productivity. Therefore, good nutrition in children is crucial for achieving the goal of universal primary education as well as gender equity in education (World Bank, 2006).

1.3 Significance of Child Health and Nutrition

Since children are the most valuable asset of a nation, their welfare and health is the edifice of sound and sustained economic development. The most neglected form of human deprivation is malnutrition, particularly among preschool children. Malnutrition is associated with more than half of all deaths of children world wide.
(Pelletier et al., 1995). Child development problems refer to problems of ill health, malnutrition, or inadequate psychosocial development, intellectual, social and emotional development. At least three factors are responsible for the rising interest in child development during the past few decades. Firstly, the increasing success of child survival programmes coupled with progress in economic development. Secondly, its failure results in reduced school performance, less productive labour force, and increased welfare and other social expenditures. Thirdly, International research findings give valuable inputs for giving more primacy to child development. Few countries also made major financial commitments to launch and expand child development programmes in the early 1980’s. Taking this footstep, India implemented its Integrated Child Development Services (ICDS) and Effective Early Child Development programmes to combine interventions in health, nutrition and early education. The cross-sectoral approach is advocated in this regard partly because this makes sense to parents and children. A child is born without barriers and to achieve its full potential in life an integrated approach in the field of health, nutrition or education is required.

In keeping with its International commitment to the World declaration on the survival, protection and development of children, Government of India’s Department of women and child development under the ministry of HRD formulated National plan of Action for children. Most of the recommendations of the World Summit Action plan are reflected in India’s National plan of Action to fulfill the needs, rights and aspirations of 300 million children in the country. The priority areas in the plan are health, nutrition, education, water, sanitation and environment. The different strategies are required for addressing the health, nutrition and development needs of preschool children depending on their age. The components of the services required by the three age groups among preschool children are summarized (Table 1.1).
### Table 1.1

**Essential Components of Early Child Care**

<table>
<thead>
<tr>
<th></th>
<th>0-6 months</th>
<th>6 months to 3 years (until joining preschool)</th>
<th>3 years to 6 years (until joining school)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Food</strong></td>
<td>Exclusive Breastfeeding – Counselling and Support for Breastfeeding; supplementary nutrition and maternity entitlements for lactating mother</td>
<td>Supplementary nutrition in the form of nutritious take home rations (THRs), nutrition counselling, nutrition and health education</td>
<td>Nutritious hot cooked meal at the centre</td>
</tr>
<tr>
<td><strong>Child Care and Development</strong></td>
<td>Crèches at worksites and maternity entitlements to ensure proximity of mother and child</td>
<td>Crèches; expanding existing crèche schemes and convert 10% Anganwadis into Anganwadi cum crèches</td>
<td>Preschool at the Anganwadi centre, Crèches/ day care facilities for those who might need it</td>
</tr>
<tr>
<td><strong>Health Care</strong></td>
<td>Immunization, growth monitoring, home based neo-natal care, prompt referral when required</td>
<td>Immunization, growth monitoring, prompt care for childhood illnesses, referral care for sick and malnourished children, de-worming, iron supplementation</td>
<td>Immunization, growth monitoring, prompt care for childhood illnesses, referral care for sick and malnourished children, de-worming, iron supplementation</td>
</tr>
</tbody>
</table>


The Eleventh plan marks a big leap forward in the area of child rights. The interventions and programmes recommended for the 11th plan period should include improving the reach and quality of existing programmes and formulating new schemes to address hitherto unaddressed areas and issues based on National Policy for Children, 1974. It also includes, National Charter for Children 2004 which makes special mention of the importance of protecting the rights and dignity of girl children; National common minimum programmes; and the National plan action for children 2005. This acceptance of the situation of the children can alone safeguard their rights and ensure better outcomes for children (Planning Commission, 2007).

The overall improvement in health is also reflected in the nutritional status of children. The economic justification for improving children’s nutrition is of three types. Firstly, children’s nutrition is a public good or an externality to the rest of society. i.e. the rest of the society derives a consumption benefit from eliminating malnutrition. Secondly, resource saving effect on better off children’s nutrition. Better nutrition is a cheaper intervention than other intervention in achieving low infant
mortality rates; reduction in the incidence of infectious diseases, increase in the minimum standard of literacy etc. There is a trade off between quality of water and sewerage against the supplementary calorie intake from the public program for undernourished children and also there is a period of between nutrition and the amount of school inputs in achieving a pre-determined level of literacy achievement. Thirdly, better infant nutrition can increase the future productivity of individual which will impact the later investment in other human capital particularly in education. Government is already spending considerable amounts in education, improved nutrition has an important addition effect over and above the effect that it can have independently of these future investments (Lipton, 1983; Kumar, 1986).

1.4 Global Views on Malnourished Children

Good nutrition is the cornerstone for survival, health and development for current and succeeding generations. Well-nourished children perform better in school, grow into healthy adults and in turn give their children a better start in life. Malnutrition is the reason behind more than half of all child deaths worldwide. Undernourished children have lowered resistance to infection, they are more likely to die from common childhood ailments like diarrhoeal diseases and respiratory infections, and for those who survive, frequent illness saps their nutritional status, locking them into a vicious cycle of recurring sickness and faltering growth. Their dilemma is largely invisible, three quarters of the children who die from causes related to malnutrition were only mildly or moderately undernourished, showing no outward sign of their vulnerability. Many Asian countries witness poverty, low levels of education, poor access to health services, low health status of women, improper care during pregnancy, high rates of low birth weight, high population densities and unfavorable child caring practices which contribute to childhood malnutrition.

The overall level of child malnutrition in India is still very high, both in absolute terms as well as relative to other countries. Even today, close to half of all Indian children are underweight, and about half suffer from anaemia. In particular, child malnutrition is much higher in South Asia (48.5 percent underweight in 1999) than in Sub-Saharan Africa (29.6 percent underweight in 2005), although the most undernourished countries in both regions fare much the same (Appendix table 1.2 and 1.3). Three South Asian countries India, Bangladesh and Pakistan alone account for
half of the world’s total underweight children. These three countries are home to just 29 percent of the developing world’s under-five population. In fact, India accounts for 51 million malnourished children which is more than that of Africa’s 47 million. South Asia is the only region which shows a gender bias with regard to child malnourishment, with girls more likely to be underweight than boys (UNICEF, 2008).

On an average, underweight prevalence among children in rural areas is almost double that of children in urban areas in the developing world and significant disparities exist between rich and poor children. Since 1990 the proportion of underweight children below five years has fallen only slightly which points to the fact that the world failed to address children’s nutrition issues. The Millennium development goal (MDG) in this regard means halving the proportion of children who are underweight for their age which is the most visible sign of undernutrition. Hunger and malnutrition among children leads and contribute to some of the world’s most intractable problems. It contributes significantly to a cycle of poverty. It hurts children in their ability to learn, ability to develop and ability to resist serious diseases (UNICEF, 2007).

South Asia has the dubious distinction of having the highest prevalence of malnutrition among children- higher than even Sub-Saharan Africa which in many ways is lesser developed than south Asia. Ramalingaswami et al refers to this as the ‘South Asian Enigma’. The ‘South Asian Enigma’ can be explained by three key differences which includes low birth weight, status of women, and hygiene and sanitation standards in south Asia. It appears that the incidence of child malnutrition is relatively higher in south Asia than Sub-Saharan Africa (Appendix table 1.3). It seems that in all the three indicators, South Asia fares far poorer than other two regions. For instance, severe underweight in south Asia is 25.7 percent, which is higher than the incidence of Sub-Saharan Africa which is 13.9 percent. Similarly, incidence of severe underweight in South Asia is presently at 17.5 percent which is more than double the incidence in Sub-Saharan Africa which is 7.4 percent. The important factors that would significantly influence the health and potentially increase the mortality of children are the extent of their malnutrition. South Asia addresses the paradox of high malnutrition with low mortality levels of children. As far as incidence of acute respiratory infection is concerned, the incidence is marginally higher in South Asia than Sub-Saharan Africa. However immunization aspect is concerned, Sub-Saharan
Africa gains a marginal advantage over South Asia and around one third of the children in south Asia have low birth weight which is around 13 percent for Sub-Saharan Africa (UNICEF, 2006).

1.5 Nutritional status of Indian Children

While nutrition and health are two sides of the same coin, nutrition is increasingly being recognized as an important indicator of development at national and international levels. India has progressed dramatically in various fields but its malnutrition level hasn’t shown any desired reduction. As a result the effect of malnutrition and poor health indicators like infant mortality rate, under-five mortality rate and maternal mortality rate in India are higher than some of the developing countries of the South East Asia. Under-five years children are nutritionally the most vulnerable and among them more than half of these children are unable to grow to their full physical and mental potential.

The survival of Indian child is a matter of concern because they are far behind in availing health care, nutrition and education facilities. Besides endemic diseases and government’s limited public health spending, malnutrition also contributes to infant, child and maternal mortality. The infant mortality rate has shown a marginal decline and is presently at 58 per thousand live births (SRS, 2004). This degrading scenario can be removed if efforts are focused on eradicating malnutrition. Almost 46 percent of all children under three are underweight and almost 80 percent of children in the age group of 6-35 months are anaemic, only 23 percent of babies are breastfed within one hour of birth, and just about 46 percent are exclusively breastfed for the first six months. Only 44 percent of all children in the 12-23 months age group have received all recommended vaccines and only half the pregnant women had at least three antenatal check-ups. As many as 57 out of 1000 children die before they reach the age of one year (Planning Commission, 2007). Article 47 of the Constitution of India states that, “the state shall regard raising the level of nutrition and standard of living of its people and improvement in public health among its primary duties”.

India which stands 66th out of 88 developing countries in the Global hunger index 2008 (GHI) reveals its lackluster performance at eradicating hunger. The GHI was developed by IFPRI (2006) and Wiseman et al (2006), as a means of capturing three interlinked dimensions of hunger- inadequate consumption, child malnutrition
and child mortality. Hunger is most directly manifested in inadequate food intake and lack of a proper diet especially in combination with low birth weight and high rates of infections which result in stunted and underweight children. According to GHI 2008, not a single state in India falls in the ‘low hunger’ or ‘moderate hunger’ categories. Instead, most states fall in the ‘alarming’ category with one state - Madhya Pradesh - falling in the ‘extremely alarming’ category. Four states – Punjab, Kerala, Andhra Pradesh and Assam-- fall in the ‘serious’ category (Appendix table 1.4). It reveals that for the majority of states child underweight is responsible for the largest variability between states. When compared to the majority of states, the contribution of low calorie consumption levels to the hunger index is higher for Kerala and Tamilnadu, and to a lesser extent in Maharashtra and Karnataka.

1.6 Nutrition and Health Profile of Kerala

Kerala is predominantly an agricultural state with 73 percent of the population living in rural areas. Kerala has achieved remarkable progress in human development, as reflected in the high levels of education and health of its population. Kerala’s demographic experience has attracted wide attention both at the national and international levels (Panikar and Soman, 1984; Panikar, 1999; Kannan et al, 1991; Zachariah and Irudaya Rajan, 1997). Kerala’s development experience also throws up a number of paradoxes. The lopsided development in Kerala is manifested in terms of ‘virtuous and vicious cycle of development’, low food intake with high nutritional status and low mortality with high levels of morbidity.

But the current health scenario is a combination of achievements and challenges. The major factors contributing to such a unique situation are a wide network of health infrastructure and manpower, policies of successive state governments and other social factors like women’s education, general health awareness and clean health habits of the people (Panikar and Soman, 1984; Soman, 1992; Kannan et al, 1991; Navaneetham and Thankappan, 1999; Oommen, 2008). Though observers from outside think that Kerala is best positioned to confront in health care development, the actual scenario is too pathetic. The important challenges of the present health scenario in Kerala are decreasing allocation to public sector, degenerating public health system, graying population, high rate of anaemia among children and pregnant women, unregulated private sector leading to inequality and increase in cost of health care, uncontrolled growth of the private sector, escalation of
health care cost, marginalization of poor, re-emerging epidemics of malaria, dengue fever, leptospirosis and now Chickungunia and growing incidence of non-communicable diseases, etc.

In spite of having the best indictors on child development, Kerala throws up certain disturbing trends in the arena of child nutrition. Utilization of public health care services like maternal and child health services is far better in Kerala compared to other states, though slight reduction in utilization of public health care services began to observe recently. By considering the sound human development base that existed in Kerala for the last few decades, the present child nutritional profile is not attractive compared to the rest of the country except for a slight decrease in severely malnourished children (NFHS-3, 2005-06; Thankappan, 2007; Gangadharan, 2008).

1.7 Review of Literature

The health and nutrition status of children is one of the crucial elements in the assessment of quality of life of the people. Access to healthy diet and optimum nutrition is key to good health. Adequate nutrition is an essential element of individual welfare which is accepted in the development literature. The link between adequate nutrition on the one hand, and health and survival on the other is well established. Following reviews focus its attention on the health consequences of malnutrition among children.

Irudaya Rajan and Navaneetham (1994), in their study assess the impact of mother’s education on utilization of maternal and child health services were studied with data sources from three districts of Kerala. Educated mothers use better antenatal and post-natal care, which results in better health of the mother and child. The study proves that illiterate mothers who received tetanus injections during pregnancy was only 41 percent, whereas this was 82 percent among mothers who received 10+ years of schooling.

Devi P.Y and Geervani P (1994) conducted a longitudinal study in four villages in the Medak district of Andhra Pradesh. 197 children up to 4 years old were selected from low-income households in the study area. Pre-tested, structured interviews were conducted to collect information on child-related, maternal, paternal, and socio-economic factors from the households. Two child-related factors, number of diarrheal episodes and calorie adequacy of diet, showed a highly significant effect on a child's
current as well as past nutrition status. The results of this study indicate a strong influence of socioeconomic status and parental care on the control of infectious diseases and food intake, which are the two major causes for malnutrition among children in developing countries.

Vinod K. Mishra et al (1999) examines their study indicates high levels of both chronic and acute malnutrition among Indian children. The lower prevalence of wasting than stunting or underweight indicates that chronic malnutrition is more prevalent in India than acute malnutrition. Although less severe in percentage terms, the prevalence of wasting in India is about 8 times and the prevalence of severe wasting is about 25 times the prevalence in the international reference population that provides the basis for comparison. A multivariate analysis of the effects of selected demographic and socioeconomic factors on child malnutrition indicates that the strongest predictors of child nutrition in India are child’s age, child’s birth order, mother’s education, and household standard of living.

Lawrence Haddad (1999), in the study on ‘Women’s status: levels, determinants, consequences for malnutrition, interventions, and policy’, this study uses a gendered conceptual framework of the determinants of child survival, growth and development to organize a review of the latest evidence on the strength of causal linkages between child nutrition outcomes and the relative status of women in seven Asian countries. Of the seven study countries, the status of women relative to men is lowest in Pakistan, India, and Bangladesh. It also reaffirms that equality in women’s status relative to men’s controlling for a host of socioeconomic factors, has a positive impact on child growth and discourages the intergenerational perpetuation of gender-based discrimination.

Mini.P.Jose et al (1999) in their study carried out in seven panchayaths of Ollukkara block of Thrissur district of Kerala. The children were categorized in to three groups based on maternal employment i.e., causal labourers, housewives and employment mothers from each group. The different anthropometric indices except mid-upper arm circumference were found to be independent of maternal employment. The dietary survey also pointed towards a poor intake in terms of quality and quantity. The intake of all food groups except flesh food was below the RDA. Thus, the study indicated that maternal employment had no significant positive or negative impact on the nutritional status of preschool children. This result had great social relevance as the
women are being accepted in their role of wage earners to improve the economic status of the family.

George K.A (2000) conducted a study on the pattern of anaemia and its relation to nutritional status and dietary habits among 3633 preschool children of 108 selected anganwadi centers in rural areas of Kerala State during the period 1996 to 1998. Weight and height of children were taken for assessing their nutritional status. Chi-square test was used to assess the relationship of anaemia to sex, dietary habits, and nutritional status. The prevalence of anaemia was 11.4 percent. The percentage of anaemic children among male and female children was 10.25 and 12.55 respectively and statistical analysis showed that female children were more susceptible to anaemia. Normal nutritional status was seen among 46.7 percent of the children. When 187 (11.78%) of the mild undernourished children were anaemic, the percentage anaemic among the moderate undernourished children was 57 (16.37%).

Chaudhury R.H (2000) analyses the health and nutritional status of children and women in South Asia have been characterized by 1) persistence of high infant and under five mortality; 2) a large proportion of malnourished children; 3) poor nutrition and unsatisfactory antenatal care of mothers; 4) excess female deaths; 5) persistence of high maternal mortality; 6) persistence of early marriage and early child bearing; 7) persistence of high fertility; 8) high and increasing adolescent fertility; 9) low use of contraception and high unmet demand for family planning; and 10) increasing risk of sexually transmitted diseases. Although various schemes addressing the issue were proposed by the governments of SAARC countries, inadequate allocation of funds for the health sector allows little room for support programs to improve health and nutrition status of women and children.

Christine M. Olson (2001) in the study ‘Nutrition and health outcomes associated with food insecurity and hunger’ explores how food insecurity and hunger relate to health and nutrition outcomes in food-rich countries such as the United States. It focuses on two subgroups of the population for women of childbearing age and school-age children. In a population-based sample of women of childbearing age, the least severe level of food insecurity (household food insecurity) was correlated with higher body mass index (BMI), controlling for other available and known influences on obesity including income level. In low income school-age children from two large urban areas of the U.S, risk of hunger and hunger were associated with compromised
psychosocial functioning, controlling for maternal education and estimated household income.

Susmita Bharati et al (2001) conducted a study ‘Determinants of nutritional status of preschool children in India’, it is to assess the spatial distribution of nutritional status of children of less than three years through Z-scores of weight-for-age, height-for-age and weight-for-height using data collected by the National Family Health Survey (NFHS-2, 1998-99), India. The nutritional status of preschool children was regressed on different socio-demographic factors after eliminating the effect of age. The data show that there are gender differences and spatial variations in the nutritional status of children in India. All the variables were found to affect significantly the nutritional status of children. The weight-for-age and height-for-age scores showed a dismal picture of the health condition of children in almost all states in India. The worst affected states are Bihar, Madhya Pradesh, Orissa and Uttar Pradesh and weight-for-height scores do not give a clear picture of state-wise variation.

Alok Bhargava (2001) conducted a study titled by ‘Nutrition, health and economic development: Some policy priorities’ it reveals that most developing countries face different resource and infrastructural constraints that limit their economic growth. Nutritional deficiencies, poor environmental conditions and inadequate educational infrastructure hamper children’s learning, which is critical for the future supply of skilled labour and hence for economic development. Improved sanitation and vaccines against infections will prevent loss of vital nutrients. Investments in educational infrastructure, including adult literacy programs, are beneficial for children’s cognitive development. Nutrition and health policies based on long-term considerations will lead to a well trained labour force enabling non-resource-rich developing countries to escape from poverty traps.

Lily Yaa Appoh and Sturla Krekling (2001) examined ‘Maternal nutritional knowledge and child nutritional status in the Volta Region of Ghana’, it examines the relationship between mother's nutritional knowledge, maternal education, and child nutritional status (weight-for-age) was the subject of investigation in this study. The data were collected in Ghana on 55 wellnourished and 55 malnourished mother–child pairs. A questionnaire designed to collect data on mother's knowledge and practices related to child care and nutrition was administered to the mothers. Data on mother's
demographic and socio-economic characteristics as well as child anthropometric data were also collected. A nutrition knowledge score was calculated based on mother's responses to the nutrition related items. Maternal formal education and marital status were also found to be associated with child nutritional status in bivariate analyses.

Nawal El-Sayed et al (2001) to assess the current status of malnutrition among 1,217 pre-school children aged 6-71 months in Alexandria, Egypt. A two-stage cluster-sampling technique was used for selecting the sample. Data on socio-demographic and environmental characteristics of the family, morbidity profiles, and breast-feeding patterns were collected from mothers of the children. Anthropometric measurements were performed, and the prevalence of malnutrition was assessed using three indicators, such as stunting, underweight, and wasting. Simple and multiple regression analyses were done for examining the factors associated with the occurrence of malnutrition using principal component factor analysis. Stunting, underweight, and wasting were observed in 15 percent, 7.3 percent, and 3.6 percent of the children respectively. High socioeconomic condition was associated with low prevalence of stunting and underweight. Interventions to improve socioeconomic and environmental situations are recommended to reduce the already low level of protein-energy malnutrition further.

Banerjee (2001) conducted a cross sectional study of school children between 6-17 years of age was carried out in an Air force station to determine their growth patterns as indicated by weight and height with a view to detect gender bias and compare the findings with those of affluent Indian children and National Centre for Health Statistics (NCHS), USA standards. A total of 763 boys and 605 girls were examined. There was no gender bias in growth. Though the children compared almost favourably, with affluent Indian children, particularly in respect to stature, they were lagging far behind the NCHS standard. Goal for achieving the NCHS standards in the long run has been discussed.

Oyekale A.S and Oyekale T.O (2002) conducted a study entitled by ‘Do mothers’ educational levels matter in child malnutrition and health outcomes in Gambia and Niger?’; this study analyzed the effect of mothers’ educational levels on child malnutrition. Data were analyzed with Foster-Greer-Thorbeck approach and probit regression. Results show stunting, wasting and underweight head counts are higher in Niger rural and urban areas, while stunting, wasting and underweight head
count, depth and severity are higher among children whose mothers had no secondary education for all the countries. The probit analysis reveals that attainment of secondary education by the mothers, urbanization, presence of pipe water, presence of mother and father at home, polio vaccination, ever breastfed and access to radio and television significantly reduce the probability of stunting, wasting and underweight, while infection with diarrhea, fever and age at first polio vaccine significantly increase it.

Peter Glick (2002) conducted a study entitled ‘Women’s employment and its relation to Children’s health and Schooling in developing Countries’ reviews the effects of women’s work on investments in children’s human capital—their nutrition and schooling—in developing countries. The study considers a range of policies (in particular, childcare) that can reduce the potential conflicts, or increase the complementarities, between women’s need or desire to work and their children’s well-being and also discussed are trends in developing economies and in the global economy that are affecting women’s work and its relation to children’s welfare, as well as affecting the ability of governments to intervene to ease the domestic constraints on women.

Girma Woldemariam and Timotiws Genebo (2002) examines the determinants of nutritional Status of Women and Children in Ethiopia, it reveals that Women in the reproductive age group and children are most vulnerable to malnutrition due to low dietary intakes, inequitable distribution of food within the household, improper food storage and preparation, dietary taboos, infectious diseases, and care. Particularly for women, the high nutritional costs of pregnancy and lactation also contribute significantly to their poor nutritional status. This study found evidence that socioeconomic and demographic variables have a significant influence on women and malnutrition in children. It was also found that household economic status, education of parents, number of prenatal care visits of the mother (as a proxy for access to health services), child’s age, birth order and preceding birth interval are important determinants of child stunting.

Elangovan and Shanmugan (2002) analyses the immunization and nutritional status among children aged under five in a major district in India, it reveals that Children in rural areas in India die due to infectious and communicable diseases. This study was carried out to know the immunization status, nutritional status and to assess the levels of the mother’s knowledge regarding immunization and nutritional diet. A
sample of 300 eligible mothers from Thuraiyaur Taluk of Trichy District in Tamilnadu was studied. For those mothers who were well aware of the immunization and nutritional programmes, the children’s height and weight were well correlated against the mothers who were not aware of these programmes, whose children’s height and weight did not show significant correlation. The result showed that 16 percent of the children were under malnutrition. The knowledge regarding immunization does not seem to influence the family size.

Mahtab S. Bamji (2003) examines ‘Early nutrition and health-Indian perspective’ reveals that India has the highest incidence of childhood malnutrition in the world. Almost 30 percent babies in India are born with low birth weight and are doomed to adverse consequences, including degenerative diseases in later life. Comparison of putative factors between regions (South Asia and Sub-Saharan Africa), countries within South Asia and select states within India, suggests neglect of women throughout their life as the main causative factor. A multi-disciplinary approach inclusive of food, nutrition, environmental and health security with local planning and social engineering to improve the health and nutrition status of women throughout their life is suggested.

Rajaram et al (2003) conducted a study entitled by ‘An analysis of childhood malnutrition in Kerala and Goa’ revealed that the confounding factors that influence the nutritional status of children in these states. The results showed that the relative prevalence of underweight and wasting was high in Kerala, but the prevalence of stunting was medium. The study recommends more area-specific policies for the development of nutritional intervention programmes.

Andrew Aitken (2003) point out that endemic deprivation and hunger is a complex social condition involving deep-rooted economic and social deficiencies. This study uses data from a survey of children in Uttar Pradesh, India to analyze their capability to be wellnourished. In assessing the capability to be wellnourished it is necessary to go beyond a narrow focus on food intake. The capability to be wellnourished depends on a person’s command over various commodities such as health care and the conversion of such commodities into nutrition-related capabilities. Three anthropometric indices, height-for-age, weight-for-age and weight-for-height are used to assess nutritional status. This study estimates OLS regressions on the anthropometric Z-scores as well as estimating ordered logit models. The nutritional
status of males and females is also estimated separately, and this suggests that there is a significant difference in the nature of male and female nutritional status functions.

Uma Sanghvi et al (2004) conducted a study ‘Assessing potential risk factors for child malnutrition in rural Kerala’, this study indicate that 42-57 percent of all child deaths in developing countries are due to the potentiating effects of malnutrition on infectious disease, of which over three-quarters can be attributed to mild-to-moderate malnutrition. Risk factors for underweight status in children under 3 years of age were assessed in Kerala. Mothers of 34 children weighing below -1 SD for their age and 59 children weighing more than 1 SD for their age, were interviewed for information about maternal health, child feeding patterns, and sibling gender and age data. Statistical analysis showed that current maternal weight, current maternal body mass index, infant birth weight and excessive maternal vomiting in pregnancy were significant risk factors for current child underweight status.

Radhakrishna and Ravi (2004) examines the ‘Malnutrition in India-trends and determinants’ analyses trends in malnutrition over the past two decades and shows that improvements in nutritional status have not kept pace with the reduction in poverty and the current level of malnutrition is unacceptably high. About half of the preschool children are malnourished and are exposed to the risk of functional impairments. Malnutrition levels are uneven across states. Some middle-income states such as Kerala and Tamilnadu have comparatively better nutritional achievements than higher income states like Maharashtra and Gujarath. Northeastern states are comparatively better performing states and some of them have even out-performed Kerala.

Shanti Ghosh and Dheeraj Shah (2004), in their study entitled by ‘Nutritional problems in urban slum children’ reveals that nutritional problems like protein energy malnutrition (PEM), anaemia and vitamin A deficiency continue to plague a large proportion of Indian children. The diets and nutritional status of urban slum children in India is far away from being satisfactory. The nutritional status of slum children is worst amongst all urban groups and is even poorer than the rural average. Most common causes of malnutrition include faulty infant feeding practices, impaired utilization of nutrients due to infections and parasites, inadequate food and health security, poor environmental conditions and lack of proper child care practices. With increasing urban migration in the years ahead, the problem of malnutrition in urban
slums will also acquire increasing dimension unless special efforts are initiated to mitigate the health and nutrition problems of the urban poor.

Geoff Lancaster et al (2004) conducted a study entitled ‘Gender bias in nutrient intake: Evidence from selected Indian states’, analyses nutrient intake in rural India and provides evidence on its determinants in selected Indian States. The estimation results show that there is considerable heterogeneity in the experience of the various Indian States and between the various age groups., while Kerala and Maharashtra record significant gender bias in the intra-household allocation of nutrients to adults in the age group 18-60 years, the bias occurs in the younger age group, 11-17 years, in case of Haryana. None of the selected States records significant gender bias in the allocation of nutrients to young infants (0-5 years). The study also provides evidence that suggests that the conventional expenditure based poverty rates underestimate poverty considerably in relation to those based on minimum levels of calorie intake recommended by the Indian Planning Commission and the results also show that the use of age and gender invariant minimum calorie levels overestimate poverty in relation to those that recognize their variation between individuals.

Jayanta Bhattacharya et al (2004) examine the relationship between nutritional status, poverty and food insecurity for household members of various ages. The most striking result is that, while poverty is predictive of poor nutrition among pre-school children, food insecurity does not provide any additional predictive power for this age group. Among school age children, neither poverty nor food insecurity is associated with nutritional outcomes. While among adults and the elderly, both food insecurity and poverty are predictive. These results suggest that researchers should be cautious about assuming connections between food insecurity and nutritional outcomes, particularly among children.

Michele Gragnolati et al (2005) examines ‘India’s Undernourished Children: A call for reform and action’ points out that the prevalence of child undernutrition in India is among the highest in the world, nearly double that of Sub-Saharan Africa, with dire consequences for morbidity, mortality, productivity and economic growth. This study explores the dimensions of child undernutrition in India, and examines the effectiveness of the Integrated Child Development Services (ICDS) program in addressing it. It finds that although levels of undernutrition in India declined modestly during the 1990s, the reductions lagged far behind that achieved by other countries with
similar economic growth rates. Nutritional inequalities across different states, socioeconomic and demographic groups are large - and, in general, are increasing and also find that the ICDS program appears to be well-designed and well-placed to address the multidimensional causes of malnutrition in India. Moreover, the poorest states and those with the highest levels of undernutrition still have the lowest levels of program funding and coverage. In addition, ICDS faces substantial operational challenges and suffers from a lack of high-level commitment.

Ranjan Ray (2005) examine ‘Analysis of changes in food consumption and their implications for food security and undernourishment: The Indian experience in the 1990s’, this study examines the changes in the nature and quantity of food consumption in India during the reforms decade of the 1990s, and analyses their implications for calorie intake and undernourishment. The results also point to a significant number of households, even in the top expenditure decile, suffering from undernourishment. This calls for a reassessment of the current strategy of directing the Public Distribution System (PDS) exclusively at households “below the poverty line” (BPL). The overall message is that, especially in a period of significant economic change, one needs to go beyond the standard expenditure based money metric measures to assess the changes in the living standards of households.

Veena Kumari and R.K.P Singh (2005) conducted a study investigates the food and nutrition security in various socio-economic groups of poor households of north Bihar. The level of food consumption and nutrient intake particularly protein and fats were comparatively high among the landless households and households with illiterate head of the households. However the energy intake was relatively low in households headed by literate members. There exists gender differential with respect to chronic energy deficiency among adult members and children of poor households. The children of poor households were also found to be prone to malnutrition where female children were more prone to malnutrition. The major policy measures required for improving food and nutrition security and nutritional status in terms of reduced chronic energy deficiency include improvement in the level of education, generate awareness about the importance of good health and not to make discrimination between the male and the female child, ensure employment to increase purchasing power, setting up of dairy enterprises etc. targeting socio-economically backward poor households warrants special attention for improving their nutritional status.
Kiresur et al (2005) conducted a study entitled by ‘Food and nutritional security in India: revisited’ reveals that India’s food security situation was precarious at the time of independence. The low priced food made available through PDS is also not affordable by the very poor. The effectiveness of the PDS system is low in rural areas, due to high wastage, leakage and transportation bottlenecks leading to poor availability. All these factors together have put the food and nutritional security of the country on a shaky ground. In order to improve the food and nutritional status of the country, this study focus on the following issues; (a) rapid economic growth with step rise in per capita income, backed by effective redistribution policies (b) a second green revolution in crops other than rice and wheat and in areas other than the already benefited ones (c) maintaining and further increasing the tempo in growth of horticulture, animal husbandry and fisheries sectors (d) technical education and development of human resources (e) sharply focused, people-led and asset building programmes in rural areas (f) targeting of PDS to provide an effective safety net only for identified poor households (g) integration of nutrition programmes with health and education (h) finally and most importantly, an effective population control programme.

Michelle Bellessa Frost et al (2005) examines ‘Maternal education and child nutritional status in Bolivia: finding the links’. This study models various pathways linking maternal education and child nutritional status in Bolivia, using a national sample of children. Pathways examined include socioeconomic status, health knowledge, modern attitudes towards health care, female autonomy, and reproductive behavior. Logistic regression results suggest that socioeconomic factors are the most important pathways linking maternal education and child nutritional status, and that modern attitude about health care also explain the impact of education. Health care knowledge accounts for less of the effect of maternal education on child nutritional status, with autonomy being the weakest pathway. Other pathways, such as reproductive behaviors, appear to influence nutritional status independent of maternal education. Overall, the pathways examined accounted for 60 percent of the effect of maternal education on child nutritional status.

Muhamad S. Akhtar et al (2005) examines ‘Nutritional status of pre-schooling Children of different socio-economic statuses as influenced by various diseases’. The study was carried out on 100 children (85 malnourished and 15 apparently healthy) of preschooling age (0-4 years). The test patients were divided into four age groups (up to
Jyothi Lakshmi et al (2005) conducted a study entitled by ‘Influence of nutrition and environment on morbidity profile of Indian preschool children’, the investigation was undertaken to study the morbidity profile of preschool children in relation to the child and maternal factors. Nutritional status was assessed using standard methodologies. Morbidity profile was associated with various child and maternal factors using appropriate statistical tests. Results revealed that acute respiratory infections, fever and gastro-intestinal disorders were the common infections prevalent. Prevalence, duration and incidence of infections were marginally lower among female children. Age among the child factors and literacy status and living conditions among the environmental factors were found to be critical factors that influenced the health status of preschool children.

Vinod Mishra and Ranjan Ray (2006) examines ‘Dietary pattern, calorie intake and undernourishment: The Vietnamese experience’ reveals that the rate of poverty reduction in Vietnam during the 1990s is second only to that of China. This study attempts to go beyond the picture portrayed by the poverty figures and studies the changes in the extent of undernourishment in Vietnam during this period. This study exploits the panel nature of the data to construct transition matrices that compare the nutritional status of the households between 1992-93 and 1997-98. A comparison with the poverty rate based transition matrices confirms what the aggregate figures suggested that there is considerable dissonance between the picture on food expenditure poverty and that on undernourishment. It also performs panel regressions to identify some of the key determinants of undernourishment with a view to providing the profile of a household that is at greatest risk from undernourishment.

Radhakrishana and Venkata Reddy (2006) examines, ‘Food security and nutrition-Vision 2020’ analyses the food security situation in India. India was successful in achieving self sufficiency by increasing its food production and also improved its capacity to cope with year-to-year fluctuations in food production; it
could not solve the problem of chronic household food insecurity. While India achieved success in combating transient food insecurity caused by droughts or floods, it fed-up failed to make much dent in chronic food insecurity as reflected in the low energy intake and high incidence of malnutrition. The overall improvement in nutritional status has also been very low. There is a chronic undernourishment in about half of the population, particularly among the vulnerable groups of children, women and elderly from the lower half of the expenditure class. As a result, severe types of programmes need to be targeted exclusively to the poor aimed at (1) eliminating transient food insecurity on account of inadequate access to food in periods of crises (2) reducing chronic food insecurity by enhancing their capabilities to participate in the growth process (3) reducing malnutrition among preschool children and women and improving basic services (safe drinking water, health care etc) to the poor.

Peter Svedberg (2006) examines ‘Declining child malnutrition: A reassessment’, monitoring of the progress towards the Millennium development goal (MDG) of halving the proportion of malnourished children before year 2015 relies on the estimated trends in child stunting and underweight from the WHO. Two methods are used for assessing the reliability of the WHO estimates of trends in child stunting. The re-estimated global and regional trends in child stunting with the alternative method and same data set are similar to those derived by the WHO. The data analysis shows that the child surveys from India are not inter-temporarily comparable. When controlling for differences in state coverage and age cohorts in the surveys, the prevalence of child stunting in India remained unchanged in the 1990s. The unaltered prevalence of stunting followed a minuscule decline in poverty. This unexpected reversal in child stunting was matched by a parallel change in (rural) poverty. The progress towards the MDG at the global level is on track owing to the large decline in China.

Sharma et al (2006) examines ‘Nutritional status of preschool children of Raj Gond- A Tribal population in Madhya Pradesh’, the cross sectional study of the nutritional status was made on 123 Raj Gond (tribal community of Central India) preschool children (62 boys and 61 girls; aged 1 to 5 years) in the Waratola village of Balaghat district of Madhya Pradesh. Anthropometric nutritional status was assessed by WHO criterion (SD classification) and also NCHS standard using weight for age, height for age, weight for height indices and MUAC. Comparatively, Raj Gond
preschool children were nutritionally more wasted than Gond and other nontribal preschool children of Madhya Pradesh.

Mary J. De Silva and Trudy Harpham (2006) examines ‘Maternal social capital and child nutritional status in four developing countries’ revealed that social capital has been shown to be positively associated with a range of health outcomes. While few associations were found between structural measures of social capital, support from individuals and cognitive social capital (trust, social harmony) displayed fairly consistent positive associations with child nutritional status across countries.

Israt Rayhan and M. Sekander Hayat Khan (2006) conducted a study ‘Factors causing malnutrition among under five children in Bangladesh’, it investigated differential impact of some demographic, socioeconomic, environmental and health related factors on nutritional status. The study used Bangladesh Demographic and Health Survey 1999-2000 (BDHS 1999-2000) data. The analyses revealed that 45 percent of the children under age five were suffering from chronic malnutrition, 10.5 percent were acutely malnourished and 48 percent had underweight problem. The main contributing factors for under five malnutrition were found to be previous birth interval, size at birth, mother’s body mass index at birth and parent’s education.

Aparna Pandey (2007) examines mother’s status in the family and nutritional status of their under five children’, this study aims to relate status of 450 mothers in the family with the nutritional status of their 530 under five children. For assessing nutritional status of children height and weight measurement were taken using standard techniques and method. Results showed that proportion of both underweight and stunting was more among children of illiterate mothers (55.2% and 55.8 %) while comparing with children of mothers having above primary education (41.0% and 42.9 %), employed mothers (77.4% and 80.6 %). while comparing with children of housewives (46.8% and 47.8 %) and mother who don’t have any control over daily family expenditure (54.7% and 50.3%). While comparing with children of mothers who had such control (25.6% and 30.0 %). More than 80 percent of families belonged to labour class and the differences persisted irrespective of economic status of families. Thus the study shows that educated mothers and those having control over family expenses take care of children more effectively reflected in better nutritional status of their children, while children of poor employed mothers suffer nutritionally.
K R G Nair (2007) his study ‘Malnourishment among children in India: a regional analysis’ analyses inter-state differentials in malnourishment among children in India on the basis of the National Family Health Survey, 1992-93, 1998-99 and 2005-06. It finds the Integrated Child Development Services suited to tackle these aspects and suggests to extend it and make it more oriented towards reducing child malnourishment.

Stephan Klasen (2007), his study examines the relationship between measures of income poverty, undernourishment, childhood undernutrition, and child mortality in developing countries. Income poverty and child mortality is highest in Sub Saharan Africa, but childhood undernutrition is by far the highest in South Asia, while the share of people with insufficient calories (undernourishment) is highest in the Caribbean. The study suggests that measurement issues related to the way undernourishment and childhood undernutrition are measured might play a significant role in affecting these inter-regional puzzles, and points to implications for research and policy.

Anish Kumar Mukhopadhyay (2007) examines the study reveals that food security has specific importance for the women in developing countries. This actually originates from the existence of biased allocation of intra household resources. From the available literature it has been gathered that the empowerment of women has a direct impact on reduction of hunger and the provision of basic needs in education, health, income etc. Children could be deemed the most food insecure part of the population because food shortage, poverty and deprivation are likely to have the harshest effects on them given their vulnerability. This study has been done to get an idea as to how nutritional status of children fares between in a cross-national perspective with an improvement in gender specific achievement indicators and also been tried to get an idea about the degree of association between food security, gender inequality and development in this connection.

Maj R Mukherjee et al (2007) conducted the cross sectional study was carried out to determine the nutritional status of school children in Army School, Pune. Associations of nutritional status with socio-economic status, education status of parents, mothers working status and family size were determined. Mothers’ educational level, wasting, socio economic status and family size were significantly associated with the nutritional status of the school children.
Harsha Aturupane et al (2008) examines ‘The determinants of child weight and height in Sri Lanka: A quantile regression approach, it reveals that reducing child malnutrition is a key goal of most developing countries. To combat child malnutrition with the right set of interventions, policymakers need to have a better understanding of its economic, social and policy determinants. Using quantile regressions, this study explores the effects of variables such as a child’s age, sex, birth order, household expenditure per capita, parental schooling, infrastructure on child weight and height at different points of the conditional distributions of weight and height using.

Caryn Bredenkamp (2008) conducted a study ‘Health reform, population policy and child nutritional status in china’, it examines the determinants of child nutritional status in seven provinces of China during the 1990s, focusing specifically on the role of two areas of public policy, namely health system reforms and the one child policy. The empirical relationship between income and nutritional status, and the extent to which that relationship is mediated by access to quality healthcare and being an only-child, is investigated using ordinary least squares, random effects, fixed effects, and instrumental variables models. By contrast, access to quality healthcare and income is not found to be significantly associated with improved nutritional status in the preferred model.

Angus Deaton and Jean Dreze (2008) examine the ‘Nutrition in India: facts and interpretations, In spite of India’s rapid economic growth, there have been a sustained decline in per capita calorie consumption during the last twenty-five years. While the decline has been largest among better-off households, it has taken place throughout the range of household per capita total expenditure. This study presents the basic facts about growth, poverty and nutrition in India, it points to a number of puzzles, and it sketches a preliminary story that is consistent with the evidence. The reduction in calorie consumption cannot be attributed to declining real incomes, nor to any increase in the relative price of food. Calorie intake has serious limitations as a nutritional intake; while calories are extremely important, there are too many sources of variation in calorie requirements for standard, invariant, calorie-norms to be usefully applied to large sections of the population. This study concludes with a plea for better, and more regular, monitoring of nutritional status in India.
Research Gap

The above review of various research studies on child nutritional status has given an important insight into the factors influencing child nutritional status of preschool children. The review has clearly shown that such factors as household economic status, education of mother, employment status of mother, employment status of father, source of water and availability of toilet facility, child morbidity, age of child, birth order, birth interval of child, maternal nutritional status and availability of medical facility have a significant influence on child nutritional status. However, little attention seems to have given to the importance of environment and hygiene among the households in the earlier studies. Very few studies emphasized on the influence of the type of family on child nutritional status. None of the studies done earlier has made an attempt to correlate household deprivation status and nutritional status of the preschool children. The present study aims to fulfill the gap that exists in the literature on nutritional status of preschool children.

1.7 Statement of Research Problem

Though Kerala known world over for its high human development achievements attained without much rural-urban disparities and caste-class differentiation, the State is now facing serious threats, especially in the field of nutritional status among rural preschool children. Various NFHS rounds and District level household survey (DLHS-3, Kerala) sweeps light on not so rosy picture of child nutritional status in Kerala compared to all India. All India child nutritional status reveals that 38 percent of stunted, 19 percent of wasted and 46 percent of underweight children compared to Kerala which accounts for 21 percent of stunted, 16 percent of wasted and 29 percent of underweight children. Besides, it also states that rural preschool children have more difficulty in coming out of ‘undernutrition trap’ when they enter into the stages of adolescent and adulthood in contrast to the urban children.

By considering the sound human development base that existed in Kerala for the last few decades, the present nutritional picture among preschool children is not attractive to the rest of the country except for a slight decrease in the severely malnourished children. Vaccination coverage is considerably higher in urban areas than in rural areas. Birth weight is another important indicator of a child’s vulnerability to the risk of childhood illness and chances of survival. The low birth
weight babies which comprise 16.1 percent are one of the health indicators in which Kerala lags behind other states. Hindu and Muslim children are equally undernourished, but Christian children are considerably better nourished. The overall performance of child health development in Kerala is deteriorating and moving through a very dangerous path. Several previous studies concluded prevalence of large disparities in district wise analysis of child nutritional status in Kerala. Though Kerala has been successfully implementing all nutrition oriented programmes and related programmes of housing, sanitation and potable drinking water, the state could not achieve the nutritional level of best performing states.

In this context, the present study focuses its attention on rural areas of Kasaragod district. Kasaragod district is a true representation of the rural picture of Kerala having 80.58 percent of population living in rural areas. Though Kerala is in the forefront of all health and nutritional indicators compared to other states in India, the rural areas of Kasaragod district suffers severe handicaps in the health and nutritional arena. Kasaragod is the only district in the state where two taluks have the lowest health infrastructure facilities. Preschool children constitute the most vulnerable segment of any community. Their nutritional status is a sensitive indicator of community health and nutrition. Rural preschool children will be a disadvantageous position to their urban counter parts regarding nutritional achievements. Nutritional indicators are measured in terms of stunting, wasting and underweight. DLHS-RCH survey (2002-04) reveals, 13.1 percent preschool children are under severe malnutrition category and 35.2 percent are moderate malnutrition category in Kasaragod district. The ICDS coverage is not effective in rural areas of Kasaragod. Similar studies are not available in rural areas of Kasaragod district; by considering all of these, the present study aims to measure socio-economic study on the nutritional status of preschool children of rural areas of Kasaragod district in Kerala.
1.8 Objectives of the study

1. to analyze and evaluate the trends and patterns of malnourishment among preschool children in Kerala.

2. to analyze the inter-relationship between household deprivation and family profile of the households of preschool children in the study area.

3. to examine the linkage of socio-economic status and extend of malnourishment among preschool children in rural areas of Kasaragod district in Kerala.

4. to suggest the cross-cutting strategies for combating malnutrition among preschool children in rural Kerala.

Hypothesis of the study

1. Environmental, maternal and individual factors are influencing nutritional status of preschool children in rural areas of Kasaragod district.

2. There is a strong correlation between household deprivation status and nutritional status of the preschool children in study area.

1.10 Methodology

The detailed methodology followed in the study is discussed in the following chapter.

1.11 Chapter scheme

The present study is divided into six chapters for the sake of clear and meaningful presentation. The first chapter covers introduction, child malnutrition views on Global, India and Kerala experience, review of literature, statement of research problem, objectives of the study, hypothesis, and limitations of the study. The second chapter presents a conceptual and theoretical framework, and also deals with the detailed methodology followed in the study. The third chapter analyzes the trends and patterns of nutritional status of preschool children in Kerala. The fourth chapter brings out the analysis of household deprivation and their socio-economic profile of the preschool children in rural areas of Kasaragod district. The fifth chapter carries out the linkage of socio-economic status and extends of malnourishment among rural areas of Kasaragod district in Kerala. The last chapter provides the summary and policy implications for the study.
1.12 Limitations of the study

The present study faces following limitations.

1. There are mainly two approaches to measure the incidence of malnutrition among vulnerable groups of the society. They are; Calorie intake approach and Anthropometric approach. The present study focuses only on Anthropometric approach and completely ignores the importance of Calorie intake approach.

2. The value assigned for the different variables used for the development of Household deprivation score (HDS) designed for the study to reflect the socio-economic status of household has been arbitrary fixed.
### Appendix

Table 1.2
Countries with the highest levels of Child Malnutrition: 1996-2005

<table>
<thead>
<tr>
<th>Country</th>
<th>Proportion (%) of children with low ‘Weight-for-age’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nepal</td>
<td>48.3</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>47.5</td>
</tr>
<tr>
<td>India</td>
<td>46.7</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>45.8</td>
</tr>
<tr>
<td>Yemen</td>
<td>45.6</td>
</tr>
<tr>
<td>Burundi</td>
<td>45.1</td>
</tr>
<tr>
<td>Madagascar</td>
<td>41.9</td>
</tr>
<tr>
<td>Sudan</td>
<td>40.7</td>
</tr>
<tr>
<td>Lao</td>
<td>40.4</td>
</tr>
<tr>
<td>Niger</td>
<td>40.1</td>
</tr>
<tr>
<td>Eritrea</td>
<td>39.6</td>
</tr>
<tr>
<td>Afghanistan</td>
<td>39.3</td>
</tr>
</tbody>
</table>

Source: World Development Indicators, UNICEF 2007
Table 1.3
Malnutrition, Mortality and Immunisation status of children
under five across regions (%)

<table>
<thead>
<tr>
<th>Regions</th>
<th>South Asia</th>
<th>Sub-Saharan Africa</th>
<th>East Asia and pacific</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthropometric indicators of children</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate and severe wasting</td>
<td>15.5</td>
<td>8.7</td>
<td>7.7</td>
</tr>
<tr>
<td>Severe stunting</td>
<td>25.7</td>
<td>13.9</td>
<td>12.6</td>
</tr>
<tr>
<td>Moderate and severe stunting</td>
<td>44.8</td>
<td>32.8</td>
<td>32.9</td>
</tr>
<tr>
<td>Severe underweight</td>
<td>17.5</td>
<td>7.4</td>
<td>5.5</td>
</tr>
<tr>
<td>Moderate and severe underweight</td>
<td>46.5</td>
<td>25.7</td>
<td>26.3</td>
</tr>
<tr>
<td>Mortality of children across regions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infant mortality</td>
<td>69.8</td>
<td>91.7</td>
<td>43.4</td>
</tr>
<tr>
<td>Under-five mortality</td>
<td>101.6</td>
<td>166.3</td>
<td>71.2</td>
</tr>
<tr>
<td>Immunization status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incidence of diarrhoea</td>
<td>14.9</td>
<td>22.3</td>
<td>9.3</td>
</tr>
<tr>
<td>Acute respiratory infection(ARI)</td>
<td>17.3</td>
<td>16.4</td>
<td>12.2</td>
</tr>
<tr>
<td>Immunization against measles</td>
<td>54.7</td>
<td>60.4</td>
<td>75.6</td>
</tr>
<tr>
<td>Immunization against DPT 3</td>
<td>54.3</td>
<td>57.1</td>
<td>70.3</td>
</tr>
<tr>
<td>Low birth weight</td>
<td>33.3</td>
<td>13.3</td>
<td>12.4</td>
</tr>
</tbody>
</table>

Source: WHO (1998), UNICEF (Various years), Klasen (2004) Demographic and Health Surveys (Various years)
Table 1.4  
Severity of Indian State Hunger Index (ISHI), by State

<table>
<thead>
<tr>
<th>State</th>
<th>ISHI</th>
<th>State</th>
<th>ISHI</th>
<th>10.0- 19.9 (Serious)</th>
<th>ISHI</th>
<th>State</th>
<th>ISHI</th>
<th>20.0- 29.9 (Alarming)</th>
<th>ISHI</th>
<th>State</th>
<th>ISHI</th>
<th>&gt;30.0 (Extremely alarming)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>None</td>
<td>Punjab</td>
<td>13.6</td>
<td>17.7</td>
<td>19.5</td>
<td>19.8</td>
<td>Haryana</td>
<td>20.0</td>
<td>20.9</td>
<td>21.0</td>
<td>22.2</td>
<td>22.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kerala</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Uttar Pradesh</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Andhra Pradesh</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Tamil Nadu</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Rajasthan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>West Bengal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>West Bengal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Karnataka</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Karnataka</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Orissa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Orissa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maharashtra</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maharashtra</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gujarat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Gujarat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chattisgarh</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Chattisgarh</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bihar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bihar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jharkhand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Jharkhand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

REFERENCES


Andrew Aitken (2003), An analysis of childhood undernutrition in Uttar Pradesh, India, MOTU, Economic and Public policy research trust, Wellington, New Zealand.

Angus Deaton and Jean Dreze (2008), Nutrition in India: facts and interpretations, Research Program in Development Studies, Center for Health and Wellbeing, Princeton University.


Aparna Pandey (2007), Mother’s status in the family and nutritional status of their under five children, Regional Leprosy Training and Research Institute, Lalpur, Raipur.


Das Gupta, P (1995), Nutritional status, the capacity for work and poverty traps, STICERD, London school of Economics, Mimeo.


Elangovan and Shanmugan (2002), Immunization and nutritional status among children aged under five in a major district in India, Department of Statistics, Annamalai University.


Geoff Lancaster, Pushkar Maitra and Ranjan Ray (2004), Gender bias in nutrient intake: Evidence from selected Indian states, Discussion paper no.5, University of Tasmania.


Michele Gragnolati, Meera Shekar, Monica Das Gupta, Caryn Bredenkamp and Yi-Kyoung Lee (2005), India’s undernourished Children-A call for an action, Health, nutrition and population (HNP) Discussion paper, World Bank.


Oyekale A.S and Oyekale T.O (2002), Do mothers’ educational levels matter in child Malnutrition and health outcomes in Gambia and Niger?, Department of Agricultural Economics, University of Ibadan, Nigeria.

Panicker.P.G.K (1999), Health transition in Kerala, Kerala research programme on local development, Centre for development studies, Thiruvanthapuram.


Peter Glick (2002), Women’s Employment and Its Relation to Children’s Health and Schooling in Developing Countries, Discussion paper no.12, Cornell University.


Ranjan Ray (2005), Analysis of changes in food consumption and their implications for food security and undernourishment: The Indian experience in the 1990s, Discussion paper, University of Tasmania.


Vinod Mishra and Ranjan Ray (2006), Dietary pattern, Calorie intake and Undernourishment: The Vietnamese experience, UTAS Discussion Paper No.02, University of Tasmania.


