Chapter-2

Review of Literature

The literature review is an integral part of the research and it makes most valuable contribution in each step of the research. It serves to enhance and consolidate the body of knowledge on the particular research problem and helps to integrate findings with the existing body of knowledge. Thus it plays an extremely important role in the research process.

The review of literature helps to understand the existing body of knowledge and also helps to frame, build and reframe the research methodology. It is an imperative to bridge the gaps between the existing available knowledge and what intends to be explored. Related literature has been supportive to design the roadmap for the research work, developing the methodology and research tool and also directs the plan for data analysis.

Most importantly, review of literature gives lead to explore, investigate the roots of the theories pertaining to malnutrition issue and thus develop the theoretical framework on the research problem. It also deals with the number of aspects which have direct and indirect linkages with the research problems like income, cultural and social aspects, services accessibility, knowledge’s and attitudes of the community towards the malnutrition issue etc. The next important aspect of literature survey is the construction of the conceptual framework which stems from theoretical framework.

Since the issue under investigation is “Factors of Malnutrition among children under 5 years- a study in Darbhanga district, Bihar”, the researcher has collected and reviewed related literature encompassing the theoretical understanding of the problem, prevalence of the issue from study locale to universal level its causes and implication in the lives of the children.

Related literature pertaining to the effectiveness of the services meant to address the issue of malnutrition amongst children has also been thoroughly examined. In this
purpose, the researcher has studied literature in the form of books, national and international journals, other research thesis, resources available on the website, action research paper of different development organizations and UN bodies, seminar papers etc.

In this regard, different Government data base like NFHS-I &II&III &IV, Annual health Survey, DLHS, Economic Survey report of the State Government of Bihar, Rapid Survey of Children 2014, research reports of the premier institutions like IIPS, National Nutrition Board, Ministry of Women and Child Development, Census of India, Data from ICDS Mission etc has been examined for the purpose of building body of knowledge and drawing the inferences. The researcher has also taken support from other Ph.D theses conducted on the same issue, article published in the international journals, unpublished articles, news paper article to build body of knowledge and strengthen the work.

In this context, review of literature gives a chronological idea about the conceptual development of Malnutrition issues in India, different facets of the problems, its causes and implications in the lives of the children, effectiveness of the services meant to address the issues at state level, national level and global level and expected to come up with some plausible recommendations and suggestions.

After appraisal of such literature, the researcher has drawn inferences from these relevant documents and acknowledged correctly the sources in this chapter.

This particular chapter has been explored under the following heads,

- Basic concept, definition of malnutrition
- Measuring malnutrition
- Prevalence of malnutrition – Western Context and Indian Context
- Prevalence and Progress of malnutrition in Bihar and Darbhanga
- Causes of Malnutrition and its multi-dimensional linkages with other social outcome
- Malnutrition through life-cycle
- Malnutrition and calorie consumptions
- Malnutrition and gender lens
- Caste, religion and Malnutrition
- Disease, infection and malnutrition cycle
Basic concept, definition of malnutrition:-

From common parlance malnutrition indicates “bad nutrition” and under nutrition. But, in the developing countries like India we generally work with under nutrition which is multi-faceted, complex and challenging health concern. We must understand that growth retarded children are the result of poor diet and survivor of infections. At this juncture, it is important to understand the concept of hunger and malnutrition which common people use interchangeably. We treat hunger as sensation in stomach when stomach is empty. Te Lintelo et al (2013) noted that “hunger means empty stomachs, an absence of calories. Under nutrition means absence of critical nutrients, including energy”.

The concept of Malnutrition transcends a long path originating from early 19th century with the concept of Distrofi Pluricarencial. It travels through the concept of Kwashiorkor, Protein deficiency, protein energy malnutrition, protein calorie malnutrition, energy nutrient malnutrition, micro nutrient malnutrition and by late 1990s the malnutrition. UNICEF in late 1990s used the term widely in international platform to denote the growth faltering of the children.

FAO (2013) defined malnutrition as “it refers more broadly to both under nutrition (problems of deficiencies) or overeating (Unbalanced diet) such as consumption of too much calories in relation to requirement with or without low intake of micronutrient rich food”. Undernourishment has been defined as “consumption of fewer than 1800 Kcal a day is defined as food deprivation or undernourishment”
(FAO, 2012). In 2013, FAO also came up with Minimum Energy Dietary Requirement (MDER) concept but member countries have used other indicators while defining malnutrition.

Robinson (1965) says “Nutrition is the science of foods, the nutrients and other substances in their action, interaction and balance in relationship to health and disease; the process by which the organism ingests, digests, absorbs, and utilizes nutrients and disposes of their end products”. Nutrition therefore is a psychological need for human being, physiological and biochemical necessity for human body and accountability for a government.

Nutritional deprivation and infectious diseases among preschoolers feature prominently among the major public health concerns in developing countries (UNICEF, 1998; WHO, 1999). Thus, malnutrition can be understood as a complex social issues encompassing range of facets including maternal health, care of the infants by the care givers and largely access to health care. Malnutrition is a critical health agenda for the developing countries and not merely indicates the intake of food rather encompass the optimum nutrition resources and robust immune systems.

Clinically, malnutrition is characterized by inadequate or excess intake of protein, energy, and micronutrients such as vitamins, and the frequent infections and disorders that result (WHO 2001). In other words, malnutrition is an abnormal physiological condition caused by inadequate, unbalanced or excessive consumption of macronutrients that provide dietary energy (carbohydrates, proteins, fat) and micronutrients (vitamins and minerals) that are essential for physical growth and development (FAO, 2014).

WFP (2000) defines malnutrition as “a state in which the physical function of an individual is impaired to the point where he or she can no longer maintain adequate bodily performance process such as growth, pregnancy, lactation, physical work and resisting and recovering from disease.” Children and women are the worst victims of malnutrition in developing countries.
UNICEF (2007) argued that “malnutrition in children is the consequence of much food insecurity, which stems from poor food quality and quantity, severe repeated infections or combinations of all three. These conditions are linked to the standard of living and whether basic needs can be met. A lack of knowledge on the nutritional needs of children and the benefits of breastfeeding contributes to childhood malnutrition”.

Poverty and hunger are closely linked having an inseparable relationship. From the rights based perspective, access to food with improved nutrition and proper health care is a basic human right and our constitution agrees to lift the nutritional level of its citizen. We understand that poverty in India is multi-dimensional and lack of access to health care, basic services, illiteracy and child malnutrition are the multi-facet of poverty.

Thus, malnutrition is strongly related to household income and poverty. Low income constrains the availability of adequate nutrient intake, which in turn causes malnutrition (Behrman and Deolalikar, 1988). Differences in young children’s stature in the world are more related to poverty than to genetics (Martorell 1989).

Schroeder.G.Dirk (2000) opined that “malnutrition is a common and widely used term to refer the suboptimal nutritional health. In international health, malnutrition generally refers to under nutrition (poor growth) rather than over nutrition” (eg- Obesity).

While defining the pediatric malnutrition, Mehta M Nilesh et al (2013) noted that “Pediatric malnutrition (under-nutrition) is an imbalance between nutrient requirements and intake that results in cumulative deficits of energy, protein, or micronutrients that may negatively affect growth, development, and other relevant outcomes”.

65
Sustainable Development Goal (2015) recorded that “good nutritional status leads to higher individual earnings and mental acuity, which in turn support macroeconomic and societal growth”. It also went on saying that many manifestations of malnutrition derive not just from a lack of sufficient and adequately nutritious and safe food, but from a host of interacting processes linking health, care, education, sanitation and hygiene, access to resources, women’s empowerment and more”.

UN Standing Committee on Nutrition’s 5th Report on the World Nutrition Situation (2004) argued that malnutrition at an early age leads to reduced physical and mental development during childhood. Stunting, for example, affects more than 147 million pre-school going children in developing countries. Malnutrition in children under five years of age increases the risk of disease and early death.

**Measuring Malnutrition:-**

Understanding the measurement of malnutrition is very critical to determine the nutrition related development outcomes.

Sachdev. H.P.S (1995) gave an idea of Anthropometric test and understanding of the grading techniques of malnutrition. We can see the evolution of malnutrition identification techniques and gradation. We understand that in developing countries, anthropometry, despite its inherent limitations, still remains the most practical tool for assessing the nutritional status of children, in the community. The only reliable source for the evaluation of nutritional status of under five children in India till 1991 was the periodic survey based on nutritional anthropometry conducted by the National Nutrition Monitoring Bureau (NNMB).

Measurement of nutritional outcome can be categorised as calorimetric or intake measures, anthropometric measure and clinical indicators. These two approaches to measure the incidence of malnutrition among vulnerable groups of the society are as follows (i) Calorie/nutrition intake approach discussed by Sukhatme, 1982; Gopalan, 1992; Seckler, 1982, and (ii) Anthropometric approach Strauss and Thomas, 1995; Kakawani, 1997; Svedberg, 2001; Pal, 1999; Osmani, 1992).
Calorie intake is quantified based on information on the actual food intake by the person in last 7 days to 30 days. This period is called reference period. Then, the calorie intake is compared with a defined calorie norm in order to assess the individual nutritional status. During setting the calorie norm for various population age, sex and economic activity is also considered.

The household calorie requirement could be obtained as the aggregate of calorie requirements of all the members of the household (NSSO; 2000, Svedberg; 2004). In Calorie intake approach, anybody consuming below the required norm is considered undernourished.

Nutritionists argue that the energy intake is a poor measure of nutritional status, which depends not only on the nutrient intake but also on non-nutrient food attributes, privately, and publicly provided inputs and health status (Martorell and Ho, 1984). They also suggest that the assessment of malnutrition should be based on outcome measures rather than input measures.

But calorimetric measure has some operational challenges. It does not account the absorption capacity of individual. This approach ignores the requirement of calorie of a person in terms of age and sex. It also does not take in to account the variation due to factors like body weight, nature of work, and status of current health of the person concerned, inter personal and intra-personal calorie requirement. The calorie intake requirement is varied due to change in climate. Calorie- adequate diet is not only a balanced diet containing the amount of protein, fat and other micro-nutrients.

To plug these gaps anthropometric outcomes were used and proved to be more reliable and friendly because it takes into consideration of height for age, weight for age, height and weight etc. In this regard, a related hypothesis of adaptability argues that even with low calorie intake, body can maintain its activity level because it has already adapted to low calorie intake. (Svedberg 2004, Sukhatme 1983, Mishra Rudra Narayan, 2013).

Anthropometric outcomes are dependable because the variable like weight, age and height are measurable by the health worker. Measures like stunting (low height for
age) shows cumulating impact of poor health for a longer period of time. Wasting (low weight for height) is time independent which measures overall stature irrespective of age. All these measures are considered to be ideal for measuring under nutrition among children (Osmani 1992, Smith and Haddad 2002).

Clinical investigation is applied to identify the deficiency of micronutrients in human body. It helps to identify anaemia, goiter, Vitamin-A deficiency and zinc deficiency. Lack of these micro nutrients lead to anaemia, blindness, scurvy, thyroid etc and also damage child immune capacity.

Arnold Fred, Parasuraman et al (2009) while analyzing the NFHS-III data of 2005-06 noted that prior to 2006, the nutritional status of preschool children was most often assessed in relation to an International Growth Reference Population established by the U.S. National Center for Health Statistics (NCHS) and endorsed by the World Health Organization (WHO).

In 2006, WHO came out with new child growth standards, which have been adopted by the Government of India. The new standards are based on properly fed children with no significant morbidity in Brazil, Ghana, India, Norway, Oman, and the United States. The new standards use the breastfed child as the normative model for growth and development.

**Prevalence of Malnutrition- Western and Indian Context :-**

Malnutrition is a global health agenda especially in developing countries. Though there is trend of reduction amongst the children but the result is not satisfactory. The trend of reduction in stunting is encouraging on one hand but on the other hand anemia amongst the women of reproductive age is increasing. Present global data elucidated in Global Nutrition report 2015 also scripts the alarming situation.

Haddad. Lawrence (2015) noted in Global Nutrition report 2015 that the scale of malnutrition is staggering. The report noted that 2 billion people experience micronutrient malnutrition. Malnutrition affects all countries and almost one in three people in the world.
IFPRI (2014) noted that “nearly half of all countries are dealing with more than one type of malnutrition at the same time”. The Global Nutrition report (2015) noted that, “161 million children under the age of 5 years are stunted and 51 million children are wasted”. Global Nutrition Report (2015) also assessed that, 794 million people in the world are calorie deficient. The percentage of wasted and stunted children under 5 years of age in Bangladesh, Pakistan, Congo, Nigeria and Ethiopia is alarming. Forty-five percent of all mortality of children under age 5 is linked to malnutrition (Black et al. 2013).

At a global level, it is clear that improvements in development outcomes such as female school enrollment, access to improved water and sanitation, and improved food supply are strong drivers of declines in stunting (Smith and Haddad 2015).

Various nutrition experts of the world have argued in the Global Nutrition Report (2015) that countries like Vietnam, Brazil, Bangladesh, Nepal and states like Maharashtra in India have done well in tackling malnutrition through combinations of progress in scaling up nutrition interventions and progress in development indicators.

**Indian Context:-**

UNICEF (2013) estimated that, India contains about 40 percent of the world’s stunted children under the age of 5 and nearly 50 percent of the wasted children. Global Nutrition report 2015 produced the figure that, all states in India showed significant declines in child stunting between 2006 and 2014. However, three states Bihar, Jharkhand, and Uttar Pradesh showed slowest declines.

Rapid Survey on Children (RSOC) was conducted in 2013–2014 by the Indian government and UNICEF. RSOC was conducted in 105,483 households and 5630 Anganwadi centres (AWC) to understand the nutritional status of children. The method was adopted through measurement of height and weight of over 90,000 children aged 0-4 and over 28,000 adolescent girls aged 10-18 have been collected across all states in India.
This report stated that, Bihar, Jharkhand and Uttar Pradesh are of particular concern, with high initial rates of stunting and subsequent declines in stunting that are lower than most other states. It has shown a positive increased rate of exclusive breastfeeding rate in the country. The rate has increased from 34% in 2006 to 62% in 2014. The below mentioned table expressed the alarming situation of India and specially amongst the SC and OBC community.

**Table 2.1 Caste wise malnutrition data in India 2013-14**

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Indicator</th>
<th>Magnitude in India</th>
<th>Prevalence amongst the SC community</th>
<th>Prevalence amongst the OBC Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stunted</td>
<td>38.7%</td>
<td>42.4%</td>
<td>38.9%</td>
</tr>
<tr>
<td>2</td>
<td>Severely Stunted</td>
<td>17.3%</td>
<td>19.3%</td>
<td>17.8%</td>
</tr>
<tr>
<td>3</td>
<td>Wasted</td>
<td>15.1%</td>
<td>15.2%</td>
<td>14.8%</td>
</tr>
<tr>
<td>4</td>
<td>Severely Wasted</td>
<td>4.6%</td>
<td>4.9%</td>
<td>4.4%</td>
</tr>
<tr>
<td>5</td>
<td>Underweight</td>
<td>29.4%</td>
<td>32.7%</td>
<td>29.3%</td>
</tr>
<tr>
<td>6</td>
<td>Severely underweight</td>
<td>9.4%</td>
<td>10.8%</td>
<td>9.3%</td>
</tr>
</tbody>
</table>

(Source :- Rapid Survey on Children Report 2013-14)

Das, Kappor and Nikitin (World Bank; 2010) noted that marginal, socially excluded populations are even more vulnerable. Disproportionately high child mortality rates occur amongst Adivasi and other Tribal populations that constitute well over 80 million of the 213 million undernourished in India.

**Prevalence & Progress of Malnutrition in Bihar & Darbhanga :-**

Bihar has experienced one of the fastest economic growths and improvement in social development indicators since last decades. There have been significant improvements
in some of the health indicators between NFHS-II (1997-98) and NFHS-III (2005-06) and also in the subsequent period as shown by more recent rounds of Sample Registration Survey (SRS) and Annual Health Survey (AHS).

The National Family Health Survey conducted in 2015-16 (NFHS-IV) is the latest study which encompassed the situation of population, health and nutritional status of children and women for India and each state. It also captures the district wise data on certain indicators, first time in the country. The data shows steady decline of maternal mortality and infant mortality but malnutrition including the maternal anaemia are not showing the satisfactory decline.

- **Infant Mortality:**
  
The state has achieved a stride in reducing the infant mortality rate (IMR). SRS Bulletin (2014) recorded IMR of Bihar as 42 against the 52 per 1000 live births in 2009. Primary focus on institutional child birth, addressing the immediate causes of neo-natal deaths and activating the role of frontline health workers in the state, has played pivotal role in this achievement. Focus on the ICDS intervention, its multi-sectoral approaches, work of the ASHA workers, infrastructural improvement has also played a facilitative role in this regard.

- **Maternal Mortality:**
  
The Maternal Mortality Ratio has declined from 312 in 2004-06 to 208 in 2011-13 in the state of Bihar but it is higher than the national average. Though there is increase in institutional deliveries and enhanced scope for timely intervention in maternal emergencies but absence of Basic and Comprehensive Emergency Obstetric Care (BEmOC) at public and private hospitals makes the situation critical. It is a barrier to further reduce mortality. (APIP of ICDS, Government of Bihar 2015-16).

The progress on war against malnutrition is not satisfactory though there are improvements in the state of Bihar. Since the research is concentrated in Darbhanga district of Bihar, therefore data of the state and particular district has been taken into consideration.

71
The below mentioned table compares two consecutive NFHS Data and indicates that there is decline of malnutrition and anemia among children (6 months to 59 months) in the state of Bihar but it is not satisfactory in comparison to its economic growth.

**Table No-2.2 Trends of malnutrition in Bihar (NFHS III and NFHS IV)**

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Indicator of children under 5 years</th>
<th>Magnitude in Bihar in NFHS-IV (2015-16)</th>
<th>Magnitude in Bihar in NFHS-III (2005-06)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stunted</td>
<td>48.3%</td>
<td>55.6%</td>
</tr>
<tr>
<td>3</td>
<td>Wasted</td>
<td>20.8%</td>
<td>27.1%</td>
</tr>
<tr>
<td>4</td>
<td>Severely Wasted</td>
<td>7%</td>
<td>8.3%</td>
</tr>
<tr>
<td>5</td>
<td>Underweight</td>
<td>43.9%</td>
<td>55.9%</td>
</tr>
<tr>
<td>6</td>
<td>Anemic (6 months to 59 months)</td>
<td>63.5%</td>
<td>78%</td>
</tr>
</tbody>
</table>

Along with this national survey, there is one malnutrition estimation study conducted by Medicines Sans Frontiers in July 2008 in 18 blocks of Darbhanga district. The study of 1379 households estimated nutrition status of 1528 children in 6 months to 59 months age category and revealed that 22.6% children are severely underweight (less than 3 SD) and 53.9% children are underweight (less than 2 SD). The vaccination coverage was extremely low as 15%.

**Causes of Malnutrition and its multi-dimensional linkages with other social outcomes:**

Malnutrition is a form of deprivation that stems out of other forms of deprivation and it also gives birth to other forms of deprivation in different stages of human life. It is a complex social issue and has long lasting effects in the lives of the children. Nutrition should be understood as an input as well as outcome of the Sustainable Development goal.
Under nutrition starts in utero and extends throughout the life and sometimes it expands to generations. A child who is born underweight indicates that he/she has intrauterine growth retardation and has potential chance of dying at infancy. Different manifestation of malnutrition develop, not only from lack of sufficient and adequate nutritious food but also from multiple reasons like poor health care, lack of education, lack of sanitation facility, limited access to resources, poor women’s health outcome indicators. The state’s welfare approach and political will to curb child malnutrition issues is also an important aspect. Thus, malnutrition is an invisible deadly issue which directly impacts the productivity of individual and is connected with the nation’s economic growth.

In India, malnutrition among children varies from region to region and from state to state. It is largely influenced due to geographical location, socio-economic factors, food habits, levels of literacy of parents, climate, and religious and cultural beliefs (Bhutia, 2014; Talapalliwar and Garg., 2014; Laxmaiah et al., 2013; Patel et al., 2012). Thus, with a population of over 1.21 billion (Census 2011), the nutritional problems in India are diverse and location specific.

Understanding the immediate and underlying causes of under nutrition in a given context is most important. UNICEF’s conceptual framework which was adopted in 1990 and further modified and explained in the report- ‘Improving Child Nutrition: The achievable Imperative for Global Progress published in 2013’. It identified three broad factors like health, care and food as underlying causes of malnutrition. In this literature review, this framework has been used to explore the underlying factors.

**Malnutrition through life cycle:-**

Malnutrition occurs during pregnancy and traverses through childhood and adolescence phases of life and has cumulative effect on future babies. Nutrition challenge continues throughout the lifecycle, but often starts in utero and extends, particularly for girls and women well into adolescent and adult life (ACC/SCN 2000).

Poor linear growth or stunting is the result of multiple circumstances, initiating from antenatal care of the mother, when life starts inside the womb, resulting in intra
uterine growth retardation (Victora et al., 2008). After birth, post natal care in terms of food quality and quantity, health care and hygiene, further slows down growth due to recurrent infections (Waterlow 1994).

The physical condition of women is closely associated with the quality of care they provide to their children, starting even before the child is born. During infancy and early childhood, frequent or prolonged infections and inadequate intakes of nutrients may add to the contributions of IUGR (intra uterine growth restrictions) to pre-school underweight and stunting (Lindsay H Allen and Stuart Gillespie; 2001).

The below mentioned picture describes how malnutrition transcends through the phases of human life. Malnutrition in the first 1000 days of a child’s life (from conception to first 2 years of life) has large irreversible impact. This phase of undernutrition causes impact in physical and cognitive development and increase the risk of premature death in adulthood.

![Inter-generational cycle of malnutrition](image)

Figure 2.1 Inter-generational cycle of malnutrition

(Administrative committee on Coordination and Sub-committee on Nutrition, UN 2000)
The intergenerational cycle of malnutrition produces the fact that, undernourished and anemic mother gives birth to low birth weight babies who are more susceptible to infections and diseases. They experience growth and development faltering which are irreversible in nature. Then the cycle of malnutrition perpetuates as the child grows up and face different forms of discrimination in the household as well as in community.

Gender discrimination, access to health care, discrimination in food intake and diet and other forms of deprivation compelled them in the vicious cycle of discrimination and deprivation. The practice of early marriage and early motherhood is also a critical player in this intergenerational cycle. Nutrition challenge continues through the life cycle particularly for girls and women. A woman with poor nutrition status (low BMI) is highly vulnerable for obstructed labour, post pregnancy complication, haemorrhage and thus chance for mortality. NFHS-III (2005-06) indicated 35.5% of women have low BMI in India and NFHS-IV (2015-16) reported 23% women have below normal BMI.

**Low Birth weight babies and malnutrition:-**

Malnutrition often starts before birth. Many terms have been used to describe small babies in nutrition science. Low birth weight babies are defined as weighing less than 2500 gm at birth. There are mainly two causes of LBW i.e being born with low weight or born prematurely. In developing countries LBW babies are not prematurely born instead of that they are born with low weight.

WHO (1995) came up with one term “IUGR-LBW” (Intra uterine Growth retardation and Low birth weight). This refers to babies who are born less than 37 weeks of gestation period and with less than 2500 gms. At the national level highest incidence of IUGR-LBW present in Bangladesh, India and Pakistan. (Lindsay H Allen and Stuart Gillespie; 2001).

Infants who are born with less than 2500 gms have four fold risk of death. It has influence on future development. De Onis M, Blossner M, Villar J (1998) opined that, “being born preterm as well as having LBW carries the strongest risk of mortality.

Ashworth. A (1998) commented that, “IUGR and LBW infants are more susceptible to hypoglycemia and to birth asphyxia. It is a factor of post natal death and suffered
from diarrhea and pneumonia for a few months after birth” (Lindsay H Allen and Stuart Gillespie; 2001). It is directly impacting the cognitive development and neuro development of the child.

Barker DJP & Leon D (1998) opined that risk of diseases such as hypertension, coronary heart disease, stroke and noninsulin dependent diabetes are associated with size, wasting and stunting at birth (Lindsay H Allen and Stuart Gillespie; 2001).

Study of mother-infant malnutrition relationship in Karachi Hospital, Pakistan established the fact that nutritional factors, parental care, perceived health status are important determinants of birth weight in a population where nutritional deficiencies are common and prenatal care is inadequate. Similar study In Zimbabwe, Brazil reported that, maternal MUAC is strongly related with low birth weight of babies. (Naveed Zafar Januja et al;2008).

**Adolescent Malnutrition and Early Pregnancy:-**

In life cycle approach the phase of adolescence plays an important role in the life. This age is characterized with rapid hormonal changes and thus physiological changes. Nutrient requirements are significantly increased in these years in the childhood. Peak growth velocity occurs normally about 12-18 months before menarche. Better nourished girls have higher pre-menarche growth velocities and reach menarche earlier than undernourished girls (Lindsay H Allen and Stuart Gillespie; 2001).

Kanade A.N (1994) noted that, in India both peak weight and height velocities were delayed by 18 months for children who were stunted at age of 10 years (Lindsay H Allen and Stuart Gillespie; 2001).

In India, child marriage is rampant because many cross cutting issues. Lack of access to education, age old practices, and exorbitant dowry practices and moreover fear of security multiplied the cause. The early marriage induced early pregnancy is one of the serious factors pertaining to women and child health issues in India.
Kushwaha KP, Rai AK, Rath AK, Singh YD, Sirohi R (1993) conducted a study in Gorakhpur, UP amongst 242 adolescent pregnancies in 10-18 years age group and found that 67% babies born were LBW and 33% babies were premature.

Research has shown that, adolescents who are still growing are likely to give birth to a smaller baby than mature women of same nutrition status (Lindsay H Allen and Stuart Gillespie; 2001). Adolescent pregnancies increase the risk of maternal and infant mortality, pre-term delivery.

Vir. S (1990) study reflected that children born to teenage mother were 40% more likely to die in their first year than those born to women in their 20’s. We must understand that, adolescents have special needs and face lot of challenges during their pregnancy. Cultural practices, behaviour of care givers in the family, biological factors and nutrition intake influenced the nutrition outcome of the babies. In this period, the adolescents are also engaged with different household level works but they are provided with poor food. In the very later stage of pregnancy, they disclosed their status of pregnancy in the family and thus the process ante-natal care is delayed. Lack of money, lack of decision making skills, lack of access to health care services and poor quality health services makes the situation more complex.

In India, there is close link of poverty and early child bearing practices in the rural societies. Delaying first pregnancy in the case of adolescent marital status has been reinforced by different studies. A study of 19 countries, in which there has been at least a half-year rise in the average age of women at marriage shows that there was no parallel increase in the time elapsed between marriage and first birth (Lindsay H Allen and Stuart Gillespie; 2001). Urgency to marry and have children early is closely linked with poor health status of girls.

**Family size and Malnutrition:**

Various studies have proved that, more the number of children, more the potential of vulnerability and discrimination in the family, based on gender and age. Family size, quality of food intake, household food intake, intra-household food distribution plays
a major role in determining the childhood malnutrition and it’s a factor of influence to improve the nutrition and infant survival.

In India, National Institute of Nutrition noted in various studies that, children having three or older brothers and sisters constitute the large number of child malnutrition. The number of children has direct bearing on nutritional wellbeing of mothers. Allan Berg in his noble work The Nutrition Factor (1973) noted that, during the Bihar famine relief program in 1966-67 severe cases of malnourished children were from the large size families. Nearly four times much serious hunger and nearly five times much protein-calorie malnutrition were found among the younger children of large families.

**Maternal education status and malnutrition:-**

In India, according to 2011 Census, only 65% percent of females above seven years are literate. In both urban and rural India, the elementary school participation rates of girls from Schedule Caste and Tribes are even lower (Census 2011).

In India, states with poor literacy level have higher prevalence of malnutrition in terms among children and presence of anemia among young adults. Maternal education changes the domain of health knowledge in the family and thus influences the health care seeking behavior. Their literacy also helped to stimulate the cognitive development of the children.

UNICEF (2007) noted that, malnutrition in children is the consequence of much food insecurity, which stems from poor food quality and quantity, severe repeated infections or combinations of all three. These conditions are linked to the standard of living and basic needs. A lack of knowledge on the nutritional needs of children and the benefits of breastfeeding contributes to childhood malnutrition.

Numbers of studies have corroborated the fact that in a society where mothers are the primary care givers of the child, maternal education plays a significant role. Community based cross- sectional study carried out in the tribal areas of India shows that undernutrition is a significant health problem and influenced by education of mothers, household wealth index and morbidities. This study also (Meshram et al.,
2012) proposed interventions like ensuring food security through PDS, education of mothers and personal hygiene.

Past studies have found strong correlation between maternal education and indicators of care, such as better sanitation process, better child feeding, timely immunization etc. Adnan M S Fakir & M W Rahman Khan referred to studies conducted by Unger (2013) and Cebu Study team (1991) and found that educated mothers are better at making decisions and recognizing the threat to the health of their children.


In the work of L. Jeyaseelan & M Lakshman (1997), we also get the linkages of education and risk of malnutrition. From their work we understand that children whose mothers were illiterate or had studied only upto middle schools had higher risk of malnutrition.

**Breast feeding practices, supplementary feeding and malnutrition:-**

Breast milk as natural medicine is acknowledged since years. But there are some underlying causes which deprives infants from exclusive breast feeding. In central region in India the colostrums is known as KHIRSHA (first thick, yellow milk). It contains antibodies and other protective proteins that protect children against infections and helps building the immune system. It has rich Vitamin A, Vitamin K and other nutrients.

Women faced taboos and mothers prefer not to provide colostrums after birth to their new born babies, be it in case on institutional child birth or non-institutional child birth. Nutritionist community has established convincing facts with epidemiological evidences that exclusive breast feeding till six months and continuing till age of two years, has immense health advantage for the child.
The recommended feeding of children is exclusive breastfeeding for the first 6 months of life and continued breastfeeding till the age of 2 years. A balanced diet rich in both macro and micro nutrients are essential for infant’s growth and development.

WHO organized a consultation with the help of UNICEF in 2000 in Geneva to assess challenges of infant and young feeding practices and formulation of strategies to ensure balanced feeding of the child. It recommends on infant and young child feeding. An appropriate breast feeding for the first 6 months of life, followed by adequate and nutritionally balanced solid food to complement breast milk has been also recommended. The strategy paper published in 2003 gives us glimpses of the comprehensive strategies adopted by WHO.

Colostrums feeding just after few hours of baby’s birth have been a crucial practice since ages. But due to different social beliefs and cultural practices, women are not encouraged to start the colostrums feeding in rural setting. World Health organization noted that 53% of pneumonia and 55% of diarrhoea deaths are due to poor feeding practices during the first six months of life. Initiation of breastfeeding within an hour of birth is known to reduce the infection specific to neonatal mortality.

Edmond K M et al(2006) through their epidemiological evidence recommended that initiation of breast feeding within the first day after child birth would be beneficial to prevent mortality.

Malhotra. Nisha’s (2012) work demonstrates that lack of nutritional information is major barrier towards following of sound nutritional practices. Media especially frequency of listening to the radio is positively related to sound feeding practices. In a developing country like India, mother plays the central role in child bearing. Mother’s employment was found to be a significant determinant. A working mother is more likely to follow good feeding practices. Working mother follows good feeding practices than a mother who doesn’t have formal employment.

Besides, socio-cultural norms, feeding practices also permeate undernutrition in India. Information barriers resulting from low awareness levels and lack of women’s
education affect breastfeeding and other child care practices leading to undernutrition among children.

WHO (1981) elucidated that, the value erosion absence of accurate information on optimum infant feeding practices, inadequate support to breast feeding mothers also impact the Infant Young child feeding practices in India. Understanding of the community on complementary feeding is very poor in terms of its timeliness, quality and quantity.

An increase in women joining work outside the home without appropriate support mechanism for breastfeeding is yet another major cause for the decreased rate of exclusive breast feeding in India. Breast milk bank and its non-availability also make the situation worse in rural setting especially for the mothers who are working as daily agricultural and non-agricultural workforce.

Even with optimum breastfeeding, children will be stunted if they are not provided with supplementary feeding practices after 6 months of age. Health workers, in this context, have a great role to play in terms of counseling support to mothers for initiation of breast feeding, exclusive breast feeding and supplementary feeding after six months of age, providing knowledge and support. It is interesting to note that, India is claiming to increase the facility based child birth (PHC, sub-center) on one hand but on the other hand, due to lack of adequate human resources the counseling process on feeding is not taking place. The ICDS in Bihar, has launched an innovative idea while celebrating the ANNAPRASHAN DIVAS in the facility and introducing the supplementary feeding of the child through a demonstration program and also providing a steel made bowl as an incentive.

In this regard, the overhauling and aggressive marketing strategy of the baby food companies successfully penetrated in the rural areas also. Working mothers feel it is safe alternative. This promotion technique of industry has undermined the women’s confidence in breast feeding practice (Coutsoudis A, Coovadia H M, Judith K M; The Lancet 2009 cited in Gupta Arun, Daddhich J P, Suri Shobha; 2011 – The World Bank).
Madhu et al., 2009 and Garg et al. 2010 opined that ignorance of colostrums feeding and very late weaning, affects the nutritional status of children below five years specially in rural areas of India.

Kuriyan and Kurpad, (2012) in their study opined that complementary feeding practices are significantly associated with poor socio-economic status, undesirable socio-cultural beliefs, maternal illiteracy, and ignorance. This poses a serious concern. It enhances threat to recurrent illness during neo-natal period. It also affects normal growth and development of children during first five years.

Malhotra. Nisha (2012) referred to study of Webbal. Sellen, DW, Ramakrishnan U et. al (2009) and inferred that income is a binding constraint to proper nutrition; however, income is one of the many determinants of poor feeding practices. Maternal characteristics like formal schooling, wealth and employment are also found to be important in mothers’ timely introduction of complementary food.

**Poverty and Malnutrition:-**

There is contention amongst the nutritionist community in the world on the matter of understanding poverty as underlying cause of malnutrition or immediate effect. There are innumerable numbers of literature which identifies poverty as the immediate cause of malnutrition in developing countries and in India also. Economic deprivation has been one of the correlates while scoring down the cause of malnutrition.

Maternal and child under nutrition remain pervasive and damaging conditions in low income and middle income countries. A framework developed by UNICEF recognizes the basic and underlying causes of under nutrition, including the environmental, economic and socio-political contextual factors with poverty having a central role ( Black E Robert, Lindsay Allen H et all; The Lancet 2008).

In India, nutritionist community argued that, poverty and female education has been playing a pivotal role on the malnutrition issue. Poverty reduction has significant impact on the alleviations of child malnutrition in India (Svedberg .Peter; 2008).
Various studies suggest that a two way relationship exists between chronic poverty and malnutrition among children and women. Development experiences suggest that income has linear relationship with nutrition in the family and breaks the vicious cycle. The regression analysis of NFHS-II data for rural malnutrition and poverty estimate indicates that prevalence of malnutrition exists even when the poverty is completely eradicated. The positive and significant result indicated that 10% reduction in poverty reduces malnutrition by 6% (Radhakrishna.R, Rao K Hanumantha, Ravi .C, Reddy Samvi B; 2004).

The association between poverty and nutrition are bidirectional, as poverty restricts access to food required to meet daily requirements or ensure dietary diversity and thus leads to malnutrition, while malnutrition can adversely affect mental and cognitive development thus perpetuating to poverty (Varadhrarajan et al., 2013).

Gragnolati et al (2006) and Shiv Kumar (2007) noted that economic growth alone is insufficient to bring about significant reductions in prevalence of malnutrition among children. Prevalence of low birth weight, sociological conditions like decision making capacity of women, hygiene and sanitation aspect also influence the malnutrition issue.

In Nair K.R.G’s (2007) work we got the reference of Ramlingaswami et al (1997) regarding the term “south Asian enigma” which is used to describe how economic growth has not ensured commensurate reduction of child malnutrition in Asia particularly India.

Salah E.O. Mahgoub, Maria Nnyepi, Theodore Bandeke (2006) conducted cross-sectional descriptive survey using a structured questionnaire and measurements of weight and height to determine the nutritional status of children aged 0 to 3 years in Botswana. The number of children under 3 years of age in the family, occupation of the parents, marital status, family income, parental education, maternal nutritional knowledge, residence location (urban or rural), gender, and breastfeeding practices have been major factors for children malnutrition cases. It has been observed in the study that the prevalence of underweight decreased significantly as family income increased and thus we can say that family economy plays a big role in malnutrition
issue. The higher the level of mother’s education, the lower the level of child underweight observed. Breastfeeding was found to reduce the occurrence of underweight among children. The study also recommended that combating malnutrition will only be possible through improving maternal income, maternal education and creation of employment or economic engagements that do not compromise important child care practices such as breastfeeding.

Thus, we can construe that poverty strongly influences the status of nutrition on one hand and on the other hand under nutrition perpetuates poverty.

**Agriculture, food production, food systems and malnutrition:**

In India, agricultural research and technology has radically improved the quantity of food production and food availability but the crisis of malnutrition continues. In 1960s, massive investment in terms of infrastructure development, increased research, promotion of technology and marketing policy sparked India’s Green revolution. It has also resulted in growth of irrigable land and most importantly reducing the poverty in rural India consecutively. Since economic reforms started in 1990s, the focus was on the manufacturing and services sectors in comparison to agriculture and allied sectors. Since then, agricultural sector has been sidelined as national priority.

The primary source of calories and nutrients is agriculture. It is a major source of income for worlds poor. Food consumption in terms of quantity, quality and diversity plays a major role in determining nutritional status and as such provides the most direct link between agriculture and nutrition. It is a globally recognized fact that, agricultural development results in the increase in food production and in turn influences the level of energy and nutrients. However, production oriented agricultural approach cannot solve the issue of malnutrition. Lack of entitlement and ability to command resources causes hunger which needs to be addressed. (Sen,1981).

Hoddinott. John (2012) argued that agricultural production and market affect health and nutrition in six ways.

Changes to income:- when changes in the agricultural production lead to increase household income, the income can be used to purchase goods that affect health status. Higher incomes can be used to purchase more food, higher quality food and more
diverse diet. Higher incomes will affect health indirectly through their impact on nutritional status.

Changes in crop, farm practices and markets:- at the farm level the introduction of new crops has the potential to improve both health and nutrition. Changes in food processing can also affect food consumption. This can be beneficial where food is fortified with micro-nutrients or harmful as in cases where processing introducing excessive level of Sodium.

Changes to crop variety and production methods:- Mechanization will reduce the physical demands of agricultural labour whereas crops that require greater manual weeding will increase it. They will also change exposure to pesticides and work related accidents.

Changes to the use of time:- where changes increased the returns the time spent in agriculture, household may increase the amount of labour they devote to agriculture productions. Household might reduce time spent on other income generating activities, make greater use of child labour or reduce the time spent on the production of health or nutrition.

Changes to saving :- agricultural productions result in higher incomes and thus individual choose to save these in the form of assets and thereby improving health.

Changes in intra-household resource allocation:- agricultural productions may change the allocation of resources at the household level. When women earn more, households spend money and allocate food differently and accumulate assets differently,( Fan. Shenggen & Pandiya-Lorch Rajul 2012).

Human health and nutrition are both foundation of a strong food system. The food system begins and ends with health and nutrition. Advances in health sciences, genomics and stem cell biology reinforces the principle that nutritious food is essential for the achievement of full potential and physical and cognitive development. Health is now considered as primary goal and quantifiable endpoint of food systems.
An integrated approach to developing agricultural and food systems and improving health, nutrition would yield more effective and efficient solutions in all areas (Per Pinstrup-Anderson 2012). The food systems contribute to increase or decrease the prevalence of chronic diseases in the community.

A study on Agriculture, food security and Nutrition through household level analysis in India’s most distressed region Vidarbha, Maharashtra by S. Parasaruman and T Rajarettnam (2011) indicated direct positive correlation between the agricultural production and malnutrition. They noted that, higher the crop production, lower the malnutrition. The study revealed that, farmers opted for cash crops instead of food crops and therefore agricultural pattern cannot be taken up as indicator to understand the malnutrition issue.

Dr. M.S Swaminathan advocated for nutri-millets production (jowar, Bajra, ragi) and its inclusion in PDS basket to address the issue of malnutrition along with wheat and rice. He also suggested that, to overcome micro-nutrient malnutrition, the farming system should include bio-fortified crops like high zinc, high iron rice, high iron bajra, Vit-A rich sweet potato and multiple nutrient rich moringa and amaranthus. He also went on saying that, ensuring protein availability at affordable cost through increased production and effectiveness of PDS need to be ensured to ameliorate the malnutrition. According to him, “2016 will be year of Pulses and there is urgent call to make pulse revolution to ensure protein in food to all. Protein hunger can also be overcome through increased consumption of egg, fish and animal products. Thus, an integrated approach of crop-livestock production for the small farmers will be viable to increase the economy in the consideration of both nutrition and income”.

Dewan. Manju (2008) observed in her study that in the present global economy market plays a key role. She went on indicating that traditional food meant for children, pregnant and lactating mothers are being forgotten and biscuits, bread, noodles, instant infant food of very high cost are getting more popular. The value of traditional food including coarse grains, sattu, khichdi, idli, dalia, matharies, ladoos etc need to be revived. These foods contribute fibre, antioxidant vitamins, Beta
carotene, vitamin C and Folic acid, which help in preventing diet related chronic disorders like diabetes, hypertension and cancer etc. (Bansal and Mehra 1999).

Access to food, food availability, food habits, taboos and malnutrition:-

Severe degree of malnutrition indicates that people have inadequate and inequal access to food in India. The FAO (Food and Agricultural Organization) in Rome Declaration on World Food Security in 1996, stated that food security exists “when all people at all times have physical and economic access to sufficient, safe and economic access to sufficient, safe and nutritive food to meet their dietary needs and food preferences for an active and healthy life”. Food security is also defined as availability, access, utilization and stability of food, which play major role in the slow progress in combating malnutrition in India (Varadhrajan et al., 2013).

Though India has made remarkable economic growth but has failed to address the issue of food availability and equal access. The issue of unemployment and poverty has been an intertwined and thus not benefitted from the economic growth and development. This results in under nutrition due to lack of purchasing power at household level, resulting in ill health with recurrent infections, finally leading to mortality.

Hurlock (2008) explained that, “malnutrition may be caused by poverty but it more often stems from faulty eating habits due to parental ignorance about which constitutes good nutrition, food likes and dislikes resulting from rebellion against the authoritarian “clean plate” training of childhood and snacking between meals”(Elizabeth. G Hurlock).

Apart from deficit in calorie, the quality and nutritive value of food consumption and its utilization in the body, plays a major role in determining the nutritional status of an individual. The lack of fortified food to compensate for the lack of natural food adds to the problem of micronutrient deficiency.

Food consumption, its nutritive value and at the end its utilization in the body are also largely affected by the knowledge and cooking practices, as well as access to safe
water and sanitation and hygiene. In India, knowledge of nutritive food and healthy cooking habits are very poor, especially among women (Vijayapushpam et al., 2003; Upadhyay et al., 2011; Abbi et al., 1988).

In rural India, there are widespread traditional beliefs concerning the nature of health and the causes of the different types of diseases. These beliefs are embedded in the core of India’s social system and vary from society to society. Food is divided into two categories - hot and cold. Milk, cheese, curd and most green vegetables and fruits are considered as cold food while meat, chilies and spices are treated as hot food.

In India, the dietary practices during pregnancy and lactation is often deeply rooted in the belief system of each society. Women are advised to eat cold rather than hot food during pregnancy. Certain fruits, milk and rice products are treated as food taboos. However, pregnant women in rural northern India mostly do not get any special or nutritious food and have to consume whatever is available for the other household members and that too after all the male members have consumed the lion share.

Jeffery et al. and Nichter, (1989) studies suggest that a pregnant woman’s diet is largely influenced by the age old belief system. They went on explaining that, women believe that overeating during pregnancy will result in large size baby and difficult labour, or a small, weak baby that has not had enough space to develop because of over consumption of food.

Bhardwaj et al, (1990) opined that, the idea of providing a special or substantial diet for pregnant women is not possible in rural areas. Rural households cannot afford to buy extra food with their marginal income. Consequently, pregnant women tend to suffer more from average calorie deficits.

**Malnutrition and Calorie consumptions:**
Malnutrition issue has been also analyzed through the lens of per capita calorie consumption. In rural India, household per capita calorie consumption was 2,240 calories in 1983, 2,233 in 1987-88, and had fallen to 2,047 calories per head in 2004-05, a decline of 8.6% from 1983; urban per capita calorie consumption was only 49 calories (2.4%) lower in 2004-05 than in 1983. Over the same period, rural (urban)
per capita protein consumption fell by 12.1% (4.6%). (Angus Deaton, Jean Drève (2009).

Angus Deaton, Jean Drève (2009) argued that malnutrition is a nation-wide phenomenon in India. It is largely prevalent Eastern and Central region in India. In the first place, there is a definite association of poverty and malnutrition at the aggregate level. States with higher levels of average poverty have higher extent of undernutrition among children. The article revealed that the level of economic development in the states also follows a similar pattern, the more developed states having a tendency to have lower levels of malnutrition. Socio-economic inequality in child malnutrition in India: searching for a SES gradient (an unpublished research document). This document is a critical analysis to probe the socio-economic reasons based on the available NFHS III data of India.

**Malnutrition and Gender lens:-**

In India, across the caste and class, preference for son over daughter has been existing since ages. It has been an established myth that, women become more powerful, highly placed in the family if she gives birth of sons.

After reviewing the study of Bose. Sunita (2011), we can build understanding on women’s status after giving birth to a daughter. We also get the view that birth of a son is an occasion for rejoicing while the birth of a daughter often goes unnoticed or even mourned.

We must accept the fact that, early childhood is a phase of fast growth. Therefore, discrimination against the girl child results in mortality and morbidity. Distribution of food at the household level also differs based on the gender of the child. Various studies have established this fact. It is a common practice that boys are given more valued foods such as milk and fats while girls are given more cereals.

Gillespie. Stuart & Suneetha Kadiyala (2012) noted that, women are more likely to have chronic energy deficiency, which has implications for intergenerational transmission of malnutrition. The low socio-economic status of women in India affects intra-household allocation of resources required for improving the nutrition
outcome. It has been noted for several decades that development, in agriculture such as increasing the commercialization should be gender sensitive.

Access to food is not equal for male and female children. There is enough evidence of gender discrimination, prevailing in many spheres of life which is translated into denial of access to adequate food (WFP-MSRF, 2001). Female children are often subjected to unequal access to food and breastfeeding. The median duration and frequency of breastfeeding was lower among female infants (NFHS-3; 2005-2006).

In Northern India, rates of malnutrition among the women and children is high and weaning practice is poor, as females are not fed well (Miller, 1981; Harriss, 1986), because of discriminated food allocation (Bidinger et al, 1986; Khan et al., 1989).

**Caste, Religion and Malnutrition:**

Persistent under-nutrition in economically poor communities and in certain social groups have become the center stage of deliberation and thinking process among the policy makers. There are marked disparities in different groups, caste and ethnic and religious groups. The NFHS-III data analysis revealed the fact that, malnutrition among Scheduled caste, Scheduled Tribes is higher than the national average (45.6%). Even child mortality is also higher in SC and OBC families in India. The logistic regression exercise based on NFHS-III data indicates that the likelihood of SC and ST children being malnourished is about 1.4 times than the children from other categories (Nidhi.S Sabharwal; 2011). For SC women, the chance of being malnourished is 1.1 times than other categories of women.

Several studies pointed out that, these communities are discriminated as they face difficulties accessing income generating activities, accessing Government schemes, education etc. The SC children face discrimination in having Mid Day meals in Government schools and ICDS centers which adversely affects their food intake and malnutrition status (Nidhi.S Sabharwal; 2011). Several studies have also highlighted the role of social factors such as caste and demographic factors like birth order, birth spacing and age at maternity in determining child's nutritional status. (Rajaram et al;2003, Som et al;2006;Maitra and Pal;2008).
In India, numerous studies indicate that malnutrition is a serious health concern for Indian women. Malnutrition threatens their survival. Social disparities in Indian context are also highlighted as one of the important correlates of undernutrition among children. The burden of undernutrition among children is disproportionately higher for marginalized communities like Scheduled Caste and Scheduled Tribe (Thorat; 2007, Rao et al; 2005 Mishra Rudra Narayan 2013).

Thus, malnutrition is not only a resultant vector of low income level, poor education and lack of public health services but also is correlate of discriminatory access to Government schemes like income opportunities, food security programs, ICDS and others. Therefore, in these marginalized communities (SC, ST and OBC) additional safeguards are required to combat the discrimination and deprivation induced malnutrition.

**Disease, infection and malnutrition cycle:**
Vulnerability to disease, exposure to infection and thus malnutrition is lethal cycle. The most immediate causes of malnutrition are infection and poor diet. The impact of infection on growth of individual children is very clear. Normal nutritional status results, when children have access to affordable, diverse, nutrient-rich food, appropriate maternal and child care, adequate health services and a healthy environment including safe water, sanitation and good hygienic practices. All these factors influence food intake and absorption and indirectly determine the susceptibility of a child to suffer from recurrent illness – thereby affecting the nutritional status of the child.

Infectious diseases are important determinants of stunting. Although there can be contributions to growth faltering from respiratory illness or malaria. The role of diarrhea seems to be particularly important perhaps because of its association with mal-absorption of nutrients as well as anorexia and catabolism (Black R E, Allen LH, Bhutta ZA Nis M et al ; The Lancet 2008).

Undernourished children are prone to suffer from recurrent diarrhoea, measles and pneumonia. A well established causal relation exists between malnutrition and
diarrhoea and acute respiratory infections. Various studies have shown that children with poor anthropometric status experience more episodes of diarrhoea and acute respiratory infections leading to death (Rice at al., 2000).

Infection such as sepsis, pneumonia, diarrhoea and tetanus are the major killer during the neonatal phase in India. Other includes prematurity and birth asphyxia. The remaining 45% death occurs in children between 1 month to 59 months, and the major causes are pneumonia and diarrhoea (Black et al., 2008).

Poor nutritional status leads to recurrent infection, finally leading to death among under five children. However, in late 1980s, the widely accepted notions that diarrhea and other infectious diseases were the primary causes of poor childhood growth began to be questioned.

Poor diet and infectious disease interact to cause growth failure in children, physiological damage especially to the immune system, and specific clinical conditions like anaemia evolves, leading to impaired development and death. Young children suffering from growth retardation have a much higher risk of mortality than others (Murray and Lopez, 1996).

Children who are survivor in initial two years become victims of stunting, and growth faltering continues though adolescent phases. On the other hand, stunted women give birth to low birth weight babies. It is also understood that low health care, poor outreach services and frequent infections lead to birth of LBW and thus cycle will be continued.

Access to clean water prevents the spread of water related diseases, like diarrhea and typhoid. These diseases occur due to use of contaminated water. Access to safe water may also reduce the impact of diseases that are transmitted by the fecal – oral route by leading to better hygiene through washing hands and cooking utensils and cleaning floors (Esrey and Habicht, 1986). Though Government of India has put emphasis on eradicating open defecation but still in rural India it is a major problem. This is resulting in high degree of food and water borne diseases.
During infancy and early childhood, frequent or prolonged infections and inadequate intake of nutrients—particularly energy, protein, vitamin A, Zinc and iron exacerbate the effects of fetal growth retardation (Martorell and Habicht, 1986).

**Access to health, care and malnutrition:**

Malnutrition is not merely a subject of food and diet. Rather it entails a large spectrum of health issues including access to health and care given to the child as well as mother during throughout the life.

UNICEF’s conceptual framework identifies three broad factors: food, health and care for defining nutrition (UNICEF, 2013). Understanding the immediate and underlying causes of malnutrition in a given context is most important. Nutrition challenge continues throughout the lifecycle, but often starts in utero and extends, particularly for girls and women well into adolescent and adult life (ACC/SCN 2000).

Poor linear growth or stunting is the result of multiple circumstances, initiating from antenatal care of the mother, when life starts inside the womb, resulting in intrauterine growth retardation (Victora et al., 2008). After birth, postnatal care in terms of food quality and quantity and health care and hygiene further slower down growth due to recurrent infections (Waterlow 1994).

Most growth faltering, resulting in stunting and wasting occurs within a relatively short period-before birth and continues until two years of age. Subsequently, growth faltering takes place, largely due to the combined stresses of low nutrient intake and infection associated with the weaning process (Waterlow, 1988; Briand et al., 1988).

The National Nutritional Monitoring Bureau (NNMB 2012) data suggest that in different States of India, women with better nutritional status (BMI>18.5) also have a history of better maternal and infant health status.

Apart from the above biological factor, age at marriage, frequent child bearing and unplanned motherhood and abortion results in poor nutritional status of Indian women and low weight babies (Prakash et al., 2011; Subramanian et al., 2009).
Parental Tobacco use and Child malnutrition:-
India, specially in rural setting a large section of community are consumers of different types of tobacco available in the market. It has serious implications on parental health as well as in the domestic economy and nutritional status of children. Tobacco use in poor families, especially by the father lead towards diversion of household income from food to tobacco and thus impacts poor food intake in the household. Finally it increases the risk of stunting amongst children.

Several studies in India, Bangladesh and Indonesia asserted the fact that parental smoking has an adverse impact on child growth. In 1981, the physician and epidemiologist Nicholas Cohen postulated in The Lancet that an important health risk of smoking was the exacerbation of malnutrition and decrease in survival among young children in poor households in Bangladesh (Best & Semba 2008).

NFHS –II data analysis presents that, children who come from households where at least one family member used tobacco were more likely to have severe stunting or severe underweight. Regular tobacco use was associated with poverty, low education in rural setting (Bonu S, Rani M, Jha P, Peters DH, Nguyen SN 2004 ,Best and Semba 2008).

A study from India showed that non-smoking mothers who were exposed to environmental tobacco smoke during pregnancy had a higher incidence of preterm birth, small-for-gestational-age babies, and infants with lower birth weight (Goel P, Radotra A, Singh I, Aggarwal A, Dua D; 2004).

Thus we can conclude that, malnutrition is a complex issue having irreversible effects on the lives of children. Social development factors are important determinants for persistent malnutrition amongst children. The above mentioned multiple evidences strengthen the argument of interconnectedness of multiple issues as causal factors for malnutrition.
Integrated and Multi-sectoral approaches to address the Malnutrition in the world and in India:-

The issue of malnutrition is a critical factor for nation’s growth. Undernutrition affects child survival, growth, development and thus impacts national growth and productivity. Malnourished children are more likely to suffer from delayed mental and intellectual development and poor school performances, inhibiting their natural potentials.

Since, last couple of decades we have observed, malnutrition has received considerable attention in national and international stage. We must understand that, addressing malnutrition is a process of multi pronged approach encompasses improving the nutrition knowledge and dietary intake patterns as influenced by a lack of access to and availability of good food choices. Evidence shows that malnutrition in childhood is associated with significant functional impairment in adult life.

In the cause analysis chapter, we have construed that malnutrition is a multi-factorial and complex issue with different layers of causes ranging from intra-household practices to international market economy and therefore it requires multi-sectoral approaches to address it. Though the internal nutritionist community argued that multi –sectoral approaches are most effective to tackle malnutrition issue but planning, coordination and execution is very difficult.

Why multi-sectoral approach?

UNICEF’s (1990) conceptual framework identified and illustrated the multi-sectoral nature of causes. It explained that, malnutrition is caused by immediate determinants like inadequate diet intake and exposure to disease at the family level. The underlying causes at the family level which influence poor diet intake and diseases are due to insufficient access to food, inadequate maternal and child health care access, poor water and sanitation. These all are influenced by quality and quantity of human, economic and organization resources. More fundamentally, these all function in economic, political, cultural and social structures. This following presentation is giving an idea about the causes of malnutrition.
In 2008, Ruel et al came up with an alternative representation which elucidated the immediate determinants of child malnutrition in great details. This framework identifies key factors influencing both over- and undernutrition at three levels: immediate (individual), underlying (household/community) and basic (societal). The framework clearly emphasized the diversity of actions needed across sectors, levels and sectors. The analysis calls for actions to provide market infrastructure, education, health care as well as to support economic growth. The framework also advocated actions intervention at national level and international level and obligated the Government, private sector and civil society organizations, household as role holders. The World Bank has called the short and long routes to nutritional improvement.
Addressing the immediate, underlying and basic causes of malnutrition, effective nutrition-specific interventions are required. These interventions need to be complemented with nutrition-sensitive actions like health and health system strengthening, strengthening agriculture and food system, improving education, water and sanitation facilities. There must be focus on gender, social protection, employment generation and labour policies and finally poverty alleviation.

The below figure provides a graphic representation of needed nutrition-specific interventions and nutrition-sensitive programmes and approaches to address childhood malnutrition (United Nations Global Nutrition Agenda Delivering On The Commitment To Eradicate Malnutrition In All Its Forms: The Role Of The Un System; 2015).

Figure 2.3 Nutrition specific interventions
These explanations accepted the fact that malnutrition is a complex social issue with strong interconnections with multiple factors in the immediate family, community, social, national and international level. Thus, nutrition is an issue of wide ranging plethora that needs to be addressed in a coordinated, collaborated manner. It calls for contextual, culture specific, inter-sectoral and integrated approaches.

**Historical evolution of multi-sectoral intervention:**

Actions against malnutrition have travelled different ages through different dimensions. Globally, the interventions moved simultaneously as the conceptual understanding changes its course and domain.

The health sector functioned as the traditional domain for malnutrition intervention till 1970s. The fundamental perspectives were basically the disease model assuming that infection or poor diet caused malnutrition. Therefore, interventions were mostly focused on the medical lines, addressing the diseases and improving the diet. These were mostly supply based and focused on individual centered approaches, addressing the proximate reasons of malnutrition.

But as time elapsed, nutritionist community and policy makers started to recognize that malnutrition was not a simple health issue, instead it is closely linked with many sectors including food and agriculture, education of parents, socio-economic and cultural factors, economy and large environment also. Later on they also included the behavioral and environmental causes also in the model.

Therefore, multi-sectoral understanding of the causes of malnutrition seemed to be the need for a multi-sectoral institutional response. This new thinking was often referred to as “multi-sectoral nutrition planning,” and it emphasized the applications of systems analysis to nutrition and the need to develop techniques and organizational models for multi-sectoral work (James Garrett, Lucy Bassett, and F. James Levinson; IFPRI- 2011).
In this period, around the globe, deliberations started to roll out in the form of workshops, conferences and roundtable to map the intervention point. The 1971 conference in MIT (Massachusetts Institute of Technology) on Nutrition, National development and Planning had been the historical hallmark in this sector. Different academic institutions also started different deliberations followed by this event. Allan Berg’s work in 1973 The Nutrition Factor in National Development put impetus on the concept of multi-sectoral interventions.

In the 1980s a new approach to understand and plan to address malnutrition emerged. This new approach encompassed the systemic multi-disciplinary planning and comprehensive program designing with holistic problem analysis framework. Specific tools for multi-sectoral nutrition planning (MNP) emerged. This analysis incorporated the assessment of market economy, education, environment, social relationship beyond the poor health and diet concept framework.

This approach made a paradigm shift from curative approach to preventive approach. The approach—argued to be comprehensive, systematic and cost effective—seemed to promise far greater national and international impact than previous isolated initiatives in such sectors as agriculture, health, and education (James Garrett, Lucy Bassett, and F. James Levinson; IFPRI- 2011).

This system perspective coincided with integrated rural development approach which used holistic framework to address the multiple constraints in nutrition field. Agriculture had been the large sector for livelihood and employment in this period. These integrated approaches also touched interventions on agriculture.

In the 1980s, awareness generation of nutrition outside the health sector emerged and started to promote linkages with inter-sectoral activities. But the nutrition cell in governance in the developing country was too small in terms of its financial allocation and human resources and nutrition intervention was not considered as national priority.

In the late 1980s an era of “nutrition isolationism” or stand alone nutrition program set in, derailing the multi-sectoral nutrition planning (MNP) concept. The pendulum
swung back to direct, nutrition-specific interventions, although with a greater emphasis on contextual understanding, as partly expressed through community ownership. In this phase, nutrition activists, who had felt marginalized and perhaps overstretched by the MNP process, chose to focus on things that the nutrition community could do alone and do well (James Garrett, Lucy Bassett, and F. James Levinson; IFPRI-2011). These interventions had been community based but they tended not to be community driven. Thus the sustainability issue came in picture. These community based nutrition programmes were narrowly focused, less holistic and multi-sectoral.

The poster children of nutrition became breastfeeding and micronutrients and these continued to be the primary focal points of nutrition programs internationally for the next 20 years (James Garrett, Lucy Bassett, and F. James Levinson; IFPRI-2011).

**Chronology of Nutrition intervention – a narrative:**

In the 1960s, world nutrition expert identified protein shortage as key nutrition problem. Subsequent research in 1970s focused on protein concentration and advocated the increase of protein in food and also recommended technological solutions. The UN set up Protein advisory group to improve the nutrition intervention. The perspectives in this period implied a change and further went into saying, malnutrition is not to be understood in the realm of food technology rather needs to be analyzed in the economic arena to access food by the poor. Thus, they focused on the poverty alleviation programs.

The historical convention in 1971 in MIT and publication of Allan Berg’s book in 1973 (The Nutrition Factor) strategically advocated the essential idea of malnutrition as core to economic growth of the country.

The world food conference held at Rome in 1974 deliberated on food crisis of the world. Changes in food export policy due to bad weather resulted in food shortage in many countries. It was then accepted that, access to food and food distribution was key obstacle instead of food supply.
In 1970s and 1980s Amartya Sen’s work on Famine and Entitlements received considerable importance amongst the global nutritionist community. Sen focused on the importance of entitlements in ensuring food adequacy. He made a persuasive case that income distribution and poverty alleviation must be explicitly considered in economic policy if adequate nutrition is to be ensured and contributed to the shift in focus from economic growth per se to growth with equity (Stuart Gillespie, Milla McLachlan, Roger Shrimpton; 2003). In this phase, other key development that took place was collection of household data through different surveys.

The 1975, world conference on Women in Development sponsored by USAID reinforced the importance of intra-household dynamics as important correlate of malnutrition. In 1980s, several publications advanced the hypothesis that nutritional stunting was not a health or a productivity problem, but rather a healthy adaptation to a food-poor environment-the small-but-healthy hypothesis (Stuart Gillespie, Milla McLachlan, Roger Shrimpton; 2003).

The 1980s, were the episode of historical structural adjustment program across the countries in the world. World Bank pitched in, lending loan to the developing countries in condition of fiscal austerity and measures to reduce public provisions of consumption goods. This was seen as damaging tool to the welfare of the poor.

The period of 1990s included the historical International conference on Nutrition (ICN) which took place in Rome and adopted the agenda of eliminating hunger and all forms of malnutrition within a decade. The awarding of two Nobel prizes like Robert Fogel an economist who suggested the malnutrition was blinding constraint on economic development in Europe since 16th century and Amrtya Sen who emphasized poverty alleviation and measured success in national positive outcome. These two works were also focused on nutrition and hunger.

It is important to mention the UN systems’ role as an important player amongst the range of stakeholders taking responsibility and accountability for the nutrition goals. The United Nations sub-committee on Nutrition was created in 1977 to support a coordinated approach to nutrition by the UN system. It aims to provide coherent technical support and exchange platform for knowledge and nutrition related matters

In 2013, these five principal organizations agreed to come together in a UN system Network for Scaling Up Nutrition (SUN) to provide support at country level and harmonize global policies in context to country’s needs. The interagency work on nutrition followed the following key principles,

- Nutrition is a pervasive development issue requiring action across the globe
- Multiple forms of malnutrition are interrelated and co-occur in large number of countries
- Nutrition is a multi-sectoral issue
- Food system change is fundamental to addressing nutrition challenges
- Health system strengthening is essential to achieve nutrition goals
- Good nutrition also requires, and is necessary for functioning education systems, social protection, and efforts to eradicate poverty and reduce inequality
- The UN is steered by Human Rights-Based approach to nutrition
- UN nutrition activities are informed by commitment to gender rights
- The UN acts in support of country priorities. Local adaptation of strategies is needed, according to varying country nutrition situations
- The UN System is one role player among several, playing unique convening, networking and technical support roles

(United Nations Global Nutrition Agenda Delivering On The Commitment To Eradicate Malnutrition In All Its Forms: The Role Of the Un System; 2015)

The below mentioned table elucidates the international events, their commitments and resolutions in chronological manner to combat the issue of malnutrition and hunger,

**Table 2.3 Chronological description of malnutrition programme**

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Declaration</th>
<th>Resolutions and Commitments</th>
</tr>
</thead>
</table>

102
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Declaration/Plan</th>
<th>Goal/Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>International Conference on Nutrition (ICN), Rome, Italy</td>
<td>World Declaration and Plan of Action</td>
<td>Eliminate Hunger and all forms of malnutrition within the decade.</td>
</tr>
<tr>
<td>1996</td>
<td>World Food Summit, Rome, Italy</td>
<td>Rome Declaration and Plan of Action on World Food Security</td>
<td>Pledge to halve the number of undernourished people by 2015.</td>
</tr>
<tr>
<td>2002</td>
<td>World Food Summit</td>
<td>Declaration of the World Food Summit: Five Years On.</td>
<td>Call to recommit to the 1996 pledge, to cut the number of undernourished people to about 400 million by 2015. Call for greater emphasis on agriculture and rural development in country development policies and international assistance.</td>
</tr>
<tr>
<td>2008</td>
<td>High-level Conference on World Food Security: the Challenges of Climate Change and Bio-energy, Rome</td>
<td>Declaration of the High-level Conference on World Food Security: the Challenges of Climate Change and Bioenergy</td>
<td>Recommitment to Rome Declaration. Commitment to increase food security assistance for developing countries (but no specific target set); calls for increased food production, fewer trade restrictions and</td>
</tr>
<tr>
<td>Year</td>
<td>Event Description</td>
<td>Document</td>
<td>Text</td>
</tr>
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</tr>
<tr>
<td>2009</td>
<td>High Level Meeting on Food Security for All, Madrid, Spain</td>
<td>Final Report</td>
<td>States to adopt national strategies for the realization of the right to food. Address all aspects of food security, including social protection systems; eliminate competition-distorting subsidies. Social and economic development of rural areas should be a primary policy objective.</td>
</tr>
</tbody>
</table>
| 2009 | World Summit on Food Security, Rome, Italy | Declaration of the World Food Summit | Reaffirms commitment to MDG/ Rome Declaration target to halve the number of people who suffer from malnutrition by 2015. Establishes Five Rome Principles for Sustainable Global Food Security:  
- support country-led processes,  
- pursue comprehensive |
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Resolution</th>
<th>Call to Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>Sixty-third World Health Assembly (WHA)</td>
<td>Resolution 63.23</td>
<td>Call on member states to increase political commitment to preventing and reducing malnutrition in all its forms. A call for increased political commitment, the implementation of the global strategy for infant and young child feeding, and strengthening of nutritional surveillance systems and improved use of millennium development goal indicators to monitor approaches, • coordinate assistance programmes effectively, • ensure a strong role for multilaterals by improving their effectiveness and coordination, • make more funds available for agriculture and food security</td>
</tr>
<tr>
<td>Year</td>
<td>Event</td>
<td>Resolution/Plan</td>
<td>Targets</td>
</tr>
<tr>
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</tr>
<tr>
<td>2012</td>
<td>World Health Assembly (WHA) Resolution 65/6: Comprehensive Implementation Plan on Maternal, Infant and Young Child Nutrition including 6 global targets for 2025.</td>
<td>Targets: 40% reduction in childhood stunting; 50% reduction in anaemia in women of reproductive age; 30% decrease in low birth weight; 0% increase in childhood overweight; an increase in the rate of exclusive breastfeeding in the first 6 months to at least 50%; a reduction in childhood wasting to less than 5%.</td>
<td>Commit to ensure that at</td>
</tr>
<tr>
<td>2012</td>
<td>Rio+20: Conference on Sustainable Development, Rio De Janeiro, Brazil, June The Future We Want Outcome Document</td>
<td>Zero Hunger Challenge launched: 100% access to adequate food all year round, zero stunted children under two years, no more malnutrition in pregnancy and early childhood, all food systems are sustainable</td>
<td>Commit to ensure that at</td>
</tr>
<tr>
<td>Year</td>
<td>Event Description</td>
<td>Rome Declaration on Nutrition and Framework of Action</td>
<td>Rome Declaration on Nutrition and Framework of Action</td>
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</tbody>
</table>
| 2014 | Second International Conference on Nutrition (ICN2), Rome, Italy | a) eradicate hunger and prevent all forms of malnutrition worldwide,  
b) increase investments for effective interventions and actions to improve people’s diets and nutrition, including in emergency situations | a) eradicate hunger and prevent all forms of malnutrition worldwide,  
b) increase investments for effective interventions and actions to improve people’s diets and nutrition, including in emergency situations |
(United Nations Global Nutrition Agenda Delivering On The Commitment To Eradicate Malnutrition In All Its Forms: The Role Of the UN System; 2015)

**Need for integrated and inter-sectoral approach in India-critical reflection:**

Since independence Government of India has been striving towards a standard quality of life for its population. Nutrition had been mentioned frequently in the five year plan as an important aspect for social development.

Nutrition intervention in India has also travelled a long path since 1930s. Critical reflection on journey of intervention on nutrition in India revealed mainly four phases i.e medical/clinical phase, food production and technology phase, community development phase and multi-sectoral phase.

The medical phase was mainly supported by the medical fraternity like chemists and laboratory specialists. This phase highlighted that; malnutrition is basically a community based problem and malnutrition is always a matter beyond the medical sector and required intervention beyond the health sector.

This perspective leads to intervention in food production and technological era, which calls for food production emphasis and food fortification measures. Iodization of salt was initiated in this phase. Other measures like lysine fortification wheat, protein rich food, protein from leaf etc were also taken up. However, the benefits of increased food production and technological advancement did not reach to the poor and economically deprived community. Then it was felt that malnutrition could not be addressed with one single sector.

Then, during the mid 1960s, community development phase began in nutrition sector. In this stint, the applied nutrition program emerged. It was the first integrated approach to deal with the malnutrition issue in India and continued for a decade. However, the approach was inter-sectoral and integrated in its perspective narratives but in practice this was mostly production centric in the form of school gardens, kitchen gardens, poultry productions etc. The program was phased out due to very
minimum impact in the country. But, the program compelled to realize that community involvement and participation is imperative in an integrated approach and Government must work on in coordination with other sectors to address the issue of malnutrition.

During 1970s, diverse nutrition programs were launched in India like Crash feeding program, Supplementation Nutrition Program for pre-school children in rural, urban and Tribal areas for bridging the gaps. Program against nutritional blindness in children also rolled out in this period. But, it was realized that mere food supplementation would not be sufficient to address the issue if it is not directed to address the other required health and care issue in children and women.

In 1975 on 2nd Oct, Government of India launched the world’s largest nutrition intervention program in an institutional set up called ICDS, in few blocks of the country as pilot. It was the first multi-sectoral program intervention with six package of services to combat the malnutrition and its immediate and underlying causes.

This phase is remarkable in the sense that it recognized malnutrition is caused by different socio-economic deprivations and they are cause and effect of each other. This realization resulted in formation of National Nutrition policy in 1993 and National Plan of Action on nutrition in 1995. Successive five year plan of Government of India under the chairmanship of Prime Minister put adequate focus and attention on the issue of nutrition in India. Sixth Five Year plan is perhaps the first one which exclusively focused on nutrition.

In subsequent plans, we have observed that nutrition has been documented as key objective in other sectoral plans like agriculture, rural development, social welfare, tribal welfare, education, food etc. It was realized that other sectors which are not implementing nutrition or health programs can also contribute towards nutrition upliftment directly or indirectly.

Therefore, Government started positioning nutrition intervention institutionally with multi-sectoral approaches as policy makers had understood that mere growth monitoring, supplementing of nutrient and feeding program would not address the
issue. Thus, the National plan of action on nutrition in 1995 was drafted incorporating sectoral plans in agriculture, civil supplies & public distribution, education, forestry, family welfare including maternal & child health, food, food processing industries, health, information and broadcasting, labour, rural development, urban development, women and child development.

**Effectiveness of ICDS, NRC, Mission Manav Vikas, Bal Kuposhan Mukt Bihar to combat the malnutrition in India & Bihar- critical analysis:-**

The Integrated Child Development Services Program, the world’s largest flagship program was launched in India in 1975 in 33 developmental blocks on pilot basis. It has travelled a long way and restructured its service delivery mechanism with utmost emphasis on community participation. This multi-sectoral program is now in mission mode in the country to reach out to all 0-6 years children, pregnant and lactating mothers and young girl child, to address the underlying issue of malnutrition. Initially it was catering to the need of women from the day of conception till delivery. But in 2001, realizing the importance of young girl child as the center point for intervention, Government launched KISHORI SHAKTI YOJNA(KSY).

The ICDS, a potential, well poised program has adopted multi-sectoral approach and has incorporated maternal and child health issues and education along with nutrition intervention. In this journey, the Government had made bilateral partnerships with many civil society organizations, UN bodies and International Banks to strengthen its quality services and expanding its outreach.

The ICDS program runs with an institutional back up in hamlets called Anganwadi Center with two human resources (Anganwadi Workers and helper) strength. They are rendering a package of services including supplementary nutrition in the form of hot cooked meal for 3-6 years children, pre-school education for 3-6 years, health and nutrition education for mothers, health check up and referral services and it has also included range of services for young girl children in the community. We must agree to the fact that anaganwadi center is the only institution in village outpost, accountable for combating the health and nutrition issues of mothers, children and adolescent girls.
In the last decade there has been improvement in many aspects of ICDS functioning. In response to the writ petition filed by People’s Union for Civil Liberties (PUCL) in April 2001, the Supreme Court issued an order in November 2001 directing the government to ensure that ICDS is immediately expanded to cover every hamlet in the country. This order also states that ICDS should reach every child below six years of age, every pregnant and lactating mother and every adolescent girl. Further, all SC/ST hamlets in the country should be covered as a matter of priority (Sinha Dipa ; 2006).

Though there is Honorable Supreme Court’s order to establish ICDS center for 400 population coverage and one anganwadi on demand for each 40 children in age group of 0-6 years children but in India inadequacy of ICDS has been critical component to reach all children in 0-6 years age group. Though, Government has decided to establish 2,00,000 additional ICDS centers in the country to bridge the gaps but so far it has not materialized. We must note that, ICDS is majorly a central Government sponsored program but there are state central share also.

In Bihar, the ICDS program was launched in the year 1975 in 2 blocks, covering 277 Anganwadi Centres (AWCs). In September 1993, ICDS project received support from World Bank. During this time a total of 355 projects were operational across 589 blocks in 56 districts.

After the bifurcation of Jharkhand, the State of Bihar comprises of 38 districts with 533 blocks. In the state there were 171 ICDS Projects with 34,925 Anganwadi Centres. Out of these 171 projects, a total of 84 projects were under the World Bank support. Thus, out of 83 million populations in the State, ICDS covered only around 35 million populations. In the year 2000-01, the State of Bihar got another 32 new projects from central aid.

Thus, by the end of 2002, the State had a total of 233 projects with 34,925 Anganwadi Centres. The World Bank assisted ICDS-III Project was launched in October 2002. A total of 146 projects having 22,712 AWCs were covered under it. (APIP of ICDS, GoB, 2015-16).
ICDS progress report 2014, recorded that 544 ICDS projects comprising of 91,677 sanctioned AWCs are providing nutrition and health services to 45 lakh children under six years, 9.5 lakh women and 7.5 lakh adolescent girls in 38 districts across the state. Central Government has approved additional 23,041 ICDS centers in 2014-15 FY which are yet to be established.

There are several studies to understand the effectiveness of this flagship program in India. Fred Arnold, Parasuraman.S et al (2009) while analyzing NFHS-III data noted that 28% of children received any services from an anganwadi center in the 12 months preceding the survey. Among children under six years who live in areas covered by the ICDS centers, only 26% received food supplements from an AWC in 12 months of the study period and one third of the children who received food supplements less than once a week. The narratives also noted that, during the study period only one-fifth children were weighed at ICDS center and half of their mothers did not receive any counseling.

There are different opinions across the country pertaining to fund flow and fund utilization of ICDS center as one of causal factors for its poor functioning. But the World Bank in 2004 argued that, over the years absolute spending as well as spending per child in ICDS has increased. But, it is also a sad fact that there has been a gradual decrease of funds in 2014-15 and 2015-16 annual budget plan lay out of Government of India for ICDS sectors.

Neerja. Chowdhury (Times of India; 2016) noted that the UPA government had increased allocations for the program, proposed restructuring including the provision of second worker to reduce the workload of existing AWW. With financial devolution recommended by the 14th Finance Commission, the NDA government decided to leave it to the states to evolve their respective strategies.

Further, the reach of the ICDS programme is very limited. There are only six lakh anganwadis in the country, compared to an estimated 17 lakh required for universal coverage based on existing norms. Supplementary nutrition is currently provided to
3.4 crore children, as opposed to 16 crore children (half of whom are undernourished) in the age group of 0-6 years (Sinha, Dipa 2006).

Community largely perceive the ICDS center as KHICDI CENTER because of its over emphasis on food supplementation program at the expense of other programs which are also critical for child development.

Michele Gragnolati, Caryn Bredenkamp, Monica Das Gupta, Yi-Kyoung Lee, Meera Shekar (2006) commented that, specifically enough attention is not given in improving child-care behaviour and educating parents on how to improve nutrition using the family food budget – both interventions that are highly cost-effective and part of the original design of ICDS. There is also very little attention given to micronutrient supplementation or disease prevention and control.

While analyzing the effectiveness of ICDS in curbing malnutrition, Ghose (2004) raised the concern and commented that the way ICDS program functions, even after 30 years, it has not been able to make a dent in the poor nutritional status of young children and suggested that the AWW should invest more time in communicating to the mothers about the importance of exclusive breastfeeding and supplementary feeding.

Along with the supplementary nutrition aspect, there is also another component called take home ration for 6 months to 3 years children who are not attending the center. There is mismatch between what has been promised in the policy document and in practice in the country.

Bredenkamp and Akin(2004) examined this issue and termed as leakage in take home food component in ICDS center since many children share the ICDS food with siblings or elders. In Madhya Pradesh only 32% children themselves consume their THR.

Along with the infrastructural gaps in the ICDS center, capacity gaps of the Anganwadi workers have been identified as stern impediment to achieve its desired goals. Various studies argued that this is perhaps because many AWWs are not fully
competent with respect to the interpretation of growth cards or because AWWs fail to
effectively communicate the meaning of children’s growth patterns to mothers
(Michele Gragnolati, Caryn Bredenkamp, Monica Das Gupta, Yi-Kyoung Lee, Meera
Shekar; 2006).

Nayak Nadini and Saxena Naresh C (2006) examined the effectiveness of ICDS in the
state of Bihar and Jharkhand and noted that 58% angawadi workers require capacity
building training. They also observed that, the entire ICDS team got salary only twice
a year and thus are de-motivated to perform and at times engage in petty corruptions.

However, living with all these limitations and bottlenecks, ICDS has been playing an
instrumental role to ensure well being of child and mother. It has played a pivotal role
in achieving decreased rate of infant mortality from 94 per 1000 live births in 1981 to
40 per 1000 live births in 2014 (Sample Registration System Report 2014). It has also
achieved reducing the malnourishment from 15.3 per cent during 1976-78 to 8.7 per
cent during 1988-90 (Sinha Dipa; 2006).

Unpacking the efficacy of Nutrition Rehabilitation Center- institution based
management of severe acute malnutrition:-

Malnutrition, technically includes stunting (chronic malnutrition), wasting (acute
malnutrition) and underweight (combination of both). The high mortality due to
undernutrition calls for urgent interventions.

NFHS-III (2005-06) revealed that 43% children under age of five years are
underweight (low weight for age), 48 % children under five are stunted (low height
for age) and 20 % children are wasted (low weight for height). Over 6% of these
children are severely wasted (<-3SD). Severely Acute Malnutrition can be defined as
Severe acute malnutrition is defined by very low weight-for-height/length (Z- score
below -3SD of the median WHO child growth standards), a mid-upper arm
circumference <115 mm, or by the presence of nutritional Oedema.

SAM children need immediate medical attention. Herewith, it is important to mention
the categories of SAM children. SAM children with medical complications need
facility based care and SAM children without medical complications require home based and community based care. Children with SAM who are admitted in a facility based care managed by highly skilled human resources have potential of high level of survival. However, immediate care givers in the family fail to continue the follow up for the case management and rehabilitation and thus relapses occurred. But, it is also important to note that, 85% to 90% SAM children don’t have medical complications and can be managed in the home based care.

Frontline community health workers like AWW, ASHA and ANM identify children with SAM by using simple coloured plastic strips (MUAC tape) that are designed to measure mid upper arm circumference (MUAC). They also identify nutritional oedema of the feet, which is another sign of this condition. AWW, ASHA and ANM also used the space during growth monitoring event at the Anganwadi centre, during Village Health and Nutrition Day to identify the cases.

Nutrition Rehabilitation Center (NRC) in Bihar or in some state is called Malnutrition Treatment Center and is a unit in a health facility where children with Severe Acute Malnutrition (SAM) are institutionalized for management and rehabilitation. Children are admitted as per the defined admission criteria and provided with medical and nutritional therapeutic care. The defined admission criteria are MUAC measurement less than 115mm, with or without oedema, less than 3 SD (weight for height) , bilateral Oedema.

Along with these following criteria the below mentioned complications are taken into considerations for admission,

- loss of appetite (anorexia)
- fever ( 39 degree centigrade)
- persistent vomiting and severe de-hydration
- not alert and very week
- unconscious, convulsion
- hypoglycemia
- severe anemia , pneumonia
- extensive superficial infection requiring Intra muscular medication
NRC is a specialized unit placed in a health facility. In Bihar, NRC is attached with District level Hospital in district headquarter and managed by local NGOs. It must be noted that, the management of NRC is through Ministry of Health of state government. NRC provides 24 hour care and monitoring of the child, treatment of medical complications, therapeutic feeding, sensory stimulation and emotional care. Along with these all clinical support NRC outreach workers and medical social workers are also accountable to conduct social assessment of the family, counseling on appropriate feeding, care and hygiene, demonstration and practice- by -doing on the preparation of energy dense child food using locally available, culturally acceptable and affordable food items. Post discharge follow up is another important service of the NRC.

As per the operational guidelines of Government of India, NRC should have 10-20 beds as per the case load in district hospital or medical college and at community health center level NRC should cater through 6-10 beds. As per the guideline, NRC must function in a cheerful, stimulating environment and it must be child friendly. NRC team comprises of medical officer, nursing staff, nutrition counselor, cook cum care taker, attendant and medical social worker.

During the literature survey, researcher could not access available resources to understand the effectiveness of NRC or MTC in India. Victor M Aguayo, Sangita Jacob et al (2012) conducted a study in 48 MTC centers available in Jharkhand (adjacent state of Bihar) and analyzed data of 3685 children who came in contact with MTC during the period of 2009 to 2011. They concluded that MTC provides critical life saving care for children with SAM and in case of medical complications. The study also revealed that, 60% children of discharged children did not fully recover weight gain in MTC as their weight gain was too low. The study also advocated strengthening of community based care for management of the SAM children and strengthening of health systems.
MSF (Doctors without Border) an international, independent, medical humanitarian organization has been working in Darbhanga district, Bihar where the research has been carried out since 2009 with a focus to address the malnutrition issue through a community based management model (CMAM). The CMAM program by MSF was launched in Biraul block of Darbhanga district in 2009 with an inpatient stabilization center for the malnourished children. The stabilization center was established in the Biraul Primary Health center. In the course of intervention, MSF also established ambulatory treatment centers (called Ambulatory Therapeutic Feeding Centers) at different community settings within the block. They trained front line health workers like government general nurse midwives (GNMs), auxiliary nurse midwives (ANMs), and accredited social health activists (ASHAs) to use mid upper arm circumference (MUAC) tapes to screen children aged 6–59 months children for SAM category and refer identified cases to the CMAM program.

Sakib Burza, Raman Mahajan et al (2015) conducted a study to introspect the effectiveness of MSF’s CMAM program in Darbhanga and obtained data in the period of Feb 2009 to Sept 2011 of 8274 children in the age group of 6-59 months suffering from severe acute malnutrition. They came up with findings that 87% children belong to socially and economically marginalized communities and 90% children were not suffering from other diseases. Children with medical complications were treated as inpatients using therapeutic milk until they were fit. Similar to existing hospital-based treatments in NRC, CMAM was hindered by a substantial default rate of 38 percent. However, the study concluded recommending community level action and management to address the SAM. (www.doctorswithoutborders.org)

Taneja G, Dixit S, Khatri A, Yesikar V, Raghunath D, Chourasiya S. A (2012) conducted a study to evaluate the effect of nutritional intervention measures on admitted children in selected nutrition rehabilitation centers (NRC) of Indore and Ujjain divisions of Madhya Pradesh and found that compulsory 14 days inpatient stay succeeded in improving the condition of admitted children. However the improvement was not sustained after discharge (Sakib Burza, Raman Mahajan et al ;2015).
There are other critical limitations of NRC/MTC in terms of its infrastructure, human resources and its overall functioning in comparison to its guideline. While analyzing the status of 8 MTC centers working in Jharkhand, PAIRVI (2013) noted that none of the centers were engaging children in a structured play or providing stimulation for social and emotional development of children, as the staff were preoccupied with preparing therapeutic feeding and administering medicines. Most importantly MTCs did not have a pediatric and/or a pediatric ward. The Medical Officer in-charge of the MTCs, who is supposed to examine each child every day, did not pay a visit to the MTC regularly.

Therefore, we can conclude that NRC has immense potential to rehabilitate the SAM children in a comprehensive manner provided that they are equipped with full human resources and adequate funds. But along with this institutional approach, community based management is long lasting mechanism in India to combat the issue, which has been corroborated with evidences and findings of different studies.

Mission Manav Vikas (Human Development)- a renewed agenda of the state Government of Bihar :-
Today’s Bihar carries the image of optimism and ambition. It has claimed that, the state governance has established good governance with a Mantra of Growth with Justice. All sectors in the state are well equipped with robust built-up and reaching out to the marginalized people. It has recovered its image from BIMARU state to state of rapid progress in the last few years. Public private partnerships, devolutions of power in grassroot governance, placing good public policy helped to regain the picture of resurgent Bihar.

However, there are critical challenges in terms of socio-economic indicators of the state which have direct implication in the lives of the people in the state. To achieve the goal of human development in line with the Millennium Development goal, the state of Bihar has adopted a mission called MISSION MANAV VIKAS in 2013-14 having a multi-sectoral approach in center stage. The key outcomes indicators envisaged in the mission mode are child health, maternal health, total fertility rate, malnutrition, Anemia control, improving life expectancy at birth, improving sex ratio and reducing child marriages.
To address the issue of malnutrition and anemia amongst children and young adults the approach paper considers these significant measures,

**Table 2.4 Malnutrition and anaemia intervention strategy in Bihar**

<table>
<thead>
<tr>
<th>Malnutrition intervention strategy</th>
<th>Anemia intervention strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Establishment of Nutritional Rehabilitation Centers at District hospital, dub-divisional hospital and block level primary health center.</td>
<td>• Strengthening Weekly consumption of IFA supplementation (WIFS) programme for Adolescent, Pregnant Women and Children</td>
</tr>
<tr>
<td>• Universalization of ICDS</td>
<td>• Promoting kitchen garden in the schools, community</td>
</tr>
<tr>
<td>• Quality improvement of supplementary feeding in the ICDS and Mid Day Meal</td>
<td>• Weekly IFA supplementation through Schools</td>
</tr>
<tr>
<td>• Community level management of Diarrhoea, Pneumonia, Fever cases and increase the coverage of Vit-A coverage</td>
<td>• Capacity building training of the outreach health workers on Anaemia control</td>
</tr>
<tr>
<td>• Community based management of SAM children</td>
<td></td>
</tr>
<tr>
<td>• Universalization of PDS systems for all</td>
<td></td>
</tr>
<tr>
<td>• Strengthening the School Health Programme.</td>
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</tbody>
</table>
Bal Kuposhan Mukt Bihar- Mission to combat malnutrition in the state:-

As an integral component of Mission Manav Vikas (2013-14), on August 15, 2014, Department of Social Welfare, Government of Bihar announced a systematic effort named ‘Baal Kuposhan Mukt Bihar’ (BKMB) campaign to reduce childhood malnutrition to below 30% by 2018. This initiative was formally launched in 2014 and since then the Government of Bihar has implemented systemic and long-term changes in implementation of ICDS within the state. The state Government has mobilized resources from ICDS annual grant, ISSNIP funds, funds from international bank and donor agencies working in the state towards implementation of malnutrition eradication drive.

The significant activities undertaken in this program in year 2014-15 are

- Strengthening the community based ICDS monitoring systems through Anganwadi Vikas Samiti (community level ICDS management committee)
- Better utilization of financial resources earmarked for Supplementary nutrition programme and initiation of egg in the hot cooked meal in ICDS and practice of hand washing
- Ensuring availability of weigh scale in all ICDS center
- Placing the water filters in all centers for safe drinking water
- Strengthening the institutional monitoring mechanism and institutionalization of review at Panchayat level
- Capacity building of the health workers
- Celebration of ANNAPRASHAN DIVAS to create model practice for supplementary nutrition
- Emphasis on coverage of colostrums feeding and exclusive breast feeding.

Though there are many bottlenecks and limitations in this program but the state has demonstrated positive will to implement the programme aiming towards curbing malnutrition.
State Nutrition Policy in Bihar:-

In response to implementation of the Mission Manav Vikas, the state has decided to formulate State Nutrition Policy and setting the target to reduce 20% of malnutrition by 2018. In line with the National Nutrition Policy 1993, National Plan of Action on Nutrition 1995 the state Government with the technical assistance from international agencies has drafted the state nutrition policy with a multi-sectoral intervention as epicenter of intervention. This policy document has also set short term and long term goals for the state. Annual Plan of Action for ICDS (2015-16) recorded that, the state is ready to deliberate the documents in public domain to give it final shape.

Maharashtra Model in combating malnutrition:-

National Family Health Survey (NFHS)-III conducted in 2005-06 revealed a heartbreaking picture of 39% of children under the age group of two years being stunted. Maharastra is known as richest state in India having the commercial capital Mumbai as administrative capital. The shocking figure compelled the state Government to formulate state Nutrition Mission in 2006-07 focusing on 15 districts as high burden district of malnutrition. These districts were mainly dominated by tribal communities and next years, the state Government expanded this mission remaining 20 districts.

Since its inception, this Mission has received full back up support from political and bureaucratic leadership and technical support from UNICEF. It has ensured engagement of all actors across the levels and placed in the entire system in the state.

Reviewing the Maharashtra model, Gillespie. S et al (The Lancet;2013) commented that in its first five years, the Mission sought to improve the coverage and quality of the services delivered through the State flagship programmes for child health, nutrition and development, namely the Integrated Child Development Services (ICDS) programme and the National Rural Health Mission (NRHM) programme. In 2010, the Government of Maharashtra launched, with technical support from UNICEF, the second five-year phase of the Mission, with a primary focus on scaling
up the delivery of evidence-based interventions for children under two and their mothers through a combination of facility, outreach and community-based approaches and emphasis on greater equity.

The IIPS evaluation study recorded that stunting in children under two years decreased from 39% in 2005-06 to 23% in 2012 and severe stunting decreased from 15% in 2005-06 to 8% in 2012. Critical improvements were also seen in use of antenatal care, breast feeding and complementary feeding practices, and use of iodized salt. Overall, the mission’s success was highly influenced by the commitment of political leadership and robust implementation mechanism placed by higher level bureaucrats with proactive participation of grassroots level health workers. Activation of ICDS, health systems strengthening, bridging the capacity gaps of workers provided the impetus in this positive trend to fight against malnutrition.

**Accessibility of other Social security Programs in context to nutrition and food security at household level:-**

In addition to this ICDS program the central Government as well as state Government has taken up many flagship programs to address the issue of undernutrition in the country. Few of these programs have been taken into consideration during literature review part to understand their linkages and effectiveness. Mid Day meal scheme, National Health Mission, Food security Program, Mahatma Gandhi National Rural employment Guarantee program, Janani Suraksha Yojna etc are significant programs in the country, which have direct and indirect bearing on the nutritional status of the children and food security at the household level. Along with this, Vitamin-A distribution program, distribution of IFA and salt idolizations are key initiatives of the nation to address the issue.

**Mid Day Meals Programs** in India has a long history since 1925. The program was introduced in Madras for the disadvantaged children and gradually expanded to Gujrat, Kerala, Tamilnadu. On 15th August, 1995, National Programme of Nutritional Support to Primary Education (NP-NSPE) was launched as a Centrally Sponsored Scheme.
In 1997-98, it covered all blocks of the country. In 2002, the program further extended to cover children in classes I - V of Government, Government aided, local body schools and also children studying in EGS and AIE centers. In September 2004 the scheme was revised to provide cooked mid day meal with 300 calories and 8-12 grams of protein to all children studying in classes I – V in Government, aided schools and EGS/ AIE centres. At present the guidelines recommend this following nutritional component,

**Table 2.5 Nutritional component of Mid Day Meal Programme**

<table>
<thead>
<tr>
<th>Components</th>
<th>Primary</th>
<th>Upper Primary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calories</td>
<td>450 Cal</td>
<td>450 Cal</td>
</tr>
<tr>
<td>Protein</td>
<td>12 gm</td>
<td>20 Gm</td>
</tr>
<tr>
<td>Micro-nutrients</td>
<td>Adequate quantities of micro nutrients like Iron, Folic Acid, Vitamin-A etc.</td>
<td>Adequate quantities of micro nutrients like Iron, Folic Acid, Vitamin-A etc.</td>
</tr>
</tbody>
</table>

(https://mdm.nic.in/Files/School%20Health%20Programme/Nutrition_Support/Nutrition_Support_Introduction.pdf)

Professor Amartya Sen, Prof Jean Dreze and the Right to Food campaign argued that MDM program is very much significant because it caters to the need of underprivileged children who are suffering from nutritional deficits and hunger. In 2010, study conducted by PRATICHI Trust in West Bengal recorded that MDM has been a successful program and has been a community led program, however there is need for improvement in quality of food. The Cooked Mid Day Meal Program has been successful in addressing classroom hunger in sample schools argued by the evaluation report of planning commission in 2010.
National Health Mission:- This flagship health program was launched in 2005, focusing 18 states in the country. The program aims at integration of health with sanitation and hygiene, nutrition and safe drinking water. It augments the infrastructure support in institution and also bridges the capacity gaps of human resources. It has been designed to reduce infant mortality, child mortality, maternal mortality, promotes institutional child birth and universal access to health care. Health care as binding factor of well being of child and mother and nutritional status has been placed without any contest. Therefore, NHM has been placed as one of key component while analyzing the issue of malnutrition in the country.

Mahatma Gandhi National Rural employment guarantee program:-

On 25th Aug, 2005, the then UPA Government enacted the National Rural Employment Guarantee Act (NREGA) which ensures a legal guarantee for 100 days of employment in every financial year to adult members of any rural household with statutory wage.

Since then, the effectiveness of MGNREGS has been debated across the country and revealed mixed responses in terms of creating household income and food security. A study on Effect of the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) on Malnutrition of Infants in Rajasthan, India recorded that MGNREGA had a significant effect on reducing wasting and underweight among infants in households that participated in MGNREGA compared with non-MGNREGA households.

The study in Rajasthan argued that the economic benefits of participating in MGNREGA appear to be effective but due to lower wage and delayed payments desired benefits could not be achieved. It has helped to reduce the starvation. (Manisha Nair, Proochista Ariana, Eric O. Ohuma, Ron Gray, Bianca De Stavola and Premila; 2013).

In another study, Jha, R., S. Bhattacharya, R. Gaiha (2011) analyzed the nutritional impact of MGNREGA wage, non MGNREGA income and Public Distribution System (PDS) participation. The study concludes that MGNREGA affects nutritional
status of households with respect to two macro nutrients, namely calories and protein as well as various micronutrients (Kumar. Parmod , 2013).

**National Food Security Act and PDS:-**

The central Government of India enacted the National Food security act in 2013 because of country wide people’s mobilization process outside the court and long struggle in the judiciary. In 2001, it was recorded that, India had surplus food grains in the country but a large number of populations were suffering from hunger. To respond to the constitutional guarantee in Art 21 (right to life and liberty), the Government enacted this act in the country. In reality, the NFSA covers two-third of Indian population i.e. more than 820 million people. The central perspective of this act revolves around the concept of life cycle approach and thus ensured food in different phases of life.

The important provisions under the NFSA are free hot cooked meal or ready to eat meal for all children in the age group of 3 years to 6 years in the country. It also mandates all ICDS centers to ensure Take Home ration to children in the age group of 6 months to 3 years, pregnant and lactating mothers.

The act also mandates schools to provide free meal in schools with prescribed nutritional standards in 6-14 years age group. The Act also guarantees a maternity benefit of at least Rs. 6000 to all pregnant women.

The act provisioned state to ensure food grains at highly subsidized rates of Rs.3, Rs.2 and Re.1 per kg of wheat, rice and millets respectively through the Targeted Public Distribution System (TPDS). It covered 75 per cent of the rural population and 50 per cent of the urban population.

The entitlement holders of the TPDS have been divided into two categories. The ‘priority’ category entitles each person in the household to 5 kg of food grains per month upto 25 kg per month for a household of 5 persons.
The second category is for vulnerable families defined by state governments as per the Union government guidelines and covered under the Antyodaya Anna Yojana. Under this category, the price rates offered to the beneficiaries are the same, but each beneficiary household is entitled to 35 kg of food grains, irrespective of the household size. (Sinha. Dipa and Biraj Patnaik ; 2016)

**Malnutrition intervention Models in other South Asian Countries:**

In South Asian countries there are some successful community based models, fighting against malnutrition issues. In this part, the researcher has taken into considerations those intervention models in summarized form to strengthen the body of knowledge.

**Bangladesh:** The Government of Bangladesh implements various programs to address the issue of malnutrition. Bangladesh Integrated Nutrition Project (BINP) was commenced in 1996, assisted by World Bank and UNICEF. It used the Food-health-care framework to address malnutrition. It has components of strengthening the existing nutrition intervention, education, community based nutrition and inter-sectoral approach. The community based nutrition program addresses the protein energy malnutrition. This approach caters to the aspect of under nutrition, LBW and micronutrient deficiency through providing supplementary iron and folic acid. It also emphasized on Exclusive Breast Feeding and inadequate maternal food during pregnancy. This program caters to children upto 2 years, pregnant and lactating mothers.

**Cambodia:** Community Action for Social Development model was launched in 1998 with support from UNICEF. Based on the approach of “building from below” (Village development committee) the program was designed. It has six components like capacity building, community education and care, food, water and environment, protection of vulnerable women and children, credit, employment and income generation. It also depends on food, health and care approach. USAID, CIDA, UNICEF are the key development partners in this country.
Srilanka:- In 1973, supplementary feeding program was launched. Providing THR to mothers and children less than 4 years were the key objectives. The Participatory Nutrition improvement project is operational in 25 districts of the country. Many NGOs are working in the field of nutrition. Food aid program by SARVODAYA was a significant intervention. Women groups are working as the change agent and work with mothers for nutrition counseling, EBF and complementary feeding.

Vietnam:- In 1994, Government launched National Program of Protein energy malnutrition control. This program caters under 5 year children and pregnant women. Program is basically based on growth monitoring and promotion. The other sectoral programs are breastfeeding promotion, control of diarrhea, ARI, household food security, anemia control.

Pakistan:-
To address the issue of malnutrition, Pakistan has launched community based and service delivery programs in the country. The community level programs include Rural Child Survival Projects which is funded by UNICEF and operational in 28 villages of Islamabad as pilot. The Prime Ministers Family Planning and Welfare programs is the major health care programs run by Lady Health workers and aiming towards nutrition promotion. In 1999, women’s Health project was launched in 20 districts with the support from Asian Development Bank focusing on micronutrient supplementation.

Summary of review of literature:-
Thus, from the comprehensive literature survey we can argue that malnutrition is a significant health agenda across the world especially in the developing countries. The issue is multi-factorial and has irreversible impacts in the lives of the children. The review helps the researcher to build body of knowledge on conceptual framework with its theoretical nuances. Nutrition as science with evolution has transcended through many ages and has become an agenda of global debate and action. This literature survey helped the researcher to build complex nature of its technical measurement aspect in nutrition science and its varied forms.
It also came out that, in India there has been progress in terms of reducing the malnutrition but the pace is not satisfactory and needs high level of political commitment and robust implementation mechanism by the skilled and motivated executives. Chronological study of prevalence of malnutrition in India and particularly in Bihar produced clarity in the mind of researcher in terms of India’s progress in this regard.

As far as its conceptual framework is concerned, the literature survey has produced fair minimum understanding of the researcher on malnutrition issue. The study of different nutritionist in India as well as in the world helps to infer diverse dimensions of its causal factors and its implications in the lives of the children and in community as a whole. The undernutrition issue thus can be termed as plethora of diverse issues ranging from socio-cultural-economic domain to large macro environment. Contextual and regional study helps to develop understanding of the locally nuanced facets of malnutrition on one hand and on the other hand, overseas cases explained global narratives.

The considerations of policy documents and action reports on malnutrition were also factored in to enhance the wisdom to understand the role of the state as key actors. The journey of interventions taken up by different UN bodies, organizations also gave a lucid idea to the researcher. In Indian context, we also took stock of the rationale of multi-sectoral interventions on nutrition and reviewed effectiveness of its inter-sectoral programs. Studying the successful models in other states of India, facilitates the analytical explanations in the successive chapters of this thesis. This thematic and component wise review on malnutrition helps the researcher to set the research tool and set the context for further analysis and interpretation.

Finally, the study has been an exploratory narrative as it has made attempt to unpack the different perspectives and component of malnutrition which were built from the review of literature. In subsequent chapters, questions pertaining to socio-economic-cultural aspects of malnutrition, Government measures to combat it, behavior and practices of the community responsible for the issue have been answered based on the knowledge gained in this chapter.
There are number of literature relevant to the issue in India as well as in the world. But, literature survey was conducted based on the direct research objectives and other correlates of the research issues. Finally, it closes with highlighting the contextual nuances, relevant study reports, opinions of nutrition experts, policy critique and some issues related to structural and systemic factors of malnutrition.