INTRODUCTION

There are 17 Sustainable Development Goals (SDGs) set by the United Nations General Assembly in 2015 for the year 2030 (Figure 1.1) which emphasized on improving Food and Nutrition Security (FNS) by ending poverty (goal 1) and hunger (goal 2), improving nutrition and health (goal 3), hygiene and sanitation (goal 6), reducing inequalities (goal 10) with the help of multisectoral partnerships (goal 17) (https://sustainabledevelopment.un.org/?menu=1300). These sustainable development goals were attempted to accomplish in the present study by improving food and nutrition security using public-private partnership in rural households.

Figure 1.1: Sustainable development goals (SDGs) for 2030

Source: https://sustainabledevelopment.un.org/?menu=1300

Developing multi-stakeholder partnerships especially public-private partnerships (PPPs) sharing knowledge, expertise, technology and financial support are critical for overall success of the SDGs (UNDP, 2018). From a thematic perspective, there is now global recognition that the sustainability of our food systems, including adequate nutrition, is key to sustainable development in general. This cuts across the SDGs, with Goal 2 specifically aiming to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture (ECDPM, 2017).

UNICEF's approach to programming for children and young people aims to achieve sustained results at scale which means maintaining and expanding support from both the public and private sectors – as well as non-governmental organizations, civil society organizations, development agencies and United Nations partners (UNICEF, 2018).

Nutrition policy making and program interventions in developing countries continue to bring together several sectors that contribute to nutrition improvement. Yet the progress toward reducing malnutrition in all forms has been extremely slow (Global nutrition report, 2017). Reaching the Sustainable Development Goals of eliminating hunger and eradicating poverty has become a key development objective in most developing countries (IFPRI, 2018). However, the approach to implement food security and nutrition interventions continues to be through nutrition-specific programs, rather than through those that integrate nutrition goals into the existing agricultural and rural development interventions and thereby result in a nutrition-sensitive food system (FAO, 2017). This shift in the paradigm is imperative to speed up the process of hunger reduction and elimination of malnutrition in all forms (HLPE, 2017).

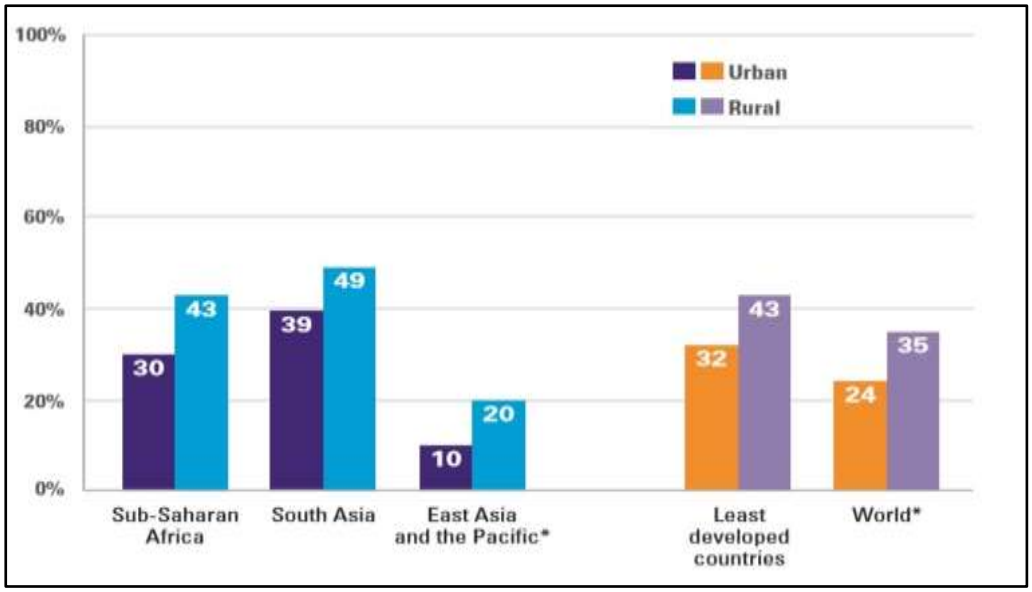
The latest available global estimates indicate that about 795 million people in the world – just over one in nine, continue to be food insecure and chronically undernourished in 2014-16 (FAO, 2014). The highest burden of hunger in absolute terms is to be found in Southern Asia. Estimates for 2014–16 suggest that about 281 million people are undernourished in the region, marking only a slight reduction from the number in 1990–92 (FAO, 2015).

Every country in the world is affected by malnutrition. Globally approximately 162 million children under the age of 5 years are affected by stunting and 52 million children are severely wasted according to WHO, 2012 report which has reduced to 150.8 million stunted children (22%) and 50.5million wasted children (7.5%) in 2018 (Global Nutrition report, 2018).

In 2016, two of every five of the world's stunted children and more than half of all wasted children lived in South Asia. This represents a critical public health emergency (as prevalence more than 10% does) and reflects a serious and pressing problem (Global nutrition report, 2017).

Rural children are more affected than urban children according to UNICEF 2013 report (Figure 1.2).

Figure 1.2: Rural and Urban Undernutrition status Globally



Source: UNICEF 2013 Report

As of February 2019, the total population of the world exceeds 7.7 billion people and this number is continuing to grow each day. With a birth rate of 19.156 births/thousand live birth, India ranks 89 in the world (http://worldpopulationreview.com). On average there are 25 million people in India per year and India ranks second with the population growth rate of 1.08% globally. (https://www.populationof.net/india/).

According to a study conducted by UNICEF done in 2013 globally, out of 22 million newborns babies, around 16% babies are suffering from low birth weight (UNICEF, 2013). According to WHO, an estimated 15 million preterm birth take place across the world every year (Lancet, 2016). Over 60% of preterm births occur in Africa and South Asia (WHO, 2018). India accounts 3.5 million preterm births, in the world, followed by China (1.17 million births) and Nigeria (0.77 million births) (Lancet, 2012).

The Government of India established the NITI (National Institution for Transforming India) Aayog to attain the sustainable development goals. In March 2018 Haryana became the first state in India to have its annual budget focused on the attainment of SDG with a 3-year action plan and a 7-year strategy plan to implement sustainable development goals when Captain Abhimanyu, Finance Minister of Government of

Haryana, unveiled a ₹1,151,980 lakh (US$1.7 billion or €1.5 billion) annual 2018-19 budget (Haryana budget, 2018). Also, NITI Aayog starts the exercise of measuring India and its States' progress towards the SDGs for 2030, culminating in the development of the first SDG India Index - Baseline Report 2018 (https://en.wikipedia.org/wiki/Sustainable_Development_Goals).

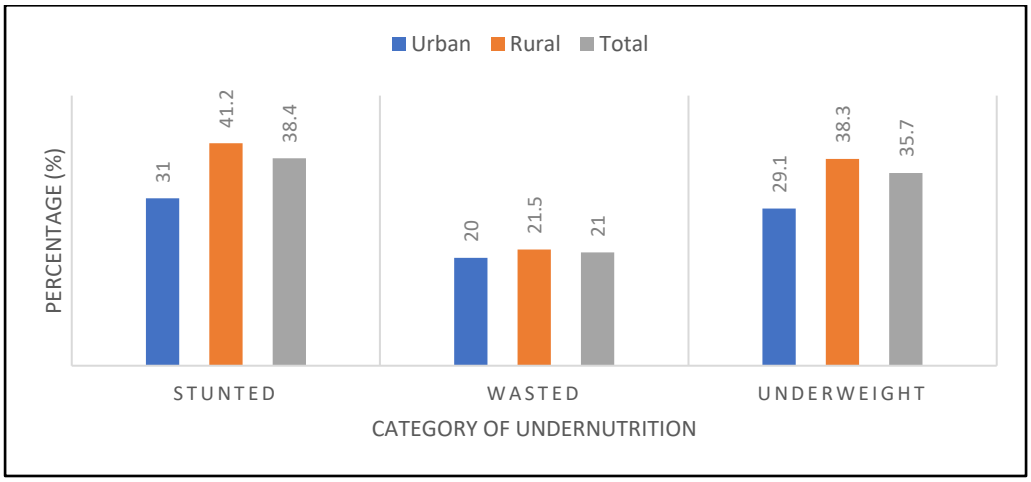
A sustainable food system (SFS) which lies at the heart of the United Nations' Sustainable Development Goals (SDGs) is a food system that delivers food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised. To realize the SDGs, the global food system needs to be reshaped to be more productive, more inclusive of poor and marginalized populations, environmentally sustainable and resilient, and able to deliver healthy and nutritious diets to all and require the combination of interconnected actions at the local, national, regional and global levels (FAO, 2018).

In India, low per capita food availability at the national level (calculated as production plus imports minus exports divided by the population) is largely a reflection of high poverty, which makes it difficult for a large fraction of the population to access nutritious food (Jain, 2015). However, India reduced its poverty rate to 12.4 percent in 2015–2016, from the 2011–2012 estimate of 21 percent, according to new data released by the World Bank (World bank, 2017), which identified rural electrification as an important driving factor for everything from greater rural spending to schooling for girls. Against the earlier estimate of 269 million people living below the poverty line (BPL) in 2011–2012, according to government data, by 2015–2016, India had 172 million people living BPL (India Spend, 2015), although the World Bank has revised the poverty line upward. As per the Food and Agriculture Organization of the United Nations (FAO, 2015), India is the world's second-largest food producer yet is also home to the second-highest population of undernourished people in the world. India is ranked 97th among the 118 countries surveyed in 2016 for the Global Hunger Index (GHI), scoring 28.5 on the 100-point scale of the index (von Grebmer et al., 2017). The GHI report describes India's hunger situation as "serious". In contrast, Brazil, Russia, China, and South Africa, all of whom share the BRICS high table with India, have single-digit

scores. India's neighbors, including Bangladesh, Nepal, Sri Lanka, and Myanmar, have better GHI scores as well (von Grebmer et al., 2017).

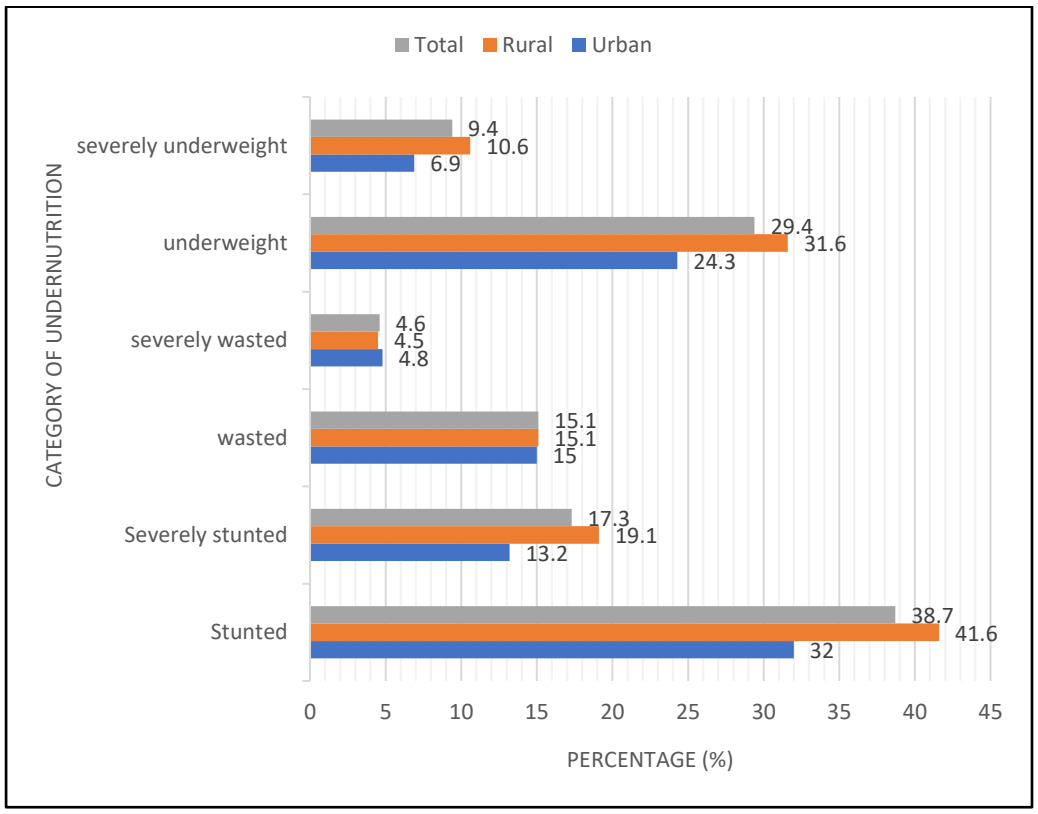
Over the past several decades, despite positive economic growth trends, India continues to struggle with malnutrition manifested in terms of high rates of child stunting and wasting that are substantially higher than other countries with similar economic growth experience and at similar stages of structural transformation (Pingali, 2019). It still stands far behind in terms of underweight children in the world comparatively to other developing countries with 38.4% stunted, 21% wasted and 35.7% underweight children (NFHS 4, 2015-16) (Figure 1.3). Whereas, According to RSOC report 38.7% under 5 children were stunted, 17.3% severely stunted, 15.1% wasted, 4.6% severely wasted, 29.4% underweight and 9.4% severely underweight in India (Figure 1.4). In case of rural children, the condition was even worse (RSOC, 2013-14) (Figure 1.3 & 1.4).

Figure 1.3: Undernutrition status of Indian children >5y (NFHS 4)



Source: National Family Health Survey 4 (2015-16) Factsheet

Figure 1.4: Undernutrition status of Indian children >5y (RSOC 2015)

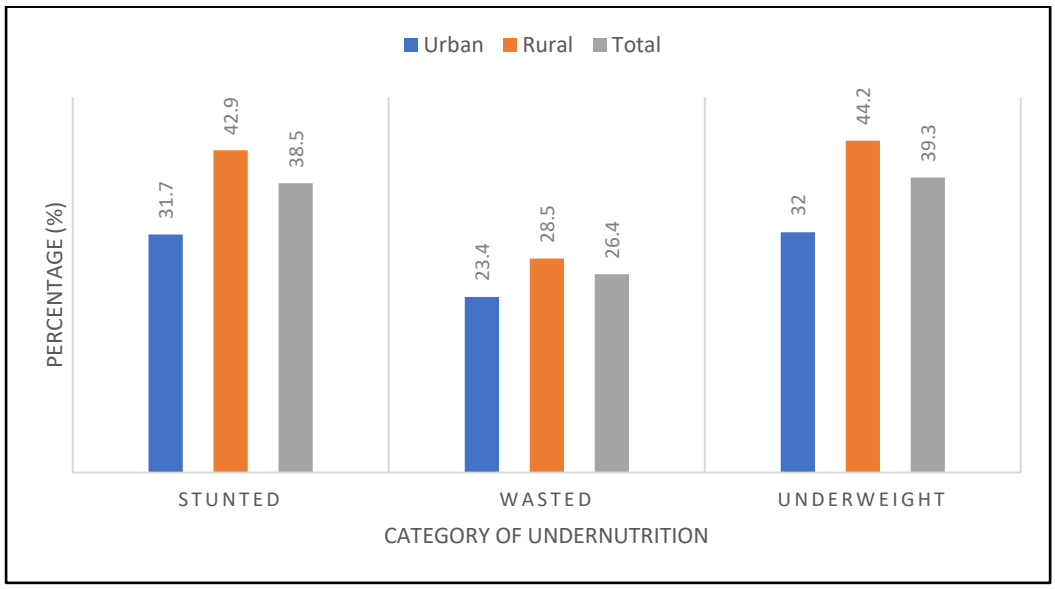


Source: Rapid Survey of India, 2013-14 Factsheet

The economically prosperous state of Gujarat is also battling with malnutrition. In this state 38.5% under 5 children were stunted, 26.4% were wasted and 39.3% were underweight (NFHS, 2015-16 report). The condition of rural children was even worse (Figure 1.5).

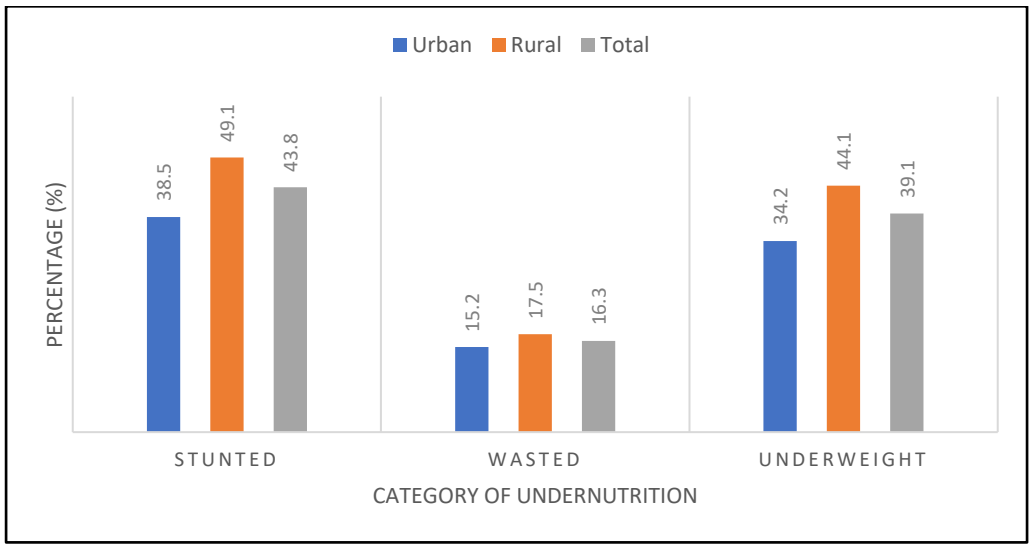
The Vadodara district of Gujarat is also facing the problem of malnutrition with 43.8% stunted, 16.3% wasted and around 39.1% underweight children (NFHS 4, 2016). Whereas, rural children were affected much more than urban children as 49.1% rural children were stunted as compared to 38.5% urban children, 17.5% rural children were wasted as compared to 15.2% urban children and 44.1% rural children were underweight as compared to 34.2% urban children (Figure 1.6).

Figure 1.5: Undernutrition status of <5y old children in Gujarat (NFHS 4)



Source: NFHS 4 (2015-16) Gujarat factsheet

Figure 1.6: Undernutrition status of <5y old children in Vadodara (NFHS 4)



Source: NFHS 4 (2015-16) Vadodara factsheet

A person when follow a nutritionally adequate diet and the utilization of food results in growth and disease recovery as well as helps in physical work and provides energy during pregnancy and lactation, considered as nutrition secure. (Frankenberger et al., 1997). Optimal nutrition is a result of access to affordable, diverse and nutrient-rich food, adequate health services, healthy environment, appropriate maternal and child-care practices and safe water, sanitation and good hygiene practices (UNICEF, 2013).

India's food and agriculture policy have historically focused on enhancing supplies and access to staple grains, especially rice and wheat, resulting in reducing the incidence of hunger in the country but created disincentives for farmers to diversify their production systems in response to rising market demand for non-staple food, such as fruit, vegetables and livestock products causing imbalance in protein, vitamin and micronutrient supply in the food system and high incidence of malnutrition in India (Pingali, 2019).

Dietary diversity has long been recognized by nutritionists as a key element of high-quality diets. Increasing the variety of foods across and within food groups is recommended by most dietary guidelines, in the United States (U.S. Department of Agriculture Human Nutrition Information Service, 1992) as well as internationally (WHO/FAO, 1996), because it is thought to ensure adequate intake of essential nutrients and thus to promote good health.

According to scientific evidence, breastfeeding could save lives of more than 820,000 children and 20,000 women annually. It can also save more than 300 billion dollars for the nations, the money spent on healthcare costs of not breastfeeding and not achieving potential gains in earning capacity. (http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)010247/abstract). According to the Lancet's analytical series on breastfeeding in 2016, improvements in breastfeeding would help achieve the SDG targets for health, food security, education, equity, development, and the environment (Lancet, 2016).

Globally, 77 million newborns out of 140 million born were not able to begin breastfeeding within the first hour of birth. One out of two women is not able to exclusively breast feed her baby for 6 months (UNICEF, 2018). Three out of 5 infants under 6 months are not able to breastfeed exclusively which is nearly 84 million infants (http://worldbreastfeedingtrends.org/uploads/WBTi-ProjectProposal-Full-2018-2022.pdf). The exclusive breastfeeding rates are 39.5% around the world. (World bank, 2019).

In India, only 41.6% of mothers initiate breastfeeding within one hour of birth, in Gujarat the rate is 50% and in Vadodara district, it is 49.5% (NFHS 4, 2015-16).

Around 54.9% of babies are exclusively breastfed during the first six months and only 42.7% of babies between 6-8 months are given complementary foods along with breastmilk (NFHS 4, 2015-16). In Gujarat the exclusive breastfeeding rates are 55.8% and in Vadodara the rates are 64.8% (NFHS 4, 2015-16).

Poor sanitation and lack of access to clean drinking water are other proximate reasons for the persistence of malnutrition in India (Pingali, 2019). In India, only 29.9% rural people use improved sanitation facility and 61.6% households still practice open defecation (RSOC, 2015). In Gujarat only 47% use improve sanitation facility and only 26.9% use clean fuel for cooking (NFHS 4, 2015-16). In rural Vadodara the situation is even worse as only 36.6% households use improved sanitation facility and 18.8% use clean fuel for cooking (NFHS 4, 2015-16).

Government of India launched ICDS in 1975, which is a unique early childhood development program aimed at addressing health, nutrition and the development needs of young children, pregnant and nursing mothers. The program is specifically designed to reach disadvantaged and low-income groups, providing the convergent platform between communities and other systems such as primary healthcare, education, water and sanitation among others (WCD, 2013)

However, even after 43 years of its establishment, objectives of this flagship intervention program of raising health and nutritional level of poor Indian children (< 6 years) remain unmet as high prevalence of child undernutrition and food and nutrition insecurity exists, especially in rural India (Sharma, 2012).

Some of the programs that have been recently launched by Government of India to address the issue of maternal and child nutrition were Poshan Abhiyan, Mother Absolute Affection (MAA), Janani Sishu Suraksha Karyakaram (JSSK), Janani Suraksha Yojana (JSY), Pradhan Mantri Matru Vandana Yojana (PMMVY) and others (http://nhm.gov.in/).

At state level, the Gujarat government has started planning and implementing programs to tackle the problem of malnutrition. Some of the programs in managing maternal and child health are Chiranjeevi Yojana, Kartuba Poshan Sahay Yojana, Mamta Abhiyan, Mission Balam Sukham, Baal Sakha Scheme, Mamta Taruni Abhiyan, Mukhyamantru

Amrutum (MA) Yojana (https://www.nhp.gov.in/gujarat_pg) (https://nhm.gujarat.gov.in/conceptnhm.htm).

Thus, there is need for integrated approaches to improve food and nutrition security which can lead to improve nutritional outcomes for mother and child in areas where agricultural produces are in abundance. Innovative approaches are needed to strengthen existing systems.

Behavior change communication is an interactive process of any intervention with individuals, communities and/or societies (as integrated with an overall program) to develop communication strategies to promote positive behaviors which are appropriate to their settings. Social factors including caregivers' poor knowledge on nutrition and lack of knowledge on food diversity in their environment may correlate with poor feeding practices. Such factors may result in low dietary diversity, low feeding frequency, and low food and energy intake for children (Saloojee et al., 2007). Caregivers' nutrition education can help to clear cultural and tradition-based misconceptions and improve their general nutrition knowledge (Shi & Zhang, 2011). Nutrition counselling also improved caregivers' knowledge in food preparation and healthy feeding behaviors (Zaman et al., 2008). Nutrition knowledge among caregivers improved in turn when they were frequently counselled by health workers who received nutrition training (Pelto et al., 2004). Therefore, behavior change communication regarding health care, Infant and young child nutrition (IYCN) practices and hygiene and sanitation practices through Positive Deviance Approach (PDA) can be effective in the improvement of overall nutritional status of the children.

Positive deviance (PD) refers to a phenomenon that exists in many resource-poor communities (Lapping et al., 2002). Inadequate feeding practices, poor utilization of resources, incorrect dietary pattern are some significant reasons for the poor nutritional status of the children in India. But it is often seen that in communities there are a few 'deviant' individuals whose uncommon behaviors or practices enable them to outperform their neighbors with whom they share the same resources. Identification of these "positive deviants" can be crucial to bring sustainable change as their behaviors are likely to be affordable and acceptable and sustainable by the wider community because their peers are already practicing them (Sethi et al., 2003). Identification of positive deviant behavior (PDB) helps to understand the psychosocial environment that

effects behavior changes and the valuable role of self-efficacious Positive deviant mothers/family members as counselors. Identification and promotion of Positive deviant behaviors (PDBs) among mother-child pair can be effective against food and nutrition insecurity.

It is necessary to innovate and consider out-of-the-box policy options to attain food and nutrition security. The role of various stakeholders and partnerships among them will be critical. These include public and private sectors, community groups, multilateral agencies, and philanthropic foundations as well as bilateral collaboration between nations (Nandakumar et al, 2010). Public-private partnership is a mode of implementing government programs/schemes in partnership with the private sector. The term private in PPP encompasses all non-government agencies such as the corporate sector, voluntary organizations, self-help groups, partnership firms, individuals and community-based organizations (IFAD, 2013). Therefore, under the right conditions, private-sector investment can contribute to pro-poor development that raises incomes and strengthens food security (Indian planning commission, 2004).

RATIONALE

Populations involved in agriculture, especially women and their children, need to be addressed for improvement of Food and nutrition security **(**FNS**)** using an integrated approach**.** Simple strategies such as PDA can be effective in behaviour change and need to be promoted where there are limited resources**.** PPP **(**working in tandem with goals of CSR of industry, academicians and ongoing government programmes**)** can be effectively integrated for improving food and nutrition status of populations**.**

BROAD OBJECTIVE

To improve Food and Nutrition Security (FNS) in rural households with mother-child pairs using public private partnership

SPECIFIC OBJECTIVES

1. Situational analysis of the food and nutrition security status of the mother-child pairs in a rural setup
2. Identification of the positive deviant behaviors depending on 4 attributes (Household dietary diversity score, IYCN score and hygiene and sanitation score, weight for age score of children) and capacity building and infrastructure development to improve food and nutrition security through interventions as a part of public-private partnership.