2 REVIEW OF LITERATURE

The study of effects of health and nutrition program, ICDS in our analysis draws upon two main strands of literature: studies involving the utility maximising behaviour of an individual and the program evaluation literature. This chapter highlights the theoretical and empirical work conducted in the related fields that this study uses.

2.1 INTRODUCTION

This study uses two main strands of literature in its aim to assess the impact and effectiveness of the integrated nutrition and health program. First, it relates to the child health studies. There have been numerous studies that estimate determinants of child health. These studies draw inferences using the human capital investment and health production function literature. We discuss these in section 2.2. Second, the study draws on the program evaluation literature. Evaluations of public programs are gaining importance for the insights they provide about the functioning of these. Section 2.3 looks at evaluation studies of some development programs, with a special emphasis on child health interventions. We briefly discuss the estimation issues that arise in program evaluation. Studies estimating effects and other features of ICDS are discussed in section 2.4. The chapter concludes with section 2.5.

2.2 DETERMINANTS OF CHILD HEALTH

In order to estimate the effects of child health and nutrition programs on the targeted population, it is important to understand the pathways of influence of these programs. We focus on the determinants of child health to disintegrate the mechanism of influence. Since we use nutritional status of children as the outcome variables to estimate impact of ICDS, we look at the factors affecting nutritional status of children. These factors can be classified into individual (child), parent, household and community specific factors.

Individual Specific Factors

Nutritional Intake: The importance of adequate food and nutrition has been emphasised strongly. The two most vulnerable periods for child malnutrition are (i) in utero (inside the womb): about 16 percent of babies worldwide are born
malnourished. (ii) in the first three years of age: young children have high nutrition requirements but their diets are of low quality, with poor energy and nutrient concentrations (Behrman et. al. 2004). Controlled experimental studies (Ramakrishnan et. al. 2005; Demment et. al. 2003) emphasize the need to consider multi-micronutrients - vitamin A and C, iron and zinc simultaneously than individually especially in improving anthropometric outcomes. Studies (Magnani et. al. 1985; Clark 1981) have estimated production functions for infants and young children and find significant positive association between nutrient intakes/breastfeeding and nutritional status. Longer duration of breastfeeding is associated with higher weight for age in some while a negative association is reported between these variables (Martorell et. al. 1984; Wolfe and Behrman 1982). Studies find that children in developing countries grow adequately in the first part of infancy. It is the inadequate quantity and poor quality of complimentary food which is the significant factor that explains subsequent faltering in growth. Illnesses have an impact on the effective absorption and utilization of nutrients.

Age of the Child: Children's nutritional status is more sensitive to factors such as feeding/weaning practices, care and exposure to infection, especially when exclusive breastfeeding stops around 4-6 months of age. Studies have found that nutritional status has an inverted U-shaped relationship with age, with an inflection point around 12-24 months (Maxwell et. al. 2000; Genebo et. al. 1999; Mishra et. al. 1999).

Gender of the Child: Preference for sons over daughters and gender inequality are well-known aspects especially in the South Asian countries and particularly in India. Studies have reported differences in nutrient intakes and nutritional status based on gender of the child (Behrman et. al. 1987, 1988). While some studies (Olaniyen 2002; Maxwell 2000; Mishra et. al. 1999) conclude that the sex of the child is insignificantly related to nutritional status indicating no bias towards male or female children.

Parent-Specific Factors

Effects of Education: The human capital framework suggests why health outcomes are likely to be influenced by education. Glewwe (1999) reasons the multi-dimensional nature of education which includes basic and complex cognitive skills, general knowledge, technical skills and norms and values for these outcomes. The pathways through which education leads to better health include (a) efficiency: more
Educated individuals make better decisions while choosing healthcare (b) *technology*: more educated make a more effective use of health inputs (c) *preference*: education conveys values (d) *income*: higher education leads to higher incomes and higher ability to purchase health-related inputs (e) *substitution*: education raises the opportunity cost of time and results in substitution away from labor intensive production thereby freeing time for health-related activities (Schultz 1984).

**Parental Education:** A major resource available to the household is the parental education. Parental education affects child health through income effect; by increasing family income it makes more resources available for rearing children (Handa 1999). Most studies report very strong associations between parental education and child health as well as child schooling attainment (Behrman and Deolalikar 1988; Alderman et. al. 2001). Parental education has a significant positive effect on child anthropometric outcomes (Strauss and Thomas 1995). A study in Ethiopia reports that, “a mother’s and father’s education are found to have independent significant impacts” on child health outcomes. Glewwe (1999) connected parental schooling to child health through parental values, parental cognitive skills and parental health knowledge and concluded that health knowledge directly improves child health outcomes. Bargaining strengths between the father and the mother are said to have differential impact of child health. Education can reveal the bargaining strengths of the adult male and female, in which case the sign of the coefficient for male and female education would be opposite.

**Maternal Education:** Many studies have specifically focused on the effect of maternal education. Beginning with the work of Caldwell (1979), an extensive body of research points out that maternal education is the single most important factor in explaining differentials in child health outcomes. It is considered to be more important than paternal education, health service availability, and even socioeconomic status. Empirical work has found a strong positive association between maternal education and child health, as defined by child mortality and nutrition (Muhuri 1995; Horton 1988; Barrera 1990). The pathways through which maternal education affects child health have also been well studied and documented. Mother’s education affects child health through many channels. *Firstly*, it enhances exposure of mother to the external world thereby providing more information and better knowledge. *Secondly*, it strengthens her bargaining power. Finally, it increases resources at her disposal.
through her earnings (Schultz 1984). Also, more educated mothers are likely to have better health which genetically leads to better health for their children (Behrman and Wolfe 1987). Mishra et. al. (1999) find mother’s education to be the strongest predictor of nutritional status of children in India.

Studies have shown that the positive effects of maternal education remain even after controlling for other factors. Garces et. al. (2000) find increased height of children due to better impact of maternal education and higher access to information. Handa (1999) finds positive impact of education on child nutrition in Jamaica. This effect was independent of household income, sanitation and other household facilities. However, Behrman and Wolfe (1987) found maternal education to be an insignificant determinant of child height after controlling for unobserved family background and genetic endowment. While some (Smith and Haddad 2000) find strong, positive links between maternal education and child nutrition, other studies controlling for factors show little or no correlation between the two.

Though the role of mother’s education is shown to be strongly and positively correlated to health of the child, the evidence of father’s education is not conclusive. Sahn (1990) and Alderman (1990) suggest that father’s education is a proxy for income control and bargaining power within the household. A study in Indonesia (Wasito et. al. 2002) finds significant role of father’s education on child height. Among the studies that explore the potentially distinct roles of maternal and paternal education on relation to nutrition outcomes, most find that paternal education either substitutes for maternal schooling, or is insignificant (Gupta et. al. 1991). Semba et. al. (2008) find that both paternal and maternal education are strong determinants of child stunting in Bangladesh and Indonesia.

Knowledge: In addition to direct impact of education, schooling may influence nutrition by transmitting information about health and nutrition. Also, simple numeric literacy assists in better use of medical services. Glewwe (1999) finds that health knowledge contributes the most to child health in Morocco. Basu and Foster (1998) have formalized a definition of proximate literacy keeping in view that knowledge commonly associated with formal schooling can be transmitted by interaction with others. Gibson and Scott (2002) have shown that externalities from literacy occur within family. Webb and Block (2003) differentiate between formal education and
nutrition knowledge using household data for Indonesia. Applying parametric and non-parametric techniques to household data, they find that mother’s nutrition knowledge has a strong positive impact in the short-run. Formal schooling dominates nutrition knowledge in determining child health.

Studies in Nicaragua show that maternal education and certain types of nutrition knowledge are significantly but independently associated with child outcomes. Many studies have addressed the issue whether nutrition knowledge interacts with education, and when and whether they can act as substitutes or complements. Thomas et al. (1990) show that in Brazil most of the impact on child height could be explained by mother’s access to media messages and that formal schooling and awareness through community health service acted as substitutes. Glewwe (1999) found that maternal knowledge in Morocco contributed more strongly to child height for age and this knowledge was gathered mainly from outside classroom through media, from relatives and via public service messages. Studies have also provided evidence that besides individual effects of maternal education, aggregated levels of maternal education at community level have positive influence on child health (Alderman, Henstche1 and Sabates 2003). Communities with higher proportion of more educated women are likely to provide better sanitation and medical services and shared health knowledge within the community (Alderman 2003; Desai and Alva 1998).

However, there are studies that argue that little variation in education levels or attending few years in school in the distant past may not make much difference to current functional abilities. Bhargava et al. (2003) model the role of mother’s functional ability through cognitive scores and improved nutritional status of children. Maxwell et al. (2000) and Ruel et al. (2002) argue that the effect of education is reflected through additional employment opportunities and income earning potential which lowers the significance of the education coefficient or make it insignificant, when income is included as one of the variables.

Women’s Status: Status of women is defined as “women’s power, relative to men, in the households, communities, and nations in which they live” (Smith et al. 2003). Women’s participation in household decision-making influences the major pathways through which women’s status influences care for children and children’s birth-weights. Five caring practices for children are crucial for their nutritional well-being:
food preparation and storage, feeding practices, psychosocial care, hygiene and home health practices (Engle, Menon and Haddad 1999), and newborn care. "Perhaps there is something in South Asian culture an aspect of its culture that bears on the treatment of women, especially in their reproductive age that is not fully captured by our existing explanatory frameworks. If we want to know more about nutrition and what to do about it, we must learn more about our women and their deprivation" (Osmani 1997). Smith and Haddad (2000) find that improvement in women's status relative to men has a large positive impact on child nutrition status. Smith et. al. (2003) and Thomas and Strauss (1997) find that women with low status tend to have weaker control over household resources, tighter time constraints, less access to information and health services, poorer mental health and lower self-esteem which affect the kind of care which they give to their children and thus adversely affect the nutritional status of their children.

Nutritional Status of the Mother: Women's nutritional status affects children's nutritional status in a variety of ways, both during pregnancy and early childhood. Women, who are malnourished, are more likely to deliver smaller babies, who, in turn, are at increased risk of poor growth and development (Gillespie and Haddad 2001). Also, malnourished women may not be able to breastfeed, have low levels of energy and have reduced cognitive skills that adversely affect children's health (Engle et. al. 1999). It has been found that countries with higher percentages of low birth weight infants generally have a higher percentage of women with low body mass index and a higher percentage of underweight children (ACC/SCN, 2000).

Maternal care is another important element that includes antenatal care, the encouragement of institutional deliveries or deliveries at home assisted by a trained health professional and the provision of antenatal care. The importance of these has been greatly emphasized (Magadi, Madise and Rodrigues 2000). Provision of health care services during and post pregnancy are also highlighted in studies. For example, the lack of antenatal care services is associated with maternal mortality, poor birth outcomes and higher risk of prenatal and neonatal mortality. Prenatal care provides an opportunity for a number of preventive interventions, including tetanus and toxoid immunizations; prevention and treatment of anaemia and infections; and detection of high-risk pregnancies needing special delivery care (Smith et. al. 2003).
Age of the Mother: The age of the mother is a proxy for her care taking abilities. It has been observed that too young mothers may not have enough experience to carry out child rearing (Mishra et. al. 1999). However, in some studies mother’s age is not a significant variable (Sahn 1990; Olaniyan 2000).

Household Specific Factors

Household Economic Resources: A key determinant of malnutrition is low income or poverty (UNICEF 1900). Improvement in economic status translates into improved nutritional status of children (Attanaiso 2004; Mishra et. al, 1999; Strauss and Thomas 1997; Sahn 1990). But many studies indicate that relationship between income growth and nutritional status is not strong. The income coefficient was insignificant in studies by Thomas (1992) and Horton (1989). In part, the insignificance may be on account of multicollinearity. Further, the measure of nutritional status reflects the outcome of inputs over a long period of time; it is possible that household income may not reflect long-term effects on nutritional status (Sharma 2006). Indicators like size of land holding, provision of electricity, type of house, cattle owned are also been used in literature. Strauss (1990) and Horton (1989) find a positive influence of the size of landholding on the nutritional status while some report it to be insignificant.

Head of the Household: The gender of the head of the household also has important implication for child. Kennedy & Cogill (1987) found that children living in households headed by women are better nourished. In line with this gender issue is the gender bias in nutrition of members of the household. While gender bias is strong in South Asian countries, its effect has not been significant for many West African countries (Strauss 1990).

Size and composition of the household: The structure and composition of the household also determine the nutritional status of the children. It is generally believed that older siblings (six years and above) do not directly compete for nurturing time with younger children and provide some childcare assistance, which results in better nutritional status of children. Maxwell et. al. (2000) find a significant negative association between households with more children under five-years of age and their health status.
Community-Specific Factors

Water and Sanitation Facilities: Lack of access to safe water and poor environmental sanitation due to unsanitary waste disposal are considered important causes of infectious diseases, especially diarrhea and intestinal parasites (UNICEF 2008). The main source of infection is poor sanitation and water facility, poor personal and environmental hygienic conditions. The young malnourished children are at greatest risk of illness due to lower immunity. Infection is the most common cause of anaemia among preschool children than poor dietary intake (Asobayire et.al. 2001; Brooker et.al. 1999; Stolzfus 1997). Poor sanitation, unhygienic environments and infectious diseases often deplete the body's stores of vital nutrients such as iron (Bhargava 2003; Gopalan 2000). Other studies show positive effect of improved sanitation and water facilities and hygienic conditions on nutritional status of individuals. In the case of sanitary behaviour, the age of child has differential effects. Jalan and Ravillion (2001) show the positive health for children under five for piped water in rural India. However, these gains are not found for children in poor families, particularly when the mother is poorly educated. Here education is a proxy for knowledge about how to ensure that water is safe to drink.

Some studies have clubbed many of the above factors under socio-economic status. The influence is evident as higher levels of income are correlated with better housing conditions. Thus, households with better toilet facilities, piped water and electricity generally have lower contaminant levels than other households without such amenities. Bhuiya et. al. (1989); Bicego and Ahmad (1996); Victoria, Smith and Vaughan (1986) have also studied the influence of socio-economic status on health. Studies have found that parental occupation strongly influences child health (Bicego and Ahmad 1996; UN 1985), with agricultural and blue collar workers having highest childhood mortality levels and professional workers having the lowest. Declining levels of child mortality have also been associated with piped water, flush toilets, non-dirt floors and radio ownership (Victoria et. al. 1986). Socio-economic status has explained half or more of the effect of maternal education on child health outcomes (Cleland and van Ginnekan 1988; Desai and Alva 1998).

Healthcare Infrastructure: Access to healthcare resources improves the nutritional status. Studies by Thomas and Lavy (1992) show that increasing provision of basic
health services like birth services, availability of drugs, immunization, improves the nutritional status of children. Peabody et. al. (1998) show that in Jamaica, women with access to high quality prenatal care have higher birth weights than women with access to poor quality care. Barber and Gertler (2001) also show that children living in communities with high quality care are healthier. Distance to medical care is another factor considered in studies. Strauss (1990) showed that distance to health facilities is orthogonal to the anthropometric status of children in rural Cote d'Ivoire while Barrera (1990) show the expected inverse relationship in case of Philippines.

The above literature review presents the determinants of child health and nutritional status. We would use these in our analysis of evaluation of health effects of ICDS where we use the above as control factors.

2.3 PROGRAM EVALUATION STUDIES

In this section we review studies in the area of evaluation of child health and nutrition programs in the developed as well as developing countries. We also look at some of the other programs' impacts and evaluations that use the same methodology and estimation techniques. While some of these studies emphasize on the impact and effects of these programs, others address the estimation issues involved.

Early Childhood Development Programs (ECD): Health and nutrition programs aimed at early childhood development play an important role in improving access to technology and resources, but are also important in fostering behavior change and, more generally, in supporting caring practices (Engle et. al. 2000; UNICEF 1990). Early childhood is understood to be a “sensitive” period for brain development. There is a proven relationship between the quality of early childhood experiences – that is, the amount of positive stimulation and sensitive, responsive caring by familiar adults – and the developing capabilities of the brain. The effect of diminishing the burden of disease and dysfunction across the lifespan has encouraged governments to invest more heavily in children before they enter formal schooling. This has involved a specific focus on targeted early childhood interventions to assist children from disadvantaged backgrounds to enter school on a more equal footing with more advantaged children.

There has also been a diversification of early childhood interventions in step with theoretical shifts in developmental science. There has been an evolution of
comprehensive, holistic or “multilevel” interventions, which employ programs, services and benefits that target outcomes across child, parent and community domains, wherein the child is viewed in the context of the family, the family in the context of the community, and the community in the context of society at large. The aims of early childhood interventions have also broadened. A new body of literature emphasizes the importance of focusing on non-cognitive skills as a critical component of child success. It is argued that if early-childhood interventions can avoid the need for special education services at school, and help children get along better with peers, then they are deemed successful, even if there is no long term improvements in cognitive skills (Currie 2003).

There have been few systematic evaluations of early childhood development (ECD) programs in the developing countries. However, there are several evaluations done in the United States that provide important lessons. The High/Scope Perry Preschool Study (Michigan) studies the effects of a high-quality preschool program for children. It randomly assigned 123 children to program and no-program groups and followed these children with respect to a variety of outcome measures from age 3 to 4. Evaluations have found gains in children’s readiness for school and their subsequent educational success (Schweinhart and Weikart 1998; Belfield and others 2006). Besides the direct benefits to participants, there are positive externalities for general public in terms of higher tax revenues and lower criminal expenditures.

In another program, called HIPPY, it was found that program had positive impacts on cognitive test scores. Experimental evaluations of other two programs pointed to modest positive effects on test scores that persisted through age 21 (Ramey, Campbell and Blair 1998). A non-experimental evaluation of the Head Start program that controlled for mother and child-specific unobservables showed that the program had positive impacts in test scores, immunization rates and lowered grade repetition (Currie and Thomas 1995). Longer term studies indicate higher rates of high school completion and college attendance and lower crime rates. The Carolina Abecedarian Project, a longitudinal study, found that the children who had received the preschool treatment at birth had higher scores on achievement tests (especially reading) and reductions in the incidence of grade retention and special education, regardless of whether or not they had received further “treatment” once they entered school. In the Milwaukee project investigators found that at grade 8, treatment children had higher
IQs than control children, but they enjoyed no other advantages. Their achievement test scores, grades, and rates of grade repetition were all similar to those of the controls. Once again, the Milwaukee project suggests that an exclusive focus on IQ is unwarranted because other factors also contribute to children’s success at school and in life (Wise et al. 2005).

Studies have used explicit statistical techniques beyond simple regression in an attempt to obtain causal estimates of program participation. Devaney and Fraker (1989) find that participation in school breakfast programs (SBP) positively affects breakfast intakes of calcium and magnesium and negatively affects breakfast intakes of iron. They use a selection bias model to estimate their results. Burghardt, Devaney & Gordan (1995) evaluate the impact of SBP on nutrient intake using an instrumental variables approach to tackle the problem of endogeneity of participation decision. However, they report that their first stage does not predict participation well. Bhattacharya and Currie (2001) estimate the effect of participation in school nutrition programs on selected nutritional outcomes of adolescents using a difference-in-difference methodology to address the endogeneity problem. They compare the changes across schools being in session for those eligible (the first difference) to those who are not eligible (the second difference) to obtain an estimate of the impact of the program. The findings indicate that school nutrition programs cause students to consume higher quality diets. However, there is little evidence of effect on nutritional outcomes like anemia and vitamin levels. In an evaluation of preschool supplementary feeding programs in developing countries, Beaton and Ghassemi (1982) review about 200 studies of preschool feeding programs, yet they find only eight evaluations that provide data on food substitution.

The evaluation studies in the developed countries have shown positive impact of early childhood development programs. This could be due to the higher resources available in these countries. However, resource constraints in the developing countries may lead to a situation where the positive effects may not be seen or may be insignificant. Still, some of the programs in developing countries have shown positive impact. Since the problems at hand differ between the developed and the developing countries, the programs aimed at early childhood development also differ in terms of their policies, interventions and goals.
Majority of the childhood programs in the developing countries aim to reduce incidence of malnutrition, a pressing and widespread problem in these countries. The community and child health programs (CHNPs) address about 40 percent of the disease burden. In terms of prevention, Mason, Musgrove and Habicht (2003) estimate that eliminating malnutrition would remove one-third of the global disease burden. Comparative studies by Ezzati, Lopez, and others (2002) and Ezzati, Vander Hoorn and others (2003) have reemphasized malnutrition as the predominant risk factor and improvement of nutrition as playing a potentially major role in reducing the burden. Clinical deficiencies contribute directly to malnutrition, but even more, malnutrition is a risk factor for infectious diseases. Furthermore, changes in child malnutrition levels in developing countries are closely related to the countries' mortality trends (Pelletier and Frongillo 2003). A number of large-scale, sustained health interventions (Sanders and Chopra 2004), use a mix of improved access to facilities and community health workers like the ones in India, Brazil and Bangladesh.

The efficacy of health and nutrition interventions in developing countries has been well established (Gwatkin, Wilcox, and Wray 1980). Prospective studies in several settings showed that health interventions with or without supplementary foods caused children to thrive and survive better: India (Kielmann and others 1978); Central America and Panama (Delgado and others 1982); Jamaica (Waterlow 1992); The Gambia (Whitehead, Rowland, and Cole 1976) are examples. These studies showed the effect of interventions on growth and (usually) mortality but did not generally factor out the relative contributions of health and nutrition.

Effective experimental programs in these areas have led to many other such large scale programs. Examining the success factors of these programs, Mason et. al. (2003) conclude that some factors are contextual while others are programmatic. The importance of context, within which programs are initiated and run, thus emerged as crucial, and priority factors were proposed from studies of community-based programs in Asia (Gillespie, Mason, and Martorell 1996; Jonsson 1997).

In an evaluation of an integrated child development program in Bolivia, Proyecto Integral de Dessarrollo Infatil (PIDI), Behrman, Cheng and Todd (2004) compare children in the program for short (less than 2 months) and longer durations in absence of satisfactory baseline and non-random treatment. The program was found to have
positive effects on children’s growth and psycho-social development and estimate that these effects mean gains in higher lifetime earnings.

Another program in Indonesia of placement of midwives in villages showed positive effects on height-for-age after controlling for community level unobservables using fixed affects (Frankenberg, Surriestini & Thomas 2005).

In impact evaluation of the Mexican Program for Education, Health and Nutrition (PROGRESA), Gertler (2004) found that newborns in treatment communities were 25.3 percent less likely to be reported ill in the month prior to the survey than newborn in control communities. Treatment children were 86 percent less likely to be stunted and 25.5 percent less likely to be anaemic. In a randomized effectiveness study of PROGRESA by Rivera et. al (2004), it was seen that PROGRESA was associated with better growth in height among the poorest and younger infants. Age-and length-adjusted height was greater by 1.1 cm (26.4 cm in the intervention group vs. 25.3 cm in the crossover intervention group) among infants younger than 6 months at baseline and who lived in the poorest households. After one year, mean haemoglobin values were higher in the intervention group. They concluded that PROGRESA, a large-scale, incentive-based development program with a nutritional intervention, is associated with better growth and lower rates of anaemia in low-income, rural infants and children in Mexico. Behrman and Hoddinott (2005) also evaluate the impact of PROGRESA on children’s nutritional status. Despite the randomized design of PROGRESA, they find it is crucial to control for unobserved heterogeneity through difference-in-difference because of administration of a nutritional supplement did not in practice follow the randomized design. They find important impacts on the height of children aged 12-36 months.

Attanasio et. al (2004) evaluate the effect of a large nutrition program in rural Colombia on child nutritional status, school achievement and female labour supply. They find large and positive impacts.

Positive effects of a child intervention program were found in Bangladesh Integrated Nutrition Program. Prevalence of underweight and stunted children was less in program areas. A similar phenomenon was observed even more strikingly in the Community Nutrition Project in Senegal, a project with a similar set of interventions carried out between 1995 and 2000 where, in urban areas, malnutrition rates fell
among participants 12-17 months of age from 33.2 percent to 29.3 percent, but fell even more among controls of the same age, from 32.3 percent to 25.9 percent (Mason et. al. 2006).

Many programs involve conditional cash transfer (CCT). The existing evidence on the impact of CCT program on children’s nutritional status is not unequivocal. Morris, Flores and others (2004) analyze the impact of PRAF, the CCT implemented in Honduras. They find that households increase their demand for preventive care due to CCT. However, PRAF did not improve children’s nutritional status. Morriss et.al (2004) find null effects of the Brazilian nutritional CCT on children’s nutritional status. In another study, Attanasio et. al (2004) evaluate Familias in accion, program in Colombia, showing that conditional cash transfer programs increase the height of children aged 0 to 2, but has limited effects on older children. On the other hand, Gertler (2004) finds that PROGRESA reduced children’s illness rate as well as prevalence of anaemia. Also, children aged between 12 to 36 months who were exposed to the program grew one centimetre more than children who were not. These effects refer to the short term impact (one year), while evidence on the long term impact is not sure.

Marta Ruiz-Arranz (2002) analyze the impact on food security of two conditional cash transfer programs, PROGRESA and PROCAMPO, implemented in rural Mexico. PROGRESA is linked to development of human capital the latter is linked to agricultural production. Their results suggest that, “contrary to conventional wisdom, men do not just drink away cash transfers and that monetary payments linked to a productive asset –land- can have as large or larger impact on food security as cash transfers not linked to a productive asset. However, PROCAMPO has a larger impact on meat and vegetables consumption and PROGRESA on the other food category. Furthermore, increased food security is achieved through different channels: PROGRESA through purchases while PROCAMPO through investment in home production. Also, cash transfers linked to information on nutrition and health increase food diversity. PROCAMPO households that also receive PROGRESA, and the information that goes with it, are more likely to be eating a more varied diet than households that get PROCAMPO only.”
In the above paragraphs we discussed development programs. The basis of most of these follows from the program evaluation literature. We now present findings of evaluations of other programs that have used more robust techniques of estimation. These highlight the importance of these techniques in assessing impact when there are biases. Table 2.1 (at the end of this chapter) summarizes some of the country experiences in intervention programs. The outcomes and resources in these are presented in table 2.2.

**Argentina’s TRABAJO Program:** Argentina’s TRABAJO program aims to reduce poverty by simultaneously generating employment opportunities for the poor and improving social infrastructure in poor communities. Using propensity score matching methods, the results of evaluation show that the distribution of gains is decidedly pro-poor, with 80 percent of program participants falling in the bottom 20 percent of the income distribution, implying efficient targeting by the program (Jalan and Ravallion 1999; Ravallion 1999).

**Bangladesh Programs on Microfinance:** The microfinance programs in Bangladesh provide small loans to poor households who own less than one-half acre of land. The evaluation investigates the impact of these on treatment group and compares them with a control group of households in areas without any microcredit financing. After testing for exogeneity of landholding, the evaluation uses non-parametric graphing and difference-in-difference techniques to assess gains. The results suggest that almost all the apparent gains from the program are due to selection bias resulting from loan mistargeting. The results differ markedly when fixed effects and difference-in-differences or simple difference approaches are used. The evaluation makes a convincing case that the former is less appropriate when unobservable target group differences are used in making the location decision (Jonathan 1998; Khandkar 1998).

**Bangladesh Food for Education:** Ravallion and Woodon (1998) evaluate this targeted social program when placement is decentralized. The Food for Education (FFE) program in Bangladesh was designed to increase primary school attendance by providing rice or wheat to selected households as an incentive to parents. Using data from Household Expenditure Survey, the authors use two-step allocation process as an instrument. A three-stage least square regression is carried out and compared with ordinary least squares. The estimated impact of FFE using the three-stage least
squares approach was 66 percent higher than the ordinary least squares estimates without geographic controls and 49 percent higher than with the controls. In other words, simple estimates that only control for variation across households (ordinary least squares without geographic controls) will substantially understate the effectiveness of the program.

The Impact of Mexico’s Retraining Program on Employment and Wages: PROBECAT (Programa de Becas de Capacitacion para Trabajadores) is a Mexican short-term training program targeted at increasing earnings and employment for unemployed and displaced workers. The key econometric techniques used are survival analysis (duration models) for the probability of working and Heckman regressions for wages. Evaluations have found limited impact of the program (Revenga, Ana, Michelle Riboud and Hong Tan. 1994)

Angeles, Guilkey, and Mroz (1998) develop an empirical model that accounts for individual heterogeneity as well as modelling the endogenous program placement in Tanzania. Their empirical modelling approach recognizes that there might be particular unmeasured features of communities that could be related to the fertility of women within the community as well as to the propensity for the government to place family planning programs within the community. Their results indicate that such selective placement of family planning programs does have important effects on programmatic effects. Without controlling for the endogeneity of the placement of the family planning facilities, they found that hospitals were the most important type of facility for providing effective family planning services. After controlling for the endogeneity of the timing of the placement of the programs, they found that hospitals providing family planning services had little impact on individual fertility outcomes, while health centers providing family planning services appeared to have large fertility reducing effects.

Gertler and Molyneaux (1994) and Pitt, Rosenzweig and Gibbons (1993) note the targeted nature of the Indonesian family planning program and estimate community level fixed effects models to measure the impact of family planning programs on fertility. Gertler and Molyneaux’s major conclusion is that, after controlling for program endogeneity, program effects on fertility are not significant even though simple methods indicate a significant negative impact on fertility for health centers.
Pitt, Rosenzweig and Gibbons (1993), on the other hand, find that simple methods yield a significantly positive impact for family planning programs on fertility. The effect becomes negative but insignificant when the endogeneity of program placement is controlled. They conclude that endogeneity of program placement is an important issue in program evaluation.

**Estimation Issues**

When accessing program impacts it is important to determine whether the provision of program to particular areas might have been governed by location specific factors that are related to the outcomes of interests. If the programs are targeted with their presence being associated with characteristics not observed by researchers, there could be important biases in studies that simply relate outcomes to the presence of programs.

Pitt, Rosenzweig, and Gibbons (1993) and Gertler and Molyneaux (1994) use a fixed effects methodology to control for non-random program placement. The fixed effects technique corrects for endogeneity of program placement if the government is responsive to fixed attributes of the target population in locating programs. The fixed effects method removes the effects of these fixed characteristics from the error terms and the model.

Program impacts can be estimated better with simulation studies. In their study of impact of assessment of school subsidy element of Progresa, Behrman et. al (2001) use a Marker schooling transition model. Their finding shows that the program effectively reduces drop-out rates and facilitates progression through the grades, particularly during the transition from primary to secondary school. Results based on simulation evaluating the effects of longer terms of exposure to the program indicate that of children were to participate in the program between ages 6 to 14, they would experience an increase of 0.6 years in educational attainment level years and an increase of 19 percent in the percentage of children attending junior secondary level.

In their study of PIDI in Bolivia, Behrman, Cheng and Todd (2003), evaluation is done using matching strategy. They show that given the assumption of selection on observables, the program has no positive effect on children height. Conditional on participation, however, they find some moderate positive effect of length of exposure.
Ruel et al. (2002) study a program implemented in Guatemala city using a ‘selection on observables’ strategy, they find very limited effects of the program. Rosenzweig and Schultz (1982) found the interaction of female education and local level of family planning activity on fertility to be significantly positive for urban women aged 25 – 43 in Colombia implying that for this group of women the program acted as a substitute for schooling. However, the finding that programs substitute for female education does not appear to be universal. For example, estimates of impact of community health services on child health show that the program and mother’s education are substitutes in some cases (Thomas et al. 1990 for Brazil) and complements in others (Strauss 1990 for Cote de Ivoire).

The effect of family planning programs on child schooling tends to be limited after controlling for availability of other programs and community infrastructure (Rosenzweig and Wolpin 1982; Hossain 1989). Fixed effects estimates of cross-price effects on schooling also show statistically insignificant effects (Duraisamy and Malathy 1991; Pitt, Rosenzweig and Gibbons, 1993). In contrast to these results, Foster and Roy’s (1997) difference-in-differences estimates of the impact of the Matlab family planning program on schooling showed that the program significantly raised completed years of schooling only after the program had been in effect for 12 years. Controlling for the number, age and sex composition of siblings, Foster and Roy found that by 1990 the program had resulted in 30% increase in completed years of schooling of children aged 8-15 in program areas.

Using regional or community level fixed effects estimation is one possible method to remove biases due to non-random program placement if the unobserved community characteristics that influence fertility are constant over time and program inputs vary.

Fixed effects estimates show mixed evidence of the impact of program on fertility. Gertler and Molyneaux (1994) use community level fixed effects to estimate the impact of a family planning program on contraceptive use, marriage probability and birth hazards in Indonesia. Their estimates suggest that the net impact of the family planning program on reducing fertility was very small.

Foster and Roy (1997) evaluate the Matlab family planning program. Their difference-in-differences estimate of the program impact shows that the family planning program significantly lowered the birth rates in treatment areas as compared
to the control areas. They also found that the impact of the program on birth rates increased with the length of program exposure. Four years after the program began in 1978, the birth rate in treatment area was 20% less than that in control area, and by 1990 the birth rate in treatment area was 25% below that in control area.

2.4 ICDS EVALUATIONS

The above literature shows the important factors that determine nutritional status of children. Since the ICDS program aims to influence these directly or indirectly, it is important to consider these in estimating the effects of the program.

There have been hundreds of studies and surveys that have assessed some aspect of ICDS. In fact, ICDS has been claimed as an "over-researched" program (Subbarao 1989). Majority have these studies have been done in by researchers in the medical field. Abstracts of many of such studies have been compiled by the National Institute of Public Cooperation and Child Development (NIPCCD). These studies contribute to our understanding of the working of the program and also throw light of its major deficiencies and gaps. A review of all these studies is not possible here. We present summaries of recent studies. Studies estimating health impact of ICDS are reviewed here while studies assessing other components and quality of ICDS are presented in chapter 7.

Radhakrishna et. al. (1998) estimate that in the absence of ICDS program the percentage of malnourished children (1-5 years) in 1988-1990 would have been 9.2% as compared to the observed figure of 8.7% and the percentage of moderately malnourished children would have been 44.5% as compared to the observed figure of 43.8. Shanti Ghosh (2004) provides evidence that even after fifty years of operation the ICDS is yet to have an impact on the poor nutritional status of children. It has been realized that the AWW can be a good resource if properly manned and supervised.

In their evaluation study of three southern states (Andhra Pradesh, Karnataka and Tamil Nadu), Vazir and Kashnath (1999) indicate higher developmental (motor and mental development source) benefits to children exposed to the pre-school education under the ICDS as compared to controls even after controlling for home environment and social economic status. The ICDS beneficiaries with more than or equal to 75%
weight for age achieved significantly higher intelligence quotients compared to the poorly nourished controls. The finding suggests that development stimulation offered by the program could promote their psychosocial development independent of nutritional status. The study also highlighted the need by mothers for better infrastructural facilities of AWCs.

Kumar (2006) explores the extent of under-nourishment among children and to look into the functioning of ICDS in ameliorating malnutrition and educating mothers on health and nutrition issues in the states of UP, Rajasthan and Orissa. The study shows the high extent of under nourishment and the less than satisfactory performance of ICDS. Around 1/4th of children were born under weight. He also finds that proper charts for growth were not maintained in any of the states.

Radhakrishna (2005) has shown that the program is regressively distributed between states. The states with a high incidence of malnutrition like Bihar, MP and UP have a relatively low coverage. Studies reveal that most of the beneficiaries of ICDS belong to the vulnerable groups highlighting the self targeting nature of the program design. Moreover, utilization of Vitamin A, Folic acid and immunization services is better in the ICDS villages. However, the overall impact of ICDS on malnutrition is very limited, which could be due to a meagre allocation of budgetary resources. Vaid and Vaid (2005) report the nutritional status of ICDS and non ICDS children in Resham Ghar colony of Jammu and Kashmir. Their study reveals that all the ICDS were providing supplementary nutrition to children pregnant women and non nursing mothers who enrolled in AWC. It was observed that ICDS children had good dietary intake as compared to the children who did not attend the ICDS centres.

Gopalan Sarala (1998) found that ICDS areas had higher coverage of Vitamin A and Iron Prophylaxis program, a lower percentage of underweight babies at birth and a better nutrition status as compared to non ICDS areas. Renu & Rekha (1982) observed that nutritional status of children improved as a result of ICDS centers. Gupta (1988) found that mean body weight and height in ICDS area were higher and nutritional status of children better than their non ICDS counterparts. Similar conclusions were drawn by Yegammai & Nivargi (1995) and Jayalakshmi and Naik (1996). Bredenkamp & Akin (2004) reveal that very little evidence exists for greater healthy
behaviors in villages with AWCs than without AWCs in Kerala, Maharashtra, Rajasthan and UP.

Sachdeva et al. (1996) showed that in ICDS covered areas the children who attended AWC showed better immunization status (67.3%) than those who did not (53.4%). Sharma & Gupta (1992) found that longer duration of AWC and ICDS projects had more favorable effect in reduction of infant mortality rate. A higher utilization of pre-natal services was found in ICDS areas than in non-ICS areas. A study aimed to assess the impact of non-formal pre-school education on the mental and cognitive development of rural and urban children from Ludhiana ICDS district, showed that higher means tests (73.77) of ICDS attenders as compared to non-ICDS attenders (67.33). No significant difference was found between rural and urban attenders or non-attendees for any age group. A significant correlation between age and cognitive ability was found and was higher for attenders (Raizada et al. 1993).

Tandon (1989) investigated the impact on the nutritional status of the target population after 3-5 years and after 8 years of ICDS interventions, compared with the nutritional status of non-ICDS (control) groups. The results showed that the ICDS nutrition intervention program achieved better coverage of the target population and led to a significant decline in malnutrition among preschool children in the ICDS population, compared with the non-ICDS groups that received nutrition, health care and education through separate programs. Tandon concluded that the success of ICDS may lead other developing countries to introduce integrated programs with certain modifications to suit local conditions. International agencies and national governments should strive to bring about the integration of nutritional services with primary health care and development programs for children because of the good results in terms of child survival and child development.

Dubowitz et al. (2007) carry out an impact evaluation study where 744 women and children in Jharkhand were examined for antenatal and birthing practices, colostrum delivery, delivery of breastmilk as first food, reported use of iodized salt, measured iodized salt status, immunization and weight-for-age z-scores (WAZ) of children 0 to 36 months of age, controlling for various measures of socioeconomic status. The results found differences between Dular (treatment) and non-Dular (control) villages in all major outcomes. The young children in Dular areas had a 45% lower prevalence
of severe malnutrition and were four times more likely to receive colostrum than those in non-Dular villages. The authors conclude that the evaluation results indicate that programmatic overlays to the ICDS program, which focus primary attention on children 0 to 36 months of age and on women, have the potential to transform into a cost-effective instrument for reducing child malnutrition in India, with implications for women and children in India.

Bose et. al (2007) investigated age and sex variations in height and weight, levels of stunting, underweight and wasting among 533 (254 boys; 279 girls) 3- to 5-year-old rural children of Bengal ethnicity at 11 Integrated Child Development Services centres of Nadia District, West Bengal, India. Height-for-age, weight-for-age and weight-for-height $<-2$ z-scores were used to evaluate stunting, underweight and wasting, respectively, following the National Center for Health Statistics (NCHS) Guidelines. Results revealed that boys were significantly heavier than girls at age 3 years. Significant age differences existed in mean height and weight in both sexes. Mean z-scores of height-for-age, weight-for-age and weight-for-height were lower than those of NCHS for both sexes at all ages. The overall rates of stunting, underweight and wasting were 23.9%, 31.0% and 9.4%, respectively. The rate of underweight and wasting was higher among girls (underweight = 35.1%, wasting = 12.2%) compared with boys (underweight = 26.5%, wasting = 6.3%). In general, the frequency of stunting increased with increasing age in both sexes. The prevalence rates of stunting (20-29%) and wasting (5-9%) were medium. The study concluded that the nutritional status of the subjects is unsatisfactory and emphasized on an improvement in the form of enhanced supplementary nutrition.

Mustaphi and Dobe (2005) evaluate a pilot phase of “Keno Parbo Na” project, based on the Positive Deviance (PD) approach, in the Murshidabad and South 24 Parganas districts of West Bengal. The results showed that the project activities awareness of the issue of malnutrition. There seems to be acceptance of desirable behavioral practices is observed within the community. A steady reduction in the moderate and severe level of malnutrition was noted across four districts.

A study was conducted to assess community contribution to the Integrated Child Development Services (ICDS) program, which promotes mother and child health in the Agra district, Uttar Pradesh, India. Three rural ICDS projects in the district were
selected, out of which a total of 74 AWCs were chosen for the study. The AWWs were interviewed through a semi-structured questionnaire to assess the community's contribution during the previous 6 months. Results revealed that about 68% of AWWs had been able to receive assistance in bringing the children to the AWC. 53.3% had received free accommodation for AWC, and 42.6% had obtained assistance in implementation of health activities. Only 4% and 12% of the AWWs reported community assistance in the preparation and distribution of nutritional supplements, respectively. There had been no contribution received in terms of raw food for supplementary nutrition and fuel for cooking. The study concludes that rural area free accommodation for the AWC and community assistance in bringing children to the AWC were the most common forms of community contribution to the ICDS program. (Nayar, Kapil and Nandan 1999)

Kapil U. (2002) presents an excellent overview of the ICDS program stating the objectives, spread and targeted beneficiaries of ICDS. Kapil and Pradhan (2000) present the working, status and efficacy of the program. The authors point out the important role played by the AWW in the implementation of this scheme at the ground level. Research indicates that ICDS had led to (i) reduction in prevalence of severe grades of malnutrition and (ii) better utilization of services of national nutritional anemia prophylaxis program and the national program for prevention of nutritional blindness due to vitamin A deficiency by ICDS beneficiaries. The ICDS scheme is being modified continuously to strengthen the program.

Bhasin et. al. (2001) assess the long term nutritional status of ICDS. Nutritional status of 1243 children (636 boys and 607 girls) in the age group of 7-13 years was assessed in relation to utilization of Integrated Child Development Services (ICDS) during their childhood in the ICDS project in Nand Nagri in East Delhi. Information regarding utilization of ICDS facilities, socio-demographic details, general awareness etc. was collected by interview technique and anthropometric and clinical examination of every child was done and Anganwadi attendance score was calculated for each child. It was found that most of the children were non-beneficiaries (59.1%). On univariate analysis, Anganwadi attendance score, age, sex of the child and education status of the father showed statistically significant association (p < 0.005) with malnutrition. On multiple logistic regression analysis higher age (OR 1.4155 for grade 1 malnutrition and 1.6913 for grade 4 malnutrition) and being female (OR
1.5214 for Grade 4 malnutrition) remained significant risk factors for development of malnutrition for all grades. Anganwadi attendance score did not show any statistically significant association for decreasing the risk of getting malnourished for any grades of malnutrition in 7-13 years age group. There is special need to take special care for girls as well as to continue the special nutrition care even at higher age. More in depth studies are needed so as to formulate effective nutritional policies for children.

Patnaik et. al. (1999) estimate “before-and-after” intervention effects on the beneficiary coverage (pregnant and lactating women and children less than two years of age) for utilization of supplementary nutrition and health services in the rural block of Amarwada in Madhya Pradesh. The study assessed the impact of these interventions on the coverage rates of the services. Study was conducted between May 97 and March 98. The routine monitoring reports of the ICDS and Health System of the state government were used as study tools. The study sample comprised of AWC beneficiaries in the project area. The total population of the block was 89,476. The results showed that participation in the supplementary nutrition program (SNP) increased two to three folds in all categories of the target population. Immunization and Vitamin A coverage levels for children also showed an increase of about 3 and 5-8 times from baseline status respectively in a year’s time. Among pregnant women, Tetanus Toxoid (TT) and Iron and Folic Acid (IFA) utilization rates have showed two and five fold increase respectively.

A study by Agarwal et. al. (2000) aimed to evaluate the impact of ICDS on maternal nutrition and birth weight. 28 ICDS and 21 non-ICDS villages in two adjoining blocks of Varanasi were chosen. 5289 pregnancies were registered during 1987-1993 in these two blocks. In the ICDS block 916 and 1453 nutrition supplemented and un-supplemented, respectively and 1748 of the non-ICDS live births with weight recorded within 48 h formed the study subjects. Results showed that ICDS supplemented mothers gained 100g more in pregnancy and birth weight was higher by 58 g (p < 0.05) as compared to un-supplemented ICDS mothers. Birth weight in un-supplemented ICDS areas was 25g higher as compared to non ICDS area. ICDS supplemented women had a significantly smaller proportion of low birth weight babies (14.4%) compared to ICDS un-supplemented (20.4%) and non-ICDS women (26.3%). The corresponding prevalence of preterm births was 2.0, 2.4 and 4.3%, respectively (P < 0.001). Multiple regression analysis showed that increased weight
gain in pregnancy, length of gestation, caloric intake and term hemoglobin were significantly associated with birth weight. However, the length of gestation was not influenced by factors improving the birth weight. The authors concluded that ICDS had a positive impact on the health of pregnant women.

Lal and others (1995) estimate the participation and utilization rates of women in the ICDS program, interviews with 363 pregnant and lactating mothers and an examination of household records were conducted. It was found 62% of the women were currently involved in the ICDS Program, 23.7% had never used ICDS services. The most frequented services were supplementary nutrition (97.3%), tetanus toxoid prophylaxis (89.3%), and iron and folic acid prophylaxis (87.1%). 62.8% of the women participating in the supplementary nutrition program participated more than 20 days/month. The major reasons for never using ICDS services were: could not spare time (53.5%) and working outside the household for long hours (50%). 15% were never approached by an anganwadi worker and were therefore not aware of ICDS services or the workers did not have an encouraging attitude. Other possible contributing factors to under- or non-utilization were high illiteracy (61%) and insufficient awareness of ICDS services among heads of households (94.9%).

Bhasin et. al. (1995) evaluate an ICDS block in Delhi. Interviews were conducted with 100 anganwadi workers (one of whose major functions is growth monitoring) to determine their knowledge on growth monitoring and to identify gaps in that knowledge. Each anganwadi worker serves a population of 1000. 99% had adequate knowledge about the significance of the lines on the growth charts that indicate different grades of nutritional status. Yet only 43% knew that they can begin growth monitoring for any child under age 6. 37% did not know that assessment of correct age is not essential for growth monitoring. 90-91% had correct knowledge about weight of a child at 1 and 3 years. Yet only 17-30% knew the correct mid-upper arm circumference (MUAC) for an optimally nourished child aged 2 and 4. These findings suggest that training programs and various meetings have emphasized inputs of growth monitoring but not on age at which growth monitoring can be started, on correct age for successfully conducting growth monitoring, and on the cut-off measurements for MUAC. They conclude that continued education on various aspects of growth monitoring is needed for AWW.
In a comparative study of TINP and ICDS, Sachdeva and Tandon (1996) conclude that a larger no. of pregnant and lactating women receiving SND under the ICDS than the TNIP in 1992-3, percentage of children receiving supplementary feeding under ICDS (40-69%) greater than under TNIP (24-57%) and number of children with normal nutritional status were found to be more under TNIP (54.9%) than the ICDS (41.8%). A study conducted by the Foundation for Research (1996) in Health Systems of the ICDS in 7 States found a widespread tendency on the part of AWWs to over-report the no. of beneficiaries as well as rates of provision of food and other services. Also it was seen that children under two years of age were not being reached by the SNP.

Ray (2005) observed higher prevalence of severe degree of malnutrition in the underserved section of population with specific reference to girl child, under 3 years of age, where there were large number of children in the family, repeated infections and Measles. He noted that growth monitoring services in the ICDS scheme meant only weight recording and was not at all satisfactory. Even the majority of the Anganwadi workers (AWW) stated that it meant monthly weight recording of children while only few knew it is in addition plotting these on growth charts and advising mothers if growth was not proper. Around 60% of caregivers did not know about growth monitoring. It was felt that the concept of growth monitoring should be changed to Growth surveillance to emphasize more on the action components of it.

In another study to assess services within ICDS, the functioning of “Monitoring and Continuing Education System” of ICDS Program in Hooghly District was studied through record analysis and individual interviews of AWW. No Sector Adviser was entrusted the task of monitoring and continuing education activities in 15 out of 17 sectors, supervisors and Health Workers were present in 88.0% and 29.4% sector meetings respectively. The sector meetings were not usually held on fixed dates. Visits of AWC by Health Workers, Supervisors and Child Development Project Officers (CDPO) were very infrequent and no joint visit was made. Only 11.8% AWWs were exposed to continuing education sessions. There was gross under reporting of pregnant mothers and live births. Need of all-round improvement of functioning of ‘Monitoring and Continuing Education System’ of ICDS Program is well felt (Biswas and Chattapadhyay 2001).
All the above mentioned studies on ICDS provide useful insights into the impact of ICDS on nutritional status of children. Yet a common shortcoming of these is that these are micro-studies and the results cannot be generalized. Large studies are rare. The major national level studies have been done by NIPCCD (1992, 2006) and NCAER (2001). The NCAER study monitors program inputs but does not provide an evaluation of impact. In the 1992 study, NIPCCD reveals that the percentage of malnourished (Grade III & IV) in the ICDS areas is less by 1.8 points for children under 3 years and by 1.5 points for children in 3-6 year old. It found that the prevalence of malnutrition was lower in the program areas, but given the sample sizes of the control and treatment groups both these differences are statistically insignificant. Other recent studies on large dataset estimate the association of living in programs areas and health status but do not find significant effect. Using multivariate analysis on NFHS data, Das Gupta et al (2005) find that the program appears to have significant and positive effect on nutritional status. However, on using more robust econometric techniques, they find little significant effect of living in program area.

2.5 SUMMARY

The literature on child health indicates the important role played by various factors in determination of nutritional status of children. The evaluations of CHNPs and other programs across different countries are also presented in this chapter. These evaluations estimate impact on various outcomes. A review of studies on the ICDS program is also presented. The literature on evaluation studies as well as ICDS is vast. We presented some of these that are more relevant for our study. In this study, we estimate the effects on child health for those children who reside in areas where the ICDS program in operational. We study impact of the program using child health model that uses some of the determinants listed in section 2.2 as explanatory variables. We look at the program evaluation literature to use the desired methodology based on data availability. As noted above, most of the studies estimating impact of ICDS are based on small sample. The results may not be applicable at a national level. We use large-scale national level data from NFHS. We improve our results by using propensity score matching that tackles the problem of selection bias in the study.
Table 2.1: Country Experiences in Community-Based Programs

<table>
<thead>
<tr>
<th>Country and Program</th>
<th>Program Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanzania: Area program with UNICEF and WHO inputs, 1984–91. After rapid initial drop in child malnutrition, moderate steady improvement. Program not sustained.</td>
<td></td>
</tr>
<tr>
<td>Tanzania: Child Survival and Development Program</td>
<td>1985–95, World Bank support. Results similar to Iringa.</td>
</tr>
<tr>
<td>Bangladesh: Bangladesh Rural Advancement Committee</td>
<td>Community-based health services with village health workers. Wide coverage since 1980s; particular focus on diarrhea.</td>
</tr>
<tr>
<td>India: Tamil Nadu Integrated Nutrition Program</td>
<td>Implemented 1960 to mid 1990s. Village program in Tamil Nadu with World Bank support; growth monitoring, supplementary feeding, and so on. Substantial improvement in underweight reported.</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Massive expansion of village programs 1975–90, covering all villages by 1990. Steady decrease in underweight during this time. Program not sustained in 1990s; now planned to restart.</td>
</tr>
<tr>
<td>Philippines: National</td>
<td>No wide CHNPs despite national decree in 1974. No significant improvement in child nutrition.</td>
</tr>
<tr>
<td>Thailand</td>
<td>National program from late 1970s; 600,000 village health volunteers trained (1 percent of population). Rapid improvement 1960–90; for example, 36 percent to 13 percent underweight children.</td>
</tr>
<tr>
<td>Jamaica</td>
<td>Expanded health services with community health aides from mid 1970s. Rapid fall in underweight, 1985–89.</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>Community health movement, 1979–90, reduced IMR, eliminated polio; about 1 percent of population as village health volunteers.</td>
</tr>
</tbody>
</table>

Source: Mason et. al. 2006
<table>
<thead>
<tr>
<th>Country</th>
<th>Outcomes</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanzania:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iringa</td>
<td>Underweight: 50 to 35 percent (1984–88)</td>
<td>US$8 to US$17/person/year (US$34/child/year from total costs); 2 village health workers/village = 1,220 total; Approximately 1:40 children</td>
</tr>
<tr>
<td></td>
<td>Immunization: 50 to 90 percent</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rates in underweight: initial 2 years, -8* pts/year; first 4 years, -4.5 pts/year; sustained (years 2–7), -0.8 pts/year</td>
<td></td>
</tr>
<tr>
<td>Tanzania: Child Survival and Development Program</td>
<td>Underweight reduction rates similar to Iringa</td>
<td>US$2 to US$3/child/year</td>
</tr>
<tr>
<td>Zimbabwe:</td>
<td></td>
<td></td>
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<tr>
<td>Supplementary Feeding Program</td>
<td>Stunting: 35.6 to 29 percent (1982–88) -1.1 points/year</td>
<td>External funds, approximately US$0.50/child/year</td>
</tr>
<tr>
<td></td>
<td>IMR: 1980–88: 110 to 53</td>
<td></td>
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<tr>
<td>Bangladesh:</td>
<td></td>
<td></td>
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<tr>
<td>BINP</td>
<td>BIPN, first 6 thanas, initial effect (1997): approximately -11 points/year; then (to February 1999) approximately -1.6 pts/year; additional Underlying (non-program) trend: national approximately -1.7 pts/year, program area approximately -2.4 pts/year</td>
<td>1 community worker per 1,000 population; Approximately 1:200 children; US$14 million/year, approximately US$18/child/year</td>
</tr>
<tr>
<td>Bangladesh: BRAC</td>
<td>No program-specific data, but child underweight and anemia in women have substantial falling trend in recent years.</td>
<td>Over all programs, US$196 million in 2003 (approximately US$8/household over all households); health program covered 31 million people, over 20 percent</td>
</tr>
<tr>
<td>India: ICDS</td>
<td>Overall underweight prevalence declining only slowly; some states reported faster, but link to ICDS not shown.</td>
<td>1 supervisor to 20 ANWs</td>
</tr>
<tr>
<td>India: TINP</td>
<td>1979–80: -1.4 pts/year in TINP districts; -0.7 in non-TINP districts: increased improvement of approximately -0.7 pts/year. From other data, increased improvement of -1.0 pts/year.</td>
<td>US$7–12/child/year</td>
</tr>
<tr>
<td>Philippines: National</td>
<td>No change found in underweight.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IMR: 1960: 77, 1996: 32</td>
<td>Low coverage and intensity</td>
</tr>
<tr>
<td>Jamaica</td>
<td>-1.9 pts/year 1985–89</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IMR: 1960: 58, 1996: 10</td>
<td></td>
</tr>
<tr>
<td>Nicaragua</td>
<td>IMR fell from (at least) 92 to 80</td>
<td>Large numbers community health volunteers trained and supported</td>
</tr>
</tbody>
</table>

* "-" implies a fall in the rate

Source: Mason et. al. 2006