

# The impact of the Anganwadi program on undernutrition among young children in rural Uttar Pradesh, India

*A quantitative and qualitative approach*



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## **Abstract**

Uttar Pradesh, India's most populous state, carries a heavy burden of child undernutrition. As much as 52% of the children under-3 in Uttar Pradesh are underweight. A major incentive to reduce the prevalence of child undernutrition in India is the Integrated Child Development Services (ICDS) program, or Anganwadi program. By placing so-called Anganwadi centers that provide health, nutrition and education services for children under-6, pregnant women and lactating mothers in rural as well as urban areas the program tries to meet its targets.

In rural Uttar Pradesh the prevalence of child undernutrition is very high, but at the same time the ICDS program coverage is rather low. The aim of this study is to try to find out whether the ICDS program has any impact on the prevalence of undernutrition among children under-3 in rural Uttar Pradesh. Furthermore we tried to determine which possible underlying factors on the micro level are affecting the functioning of the ICDS program.

For the first objective a quantitative cross-sectional analysis has been made on a sample of 1961 children under-3 from rural Uttar Pradesh. By applying loglinear modeling we tried to find a significant relationship between the prevalence of undernutrition and the coverage of the ICDS program. Furthermore we assessed a set of possible determinants of undernutrition. No significant statistical evidence was found for ICDS coverage as a determinant for the prevalence of undernutrition among children under-3 in rural Uttar Pradesh.

For the second objective a qualitative analysis has been made by taking and analyzing in-depth interviews from Anganwadi workers and mothers of young children in four selected villages in Hathras district in Uttar Pradesh. From the interviews with 21 respondents we concluded that the quality and the provision of the Anganwadi services, e.g. supplementary nutrition, health and nutrition education, pre-school education, health check-ups and immunization, was rather poor. Furthermore there seemed to be a lack of awareness and participation on the Anganwadi program among the ICDS beneficiaries.

# Table of contents

1	Introduction.....	7
1.1	Child malnutrition in India.....	7
1.2	Objective and research questions.....	11
2	Literature review .....	13
2.1	Child malnutrition.....	13
2.2	India's battle against malnutrition .....	14
2.3	The ICDS program.....	17
2.4	Program impact.....	18
3	Theoretical framework.....	20
3.1	Coleman's social theory.....	20
3.2	Mosley & Chen's analytical framework for the study of child survival in developing countries .....	21
3.3	Conceptual model .....	22
4	Methodology .....	25
4.1	Conceptualization and operationalization.....	25
4.2	Research design .....	26
4.2.1	Quantitative analysis.....	26
4.2.2	Qualitative analysis.....	27
4.3	Data sets and data collection.....	28
4.3.1	National Family Health Survey .....	28
4.3.2	Census of India .....	29
4.3.3	In-depth interviewing.....	29
4.3.4	Questionnaires.....	30
4.4	The research area and the sample villages .....	30
4.4.1	The research area .....	30
4.4.2	Selection of the villages .....	32
4.4.3	The villages.....	35
4.5	The in-depth interviews .....	36
4.5.1	Selection of respondents .....	36
4.5.2	Description of the sample .....	36
4.5.3	Conducting the interviews .....	37
4.6	Data analysis .....	39
4.6.1	Quantitative analysis: logistic regression and loglinear model.....	39
4.6.2	Qualitative analysis: grounded theory .....	41
5	ICDS coverage and the prevalence of child undernutrition in rural Uttar Pradesh .....	42
5.1	ICDS coverage.....	42
5.2	Prevalence of undernutrition.....	44
5.3	The relationship between ICDS coverage and the prevalence of undernutrition ...	49
5.4	Summary and conclusion.....	61
6	Functioning of the Anganwadi centre.....	63
6.1	Perception of the Anganwadi worker on the functioning of the Anganwadi centre.....	63
6.1.1	The Anganwadi centre: physical infrastructure and facilities.....	64
6.1.2	Functioning of the AWW or AWH.....	65
6.1.3	Functioning of the AWC.....	69

6.2 Perceptions of mothers on the functioning of the Anganwadi centre.....	81
6.2.1 Mothers health and behaviour.....	82
6.2.2 Child health and child development .....	88
6.2.3 Knowledge on the Anganwadi centre .....	96
6.3 Discussion and conclusion.....	97
7 Conclusions and recommendations.....	101
7.1 Summary and discussion of results.....	101
7.2 Recommendations.....	104
8 Literature.....	104
Appendix A.....	108

## List of figures and tables

Figure 1-1 Geographical pattern of underweight in children younger than 5 years .....	8
Figure 1-2 Nutritional status of children under-3 .....	9
Figure 1-3 ICDS coverage versus Prevalence of underweight among children under-3, 1998.....	10
Figure 3-1 Coleman’s approach to social theory .....	20
Figure 3-2 Operation of the five groups of proximate determinants on the health dynamics of a population .....	21
Figure 3-3 Conceptual model.....	24
Figure 5-2 Age composition boys and girls.....	45
Table 2.1 Range of services that the ICDS seeks to provide to children and women .....	17
Table 4.1 Population data Uttar Pradesh.....	32
Table 4.2 Population data Hathras district.....	34
Table 4.3 Population data study villages .....	36
Table 5.1 Availability of AWC by current population of village.....	43
Table 5.2 Results of relationship between population size of the village and the availability of an AWC in the village .....	44
Table 5.3 Sample description by sex, religion and ethnicity .....	46
Table 5.4 Height-for-age distribution in sample.....	46
Table 5.5 Weight-for-height distribution in sample .....	47
Table 5.6 Weight-for-age distribution in sample.....	47
Table 5.7 Anthropometric indices by sex, age, religion and ethnicity .....	48
Table 5.8 Pearson Chi-square test on sex, age, religion and ethnicity as determinants of anthropometric indices.....	49
Table 5.9 Possible determinants of undernutrition by weight-for-age .....	51
Table 5.10 Pearson Chi-square test on possible determinants for undernutrition .....	53
Table 5.11 Results of <i>Immunisation*Illness*AWC*Wt/A</i> loglinear model .....	55
Table 5.12 Step summary of backward elimination procedure for <i>Immunisation*Illness*AWC*Wt/A</i> loglinear model .....	56
Table 5.13 Goodness-of-fit test for <i>Immunisation*Illness*AWC*Wt/A</i> loglinear model. 57	
Table 5.14 Results of <i>Education*HHSoL*AWC*Wt/A</i> loglinear model .....	58
Table 5.15 Availability of AWC, Household standard of living, Weight-for-age crosstab .....	58
Table 5.16 Results of <i>Water*Breastfeeding*AWC*Wt/A</i> loglinear model.....	59
Table 5.17 Gave child plain water, Months of breastfeeding, Weight-for-age crosstab ..	59
Table 5.18 Results of <i>Age*Ethnicity*AWC*Wt/A</i> loglinear model .....	60
Table 6.1 Supplementary feeding norms .....	79

# 1 Introduction

One of the major challenges the world faces nowadays is guaranteeing the wellbeing of millions of children on its surface. The World Health Organization (WHO) estimates in the World Health Report 2005 that every year worldwide almost 11 million children die before their fifth birthday. The causes these children die from are mostly preventable or can be treated. A growing number of countries are making progress towards a healthier situation for children, but many countries still fall short on guaranteeing the wellbeing of their children. The reasons these countries lag behind are varying but commonly involve problems like poverty, inequality, war and epidemics of infectious diseases like HIV/AIDS. This study focuses on a major determinant of ill-health and child mortality: malnutrition.

## 1.1 Child malnutrition in India

In the last decades child mortality rates have declined significantly in some regions but have remained the same or declined very little in other regions. Sub-Sahara Africa and South-East Asia<sup>1</sup> are the regions with the highest rates of child mortality, together they account for more than 70% of all child deaths worldwide (WHO, 2005).

### *Malnutrition and child mortality*

Malnutrition is a primary cause of ill-health and child mortality. Worldwide almost half of all the deaths among children below the age of five each year are associated with malnutrition (WHO, 2000). In spite of a global decline of underweight among children of 18% between 1990 and 2000, levels of undernutrition in central and southern Asia remained substantially high. In Sub-Saharan Africa undernutrition even increased (figure 1-1) (WHO, 2005).

### *India*

India has a tremendous share of children suffering from undernutrition. The percentage of Indian children under the age of 3 years, i.e. children under-3, that is undernourished is 47% according to the data of the National Family Health Survey of 1998-99 (NFHS-2) on India. 18% Of the children under-3 is severely undernourished. In total approximately 37 million children under-3 (Deolalikar, 2004) suffer from undernourishment (IIPS and Orc Macro, 2001a).

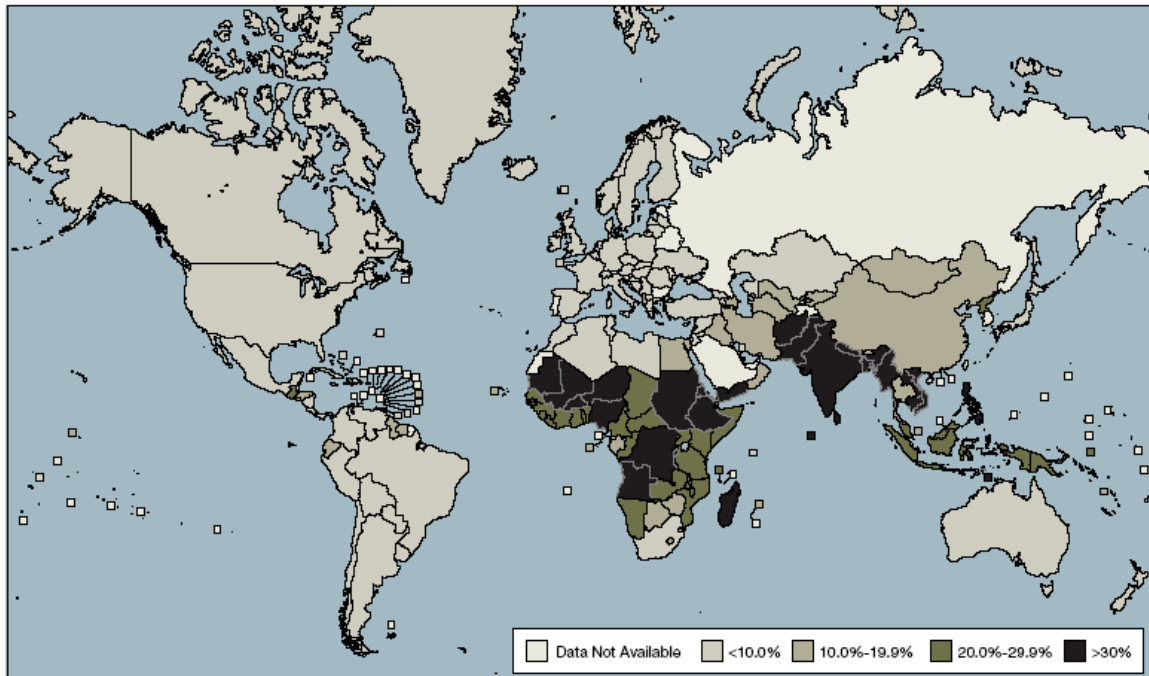
Not only malnutrition levels are high, but infant and child mortality, indicators of a country's level of socioeconomic development and quality of life, also reach significant levels. In the NFHS-2 it is estimated that from India's children under the age of 5 approximately 95 per thousand die each year. A major contributor to the under-5 mortality rate (U5MR) is the infant mortality rate (IMR), the probability of children dying before their first birthday, which is 68 per thousand. Child mortality, the

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<sup>1</sup> As defined by the WHO; Bangladesh, Bhutan, Democratic People's Republic of Korea, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand, Timor-Leste.

probability of dying between the first and fifth birthday, is 29 per thousand in India (IIPS and Orc Macro, 2001a).

**Figure 1-1 Geographical pattern of underweight in children younger than 5 years**



Percentage with weight 2 SDs below the mean weight for age of the reference population from the National Center for Health Statistics and World Health Organization. Geographical distribution of the prevalence of underweight children based on latest survey data.

Source: Onis (2004)

Compared to other Asian countries these numbers are very high, but what's also important, the rate of decline in IMR and U5MR in India lags behind to other countries in the region. Between 1990 and 2004 India's IMR declined from 84 to 62 while for example Sri Lanka's IMR declined from 26 to 12, Thailand's IMR from 31 to 18 and Bangladesh' IMR from 100 to 56 (UNICEF, 2006a, 2006b, 2006c, 2006d). Many countries, like Bangladesh and Sri Lanka, have established an annual decline in IMR from 3-5% over the last three decades while India averaged an annual decline of 2,6%. For India the decline in U5MR was almost identical as for the IMR in this period (Deolalikar, 2004).

### *ICDS*

Improvements in the nutritional status of children in India are of great concern to the government of India and non-governmental organizations like UNICEF, the WHO and the World Bank. In 1975 India started the Integrated Child Development Services (ICDS) program, also known as the Anganwadi program. With financial and technical support from UNICEF and the World Bank among others the program aims to improve the health, nutrition and development of children under the age of six. The methods adopted for achieving these objectives range from offering education on health, nutrition and hygiene to mothers, giving pre-school education to young children, providing supplementary feeding for children under-6 and pregnant and nursing mothers, perform growth



monitoring, to offering some basic primary health care services as immunization and vitamin A supplementation (Gragnolati et al, 2005). These services are provided by means of so-called Anganwadi centers which are established mainly in rural villages. Children can visit the centre on a daily basis and pregnant women can receive home visits from the Anganwadi worker who runs the centre. Since the onset of the program it has expanded rapidly and became one of the largest programs of its kind in the world covering over 5500 ‘community development blocks’ in India, almost entirely in rural areas (Das Gupta et al, 2005).

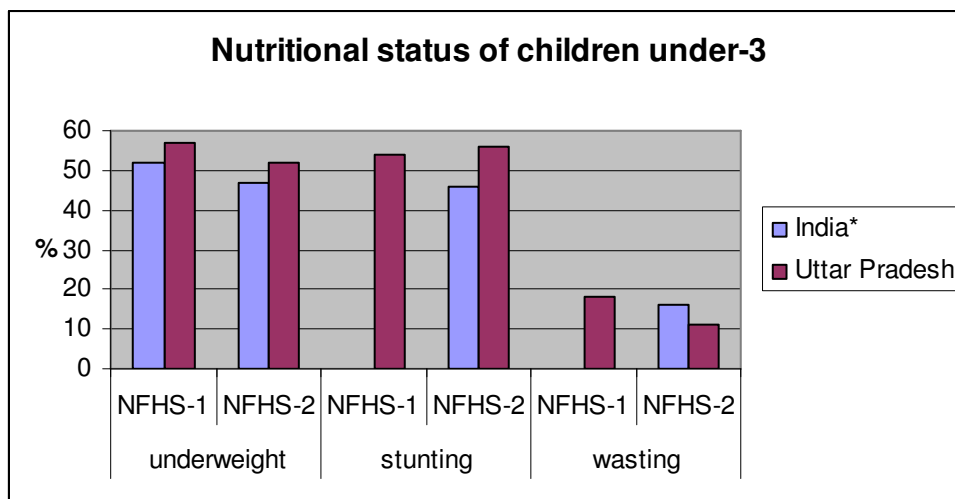
The impact of the ICDS-program or similar nutrition intervention programs in other countries is a frequently discussed issue and has been the topic of a large number of studies<sup>2</sup>. The results of these studies offer a wide range of conclusions on the impact of such a program. A few of these studies are discussed in section 2.4.

### *Uttar Pradesh*

One of India’s states with the highest child mortality and U5MR is Uttar Pradesh. The child mortality and U5MR are respectively 39 and 123 per thousand compared to 29 and 95 per thousand for India estimated in the NFHS-2 of 1998-99.

The nutritional status of children under-3 is also very poor in Uttar Pradesh. If we compare the situation of Uttar Pradesh with the national situation we see that the numbers of malnutrition are higher in Uttar Pradesh. 52% Of the children under-3 is undernourished, measured in weight-for-age, which is 5% more than on national level.

**Figure 1-2 Nutritional status of children under-3**



\* Children’s height was not measured in five states in NFHS-1  
Data obtained from NFHS-2, 2001

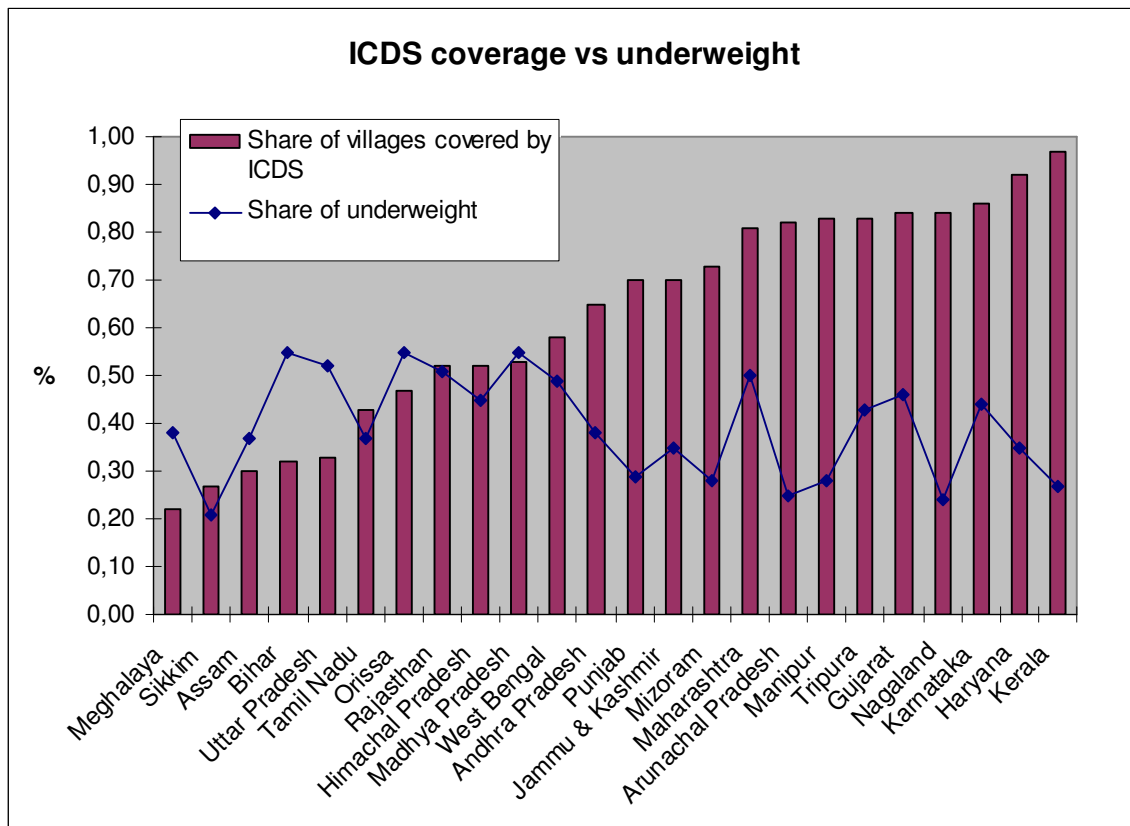
Two other indices of malnutrition, stunting, i.e. height-for-age, and wasting, i.e. weight-for-height, also show remarkable numbers compared to the Indian national average numbers. In Uttar Pradesh stunting is much more prevalent, 56% against India’s 46%, and wasting is less prevalent, 11% against 16% (figure 1-2).

<sup>2</sup> See for example, Tandon 1993, Das Gupta 2005, Gupta 2001, Kielmann 1982,1983

The data from NFHS-1 and -2 show that there has been some improvement in the prevalence of undernutrition among children under-3 in Uttar Pradesh between 1992-93 (NFHS-1) and 1998-99 (NFHS-2), but the rate of improvement in these six years has been small. The percentage of underweight children decreased from 57% to 52% and the proportion of stunted children even increased by two percent up to 56%. The only considerable improvement can be seen in the proportion of children who are wasted which declined from 18% to 11% (IIPS and Orc Macro, 2001a/b).

Together with the states Bihar, Madhya Pradesh, Orissa and Rajasthan, Uttar Pradesh lies in the poorest and most populous region of India. They account for more than 40% of India's population and contribute a high proportion of malnourished children in the country. Despite the high need of the ICDS program in these states the coverage of the program is very low (figure 1-3). Especially Uttar Pradesh and Bihar lag far behind by the other states with respectively 33% and 32% villages covered by the ICDS program. In the richer Northern and Southern states coverage of over 80% is not uncommon (Das Gupta et al., 2005).

**Figure 1-3 ICDS coverage versus Prevalence of underweight among children under-3, 1998**



Data obtained from NFHS-2, 2001

## **1.2 Objective and research questions**

To come to an understanding of the poor situation regarding the nutritional status of children under-3 in rural Uttar Pradesh in combination with the low regional coverage of the ICDS program this study aims to find out whether the ICDS program is succeeding in meeting its target of reducing the prevalence of child undernutrition in rural Uttar Pradesh. Furthermore the objective is to consider possible explanations on the macro level as well as on the micro level.

One of the factors contributing to the impact of the ICDS program on the macro level is the coverage of the program. In figure 1-3 the prevalence of underweight seems to decrease slightly for states with a better coverage of the ICDS program, even though several states do not fit in this tendency. A low program coverage might have a different impact on undernutrition among children in a region than a high program coverage because less children will be reached by the program. Emphasis will be partly put on the coverage of the program in this study because this seems to be an obvious factor that influences the impact of the program. But of course other factors on the macro-level that might contribute to the impact of the program should be considered as mentioned previously. These other factors, for example disease, immunization or socioeconomic status, have to be taken into account where possible in order to come to a valid conclusion.

To meet the objective of this study the following research question has been formulated:

***Can the high prevalence of undernutrition among children under-3 in rural Uttar Pradesh partly be explained by the low coverage of the ICDS program in this region?***

Answering this question requires knowledge on the proper effect of the ICDS program on undernutrition among young children in the villages it is implemented in. Therefore this research consists of a quantitative part on a macro-level in which a comparative analysis will be made between children who live in villages covered by the ICDS and children who live in villages without coverage. The prevalence of undernutrition among children under-3 and variables correlating with undernutrition shall be considered and, if necessary, controlled for. Factors as poverty, educational level of women, availability and accessibility of health care facilities, religion, caste, sex and number of household members can be thought of here.

A better understanding of the outcome of the quantitative analysis on macro level can be obtained by a qualitative analysis of the underlying factors determining the impact of the ICDS program. Program coverage is one factor for a successful impact of the ICDS but the functioning of the program is another factor of equal importance. How does the program function in the villages it covers? Obviously, to answer this question on state level an elaborate study of considerable magnitude is needed. A significant sample of villages and of respondents would be required in order to draw conclusions on this level. Since this is not possible for this study considering the time, money, and other resources required, this study will be limited to a small area in Uttar Pradesh. This analysis will

function as an illustration of possible underlying factors that determine the impact of the ICDS program. Hence, the second research question for the qualitative analysis of this study is:

***What underlying factors can be distinguished for the functioning of the Anganwadi centre?***

The functioning of the Anganwadi centre implies the performance of the Anganwadi centre on the services the ICDS program seeks to provide to children and women, and the way in which the Anganwadi centre establishes this performance. Some of these services are for example micronutrient supplementation, health and nutrition education, and supplementary feeding.

The functioning of the program depends on numerous factors like the attendance of children, the training of the Anganwadi worker and the targeting of the food supplementation. Mothers of children play a key role in the functioning of the program: they decide whether a child attends the Anganwadi centre and furthermore they are ICDS beneficiaries themselves as well. But not only the mothers play a key role, also the Anganwadi worker is of great relevance for the functioning of the program because she runs the Anganwadi centre. To obtain the necessary information on the functioning of the program interviewing the mothers of young children and the Anganwadi workers will be necessary. By means of these interviews the underlying factors that contribute to the success or failure of the program on reducing the prevalence of undernutrition in rural Uttar Pradesh are measured.

For this reason some sub-questions are formulated that arise from the second research question:

***How do mothers perceive the Anganwadi centre?***

***What is the perception of the Anganwadi worker on the functioning of the Anganwadi centre?***

The purpose of the in-depth interviews with the Anganwadi workers and the mothers of young children who potentially attend the Anganwadi centre is to get to know their personal perceptions on the Anganwadi centre and their behaviour regarding the Anganwadi program. Ultimately this should result in the identification of some possible determinants for the functioning of the Anganwadi centre.

First, more background information on child malnutrition and India's fight against child malnutrition will be given in the second chapter as well as a review on studies on the impact of nutrition intervention programs. The third chapter gives a description of the theories that have been used for this study and the conceptual model that is derived from these theories. Then, in chapter four, an elaborate description of the methodology for the study is given. Chapters five and six contain the results of respectively the quantitative analysis and the qualitative analysis which will finally be discussed in chapter seven. This final chapter also includes the conclusions of the study and further recommendations.

## **2 Literature review**

This chapter aims at giving more detailed information on malnutrition, but also some background information on Indian and international policies concerning child welfare. Furthermore some empirical evidence on the impact of nutrition intervention programs will be examined.

### **2.1 Child malnutrition**

What exactly is malnutrition? Malnutrition means a deficiency or an excess in a person's consumption of macronutrients, i.e. carbohydrates, protein and fat, and micronutrients, i.e. vitamins and minerals. Undernutrition results from a deficiency in nutrients and overweight and obesity occurs as a result of an excessive intake of nutrients (Gardner and Halweil, 2000). There are several ways in which malnutrition shows among children. Some of the main indications are low birth weight, early childhood growth failure, stunting, i.e. too low height-for-age, wasting, i.e. too low weight-for-height, iron deficiency anaemia, iodine deficiency disorders, vitamin A deficiency and overweight or obesity. All of these symptoms have their specific implications on the health of the child, for example an increased morbidity and mortality of infants, impaired growth, poor cognitive and (psycho)motor development and impairment of functions at later stages in the life span (Gillespie and Haddad, 2003).

Most growth retardation occurs by the age of 2 and is largely irreversible. In India the prevalence of undernutrition is highly socioeconomic and demographic differentiated. Differences can for example occur for urban and rural areas, for castes, for the sexes or for household wealth status. There is also much variation in undernutrition patterns and trends on state, district and village level (Gragnotati et al, 2005).

Poverty is often seen as the main underlying cause of malnutrition. It limits, for example, access to food, land, credit, health care, education and a clean living environment. Poverty can be the outcome of many factors like conflicts or war that can destroy crops and infrastructure and disrupt economies. But poverty can also result from international trade agreements allowing developed countries to sell their commodity surpluses in developing countries cheaply undercutting local farmers, or internal agricultural policies subordinating small farmers and favoring large land-owners. Policies, on every societal level, are thus strongly related to poverty and in extend the prevalence of malnutrition (Gardner and Halweil, 2000). Of course poverty and malnutrition are unintentional side-effects of some policies.

In this study solely undernutrition will be observed. It should be mentioned that, in contrast to what some may think, undernutrition is not synonym to kwashiorkor or marasmus, which are forms of severe malnutrition that show through extreme low body weight, a swollen abdomen, and lethargy for example. It also encompasses milder forms of undernutrition that are characterized by smaller, but significant, deficits in anthropometric indicators (WHO, 1995).

As pointed out above undernutrition can be identified by several indicators. Of these indicators anthropometry is the single most universally applicable and inexpensive available method for measuring size, proportions, and composition of the human body. Growth in children and body dimensions at all ages are indicators of overall health and welfare of individuals and populations. Therefore anthropometry is widely and successfully used to assess health and nutritional risk, especially in children.

There are three main anthropometric indices that are commonly used. These indices are derived by comparing weight and height with reference curves: height-for-age, weight-for-age, and weight-for-height. The widely accepted reference curves, or growth standards, are developed and recommended by the American National Centre for Health Statistics and the World Health Organization, NCHS/WHO (WHO, 1995). These curves represent a reference population which is based on empirical evidence that children who receive adequate nutrition in all population groups for which data exists all follow a similar growth pattern. According to the Nutrition Foundation of India these WHO reference curves are generally applicable to the Indian child population (IIPS and Orc Macro, 2001a).

Undernutrition at the population level can be identified by several indices. Stunting or shortness, i.e. low height-for-age, implies growth faltering due to long-term malnutrition and poor health. This can be caused by long-term processes such as poverty and long-standing cultural beliefs. Wasting or thinness, i.e. low weight-for-height, implies a significant weight loss caused by acute starvation and/or severe disease. But it can also be because of a chronic dietary deficit or disease. Acute food shortage, increased rates of diarrhoea, or economic crises are obvious examples of causes for low weight-for-height. A third anthropometric index is underweight, i.e. low weight-for-age, which is a composite indicator reflecting low height-for-age, low weight-for-height, or both (WHO, 1995).

The anthropometric indices are expressed in terms of Z-scores, or standard deviation score, which is 'the deviation of a value for an individual from the median value of the NCHS/WHO international reference population, divided by the standard deviation for the reference population' (WHO, 1995).

$$\text{Z-score or SD-score} = \frac{(\text{observed value}) - (\text{median reference population})}{\text{standard deviation of reference population}}$$

An abnormal anthropometry is defined as -2 SD or Z-scores below, or +2 SD or Z-scores above the reference median. If children fall below 2 Z-scores from the reference median they are indicated as *undernourished*, and if they fall more than 3 Z-scores below the reference median they are regarded as *severely undernourished* (NFHS-2).

## **2.2 India's battle against malnutrition**

The Indian government states that it has prioritized the wellbeing of the countries children as one of its' main areas of interest and is making an effort towards a better

climate for the development of the child. This has resulted in various legislations and policies concerned with the welfare of children (Department of Women and Child Development, 2001).

#### *Constitution of India*

Fundamental for all of India's policies and initiatives regarding its children is the *Constitution of India*. The *Constitution of India* recognizes children as persons with fundamental rights and it contains several provisions to establish the children's fundamental rights. Children's right to be protected against exploitation, to have free and compulsory education or the state's obligation to try to raise the level of nutrition and standard of living and to improve public health are a few examples of children's rights and the state's obligations (Department of Women and Child Development, 2001).

In 1974, during the country's peak period of population growth, the *National Policy for Children* was proclaimed. The aim of this policy was "to provide adequate services to all children, both before and after birth, and during the growing stages for their full physical, mental and social development." (Department of Women and Child Development, 1997). The measures the government intended to take were mainly on the area of nutrition and education, with special attention to children of weaker sections like Scheduled Caste, Scheduled Tribe and Other Backward Caste children, i.e. the socially, politically and economically most deprived layer in Indian society, or children with a handicap. Along with the *National Policy for Children* came different other initiatives to support the new policy: the *National Children's Board*, which acts as a forum to review, plan and coordinate various services directed towards children, was set up as well as the *Bureau for Nutrition and Child Development*, the responsible institute for the implementation of the policy and the resulting programs under it. And for financial support to organizations that undertake child welfare programs the *National Children's Fund* was established (Department of Women and Child Development, 1997).

#### *Integration*

The 1974 policy and all the initiatives that followed it led to a perspective of 'integration' by the government of India. In an attempt to integrate various early childhood services the *Integrated Child Development Services (ICDS)* program was started in 1975, aiming at improvement of health, nutrition and development of children under-6. In the next paragraph the ICDS program will be discussed in more detail.

Furthermore, during the 1970s and 1980s several new initiatives in the field of child welfare were adopted and implemented. In 1975 the *National Institute of Public Cooperation and Child Development (NIPCCD)* was established, an autonomous body concerned with the provision of a comprehensive perspective on the status and needs of children and women through development, research and networking. Various national policies addressing children as one of their specific target groups were adopted: the *National Health Policy* in 1983, the *National Policy on Education* in 1986 and the *National Policy on Child Labour* in 1987 were aiming at putting the Indian child in a favorable position for receiving special attention towards a better situation in the future.

The *National Health Policy* of 1983 included the ambitious goal 'Health for All by the year 2000' which had to be achieved by eradicating polio, smallpox and leprosy for instance, and by a strong decline in infant and child mortality. Furthermore the policy emphasized the persistent incidence of undernutrition, especially among women and children, and the need for action to battle this problem. The target 'Health for All by the year 2000' turned out to be an overrated goal, but some noteworthy success has been booked over time, by eradicating smallpox, almost eradicating polio and achieving a sustainable drop in Infant Mortality Rate, from 146 per thousand in 1951 to 110 per thousand in 1981 and 70 per thousand by 2000 (Ministry of Health & Family Welfare, 2001).

#### *Department of Women and Child Development*

In 1985 the *Department of Women and Child Development* (DWCD) was established under the Ministry of Human Resource Development. To ensure the development of women and children the department's major task is to run the ICDS program. The DWCD functions as a nodal department in the government of India intended for all issues concerning children and is always consulted on major initiatives relating to children. Collaboration with non-governmental organizations is of great importance for the DWCD because most of the programs under the Ministry of Human Resource Development are run through NGO's (Department of Women and Child Development, 1997).

#### *International incentive*

The early 1990s were marked by a significant international incentive on child welfare: the adoption of the United Nation's *Convention on the Rights of the Child*. India signed the document in 1992. The contemporary Indian policies on child welfare but also international policies like the *World Declaration on the Survival, Protection and Development of Children* and the *Millennium Development Goals* are all rooted in the *Convention on the Rights of the Child* (UNICEF, 1990).

Immediately after signing the convention India formulated its *National Plan of Action for Children* (1992) comprising some quantifiable targets on the needs and ambitions concerning health, nutrition, education and related social aspects of the over 300 million children the country counted at that time (Department of Women and Child Development, 1992). A renewed version of the *National Plan of Action for Children* was implemented in 2005, providing new targets on child survival, child development, child protection and child participation (Department of Women and Child Development, 2005).

#### *Millennium Development Goals*

In the year 2000 the United Nations adopted the *Millennium Development Goals* (MDGs). The MDGs have become the most widely-accepted measure of development efforts by governments, donors and NGO's. The MDGs consist of 8 quantifiable targets, related to human development, to be achieved by 2015. They include eradication of extreme poverty and hunger, achieving universal primary education, promoting gender equality and empowerment of women, reducing child mortality, improving maternal health, combating HIV/AIDS, malaria and other diseases, ensuring environmental sustainability and developing a global partnership for development. Among most countries in the world



India also committed itself to the MDGs. The MDG regarding child malnutrition is to reduce the prevalence of underweight children by one-half between 1990 and 2015. This would mean a reduction from 54,8% in 1990 to 27,4% in 2015 in India (The World Bank, 2004).

However, despite all these initiatives, legislature, and governmental and non-governmental bodies that have been established over the last six decades, the welfare of children under-6 in India is still very poor, especially when we look at the numbers of undernourished children that have stagnated over the last seven years. A lack of attention for children's issues in democratic politics and public policy is a major cause for this according to the Citizens' Initiative for the Rights of Children Under Six (CIRCUS). In their report 'Focus on children under six' CIRCUS states that children's issues are only very briefly and very seldom discussed in Parliament and should be much higher on the priority-list of the government considering the state of India's children (CIRCUS, 2006).

### **2.3 The ICDS program**

As explained in the introduction the goal of the ICDS program is to improve health, nutrition and development of children under-6. The program runs through Anganwadi centers (AWCs) that provide a range of services. It is ICDS policy to have one AWC per approximately 1000 persons. In practice this usually comes down to one AWC in a majority of Uttar Pradesh' villages because a majority of the villages in Uttar Pradesh hover around 1000 inhabitants. Table 2.1 shows the 8 key services that the ICDS program seeks to provide.

**Table 2.1 Range of services that the ICDS seeks to provide to children and women**

	<b>Children under 6</b>	<b>Pregnant women</b>	<b>Lactating women</b>
<b>Health check-ups, and treatment</b>	Health check-ups by AWW, ANM, LHW Treatment of diarrhea Deworming Basic treatment of minor ailments Referral of more severe illnesses	Antenatal check-ups	Postnatal check-ups
<b>Growth-monitoring</b>	Monthly weighing of under-threes Quarterly weighing of 3-6 year olds Weight recorded on growth cards		
<b>Immunization</b>	Immunization against poliomyelitis, diphtheria, pertussis, tetanus, tuberculosis and measles	Tetanus toxoid immunization	
<b>Micronutrient supplementation</b>	IFA and Vitamin A supplementation for malnourished children	IFA supplementation	
<b>Health and nutrition education</b>		Advice includes infant feeding practices, child care	Advice includes infant feeding practices, child care and development,

		and development, utilization of health services, family planning and sanitation	utilization of health services, family planning and sanitation
<b>Supplementary nutrition</b>	Hot meal or ready-to-eat snack providing 300 calories and 8-10g protein Double rations for malnourished children	Hot meal or ready-to-eat snack providing 500 calories and 20-25g protein	Hot meal or ready-to-eat snack providing 500 calories and 20-25g protein
<b>Preschool education</b>	Early Childhood Care and Preschool Education (ECCE) consisting of “early stimulation” of under-threes and education “through the medium of play” for children aged 3-6 years		

Note: In practice, not all of these services are necessarily provided at every AWC

Source: Gragnolati et al, 2005

The ICDS program has adopted a ‘life-cycle approach’, which means that the program services are not only targeted towards children under-6, but also to pregnant women, lactating mothers, and more recently unmarried adolescent girls have been added as program beneficiaries.

Funding for the program comes from the Indian government and a range of donors including UNICEF, SIDA, WFP, CARE and NORAD. Furthermore the program has been supported by the World Bank since 1980 (Gragnolati et al, 2005). The program has expanded during the last three decades to a program reaching more than 23 million children under-6 and approximately 5 million expectant and nursing mothers. The budgetary allocation is around \$170 million per year (Das Gupta et al., 2005).

The program has moved to its third phase in 1999. Instead of emphasizing program coverage the quality of the services has become the accent of the program (Gragnolati et al, 2005).

## **2.4 Program impact**

The impact of the ICDS-program or similar nutrition intervention programs in other countries is a frequently discussed issue and has been the topic of a large number of studies<sup>3</sup>. The results of these studies offer a wide range of conclusions on the impact of such a program.

In their comparative study on nutrition intervention Kielmann et al. (1982) conclude that nutrition intervention programs have a beneficial effect. They state that nutritional supplementation to preschool children can significantly reduce the number of deaths and lower the prevalence of malnutrition among them. But, the impact of the nutritional intervention depends largely on the participation of the community.

<sup>3</sup> See for example, Tandon 1993, Das Gupta 2005, Gupta 2001, Kielmann 1982,1983

In a study on the Narangwal Nutrition Project in India by Kielmann et al. (1983), nutritional supplementation in combination with health care is being tested. The main conclusion of this research is that supplementary nutrition alone or in combination with health care can significantly improve growth, in height as well as weight, of children under-3. Two other variables that have a major additive effect on growth are sex and caste. Children from higher castes and males are more likely to benefit from supplementary nutrition according to Kielmann et al. (1983).

On the opposite Das Gupta et al. (2005) conclude that despite the emphasis on supplementary feeding in the ICDS-program in India, nutritional outcomes among children of all socio-economic groups are still poor. One of the reasons for this is the exposure to diseases. Diseases make children particularly vulnerable for undernutrition. Therefore they suggest to focus more on environmental hygiene and child feeding practices. Besides this, they argue, the program coverage and the fund allocation are not directed at the states with the greatest need for this, the states with the highest prevalence of malnutrition. Other reasons for the disappointing results of the ICDS program are the low attendance levels in some states, the inadequate training of Anganwadi workers (AWWs), erratic provision of supplies, the poor targeting of food supplementation and a lack of community participation.

### 3 Theoretical framework

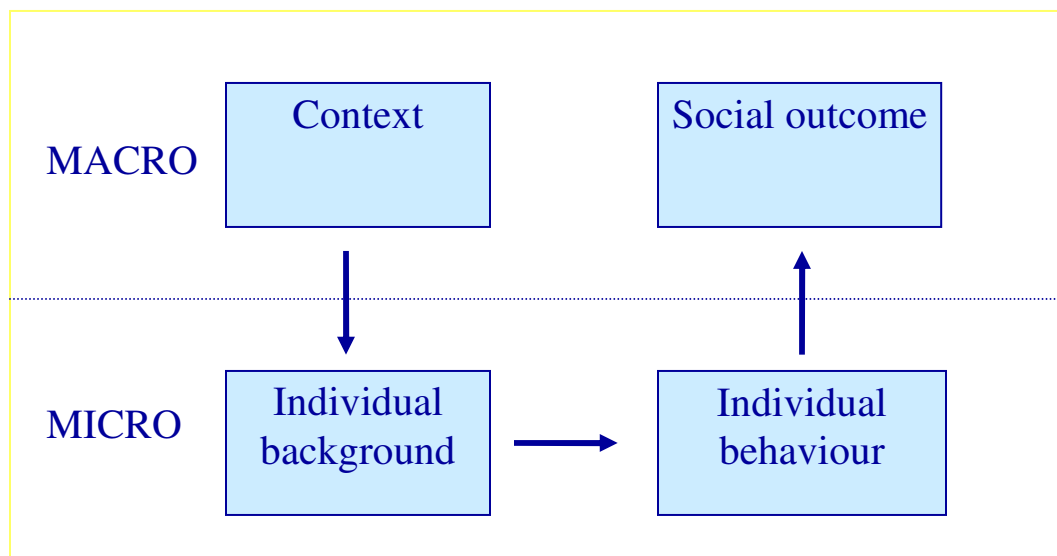
This study emphasizes the interaction between the macro level and the micro level. Undernutrition among young children, a demographic outcome on the macro level, is the subject of this study. For a possible explanation for the prevalence of undernutrition among young children the research will be focusing on the micro level. The perceptions of the mothers and the Anganwadi workers, both regarded as individual actors, will be examined in order to explain their behaviour that results in certain health behaviour, including the attendance of the children to the AWCs, and the functioning of the AWCs.

Two theories are the main foundation for the conceptual model of this study, Coleman's social theory and Mosley and Chen's analytical framework for the study of child survival in developing countries. Both theories are explained in the following paragraphs.

#### 3.1 Coleman's social theory

Coleman's approach to social theory deals with the relation between the macro and the micro level. Coleman states that relations at the level of the social system, the macro level, can be explained through moving down to the level of individual actions, the micro level, and back up again to the macro level (figure 3-1). The social context, for example the economical or political context, influences the ideas, values, norms, etc. an individual has. Based on this individual 'background' the individual makes choices which result in certain individual behaviour or actions. The behaviour or actions of a group of individuals combined cause a certain outcome at the level of the social system, a social outcome (Coleman, 1986).

Figure 3-1 Coleman's approach to social theory



Source: Coleman, 1986

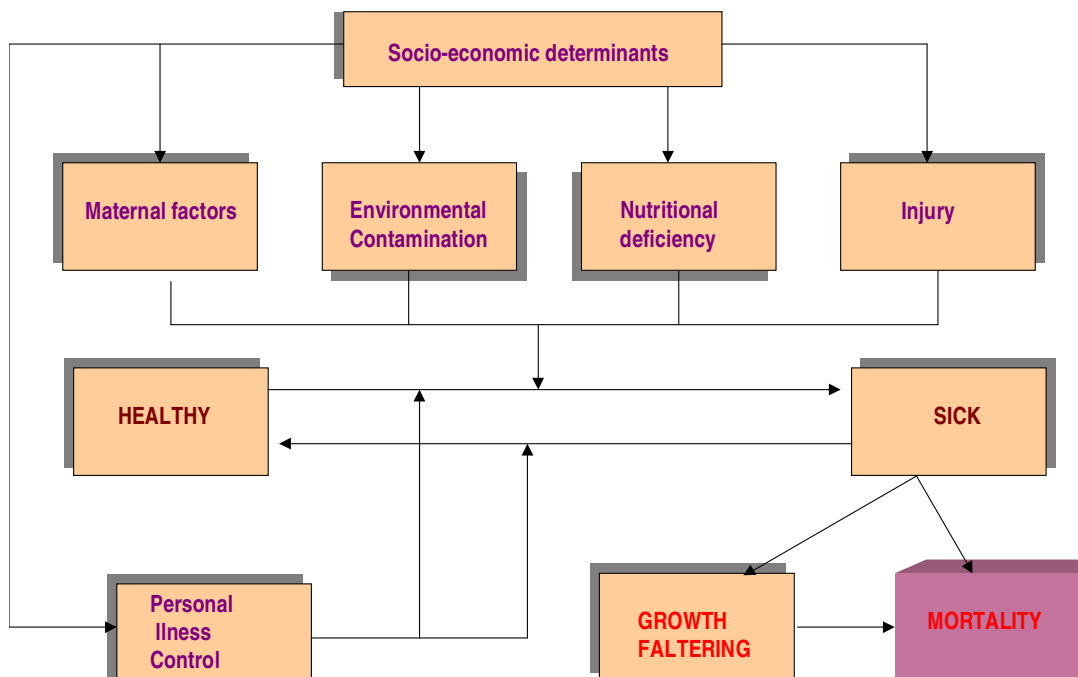
The relation of interest on macro level is the relation between the ICDS program and undernutrition among children under-3. Undernutrition is in this case the social outcome and is placed in the context of the ICDS program. On the micro level two types of individual actors are recognized in this study, the mothers and the AWWs. Their behaviour is studied as a possible explanation for undernutrition among children under-3.

### 3.2 Mosley & Chen’s analytical framework for the study of child survival in developing countries

For a study on child malnutrition in developing countries and health program impact on malnutrition two theoretical models can be considered: the model of the malnutrition-infections syndrome and its demographic outcome by Van Norren and Van Vianen (1986) and the analytical framework for the study of child survival in developing countries by Mosley and Chen (1984). The model by Van Norren and Van Vianen however only uses variables that are defined at the individual level and is therefore inappropriate to evaluate the effects of a health care program as the ICDS program, that focuses on specified groups, namely children and mothers, instead of individuals.

On the contrary, Mosley and Chen (1984) state that in developing countries in general growth faltering and mortality in children are the result of “the cumulative consequences of multiple disease processes (including their biosocial interactions).” (1984, p.27) and they recognize three categories of socioeconomic determinants that operate through a range of proximate determinants to influence morbidity (e.g. growth faltering) and mortality (figure 3-2).

Figure 3-2 Operation of the five groups of proximate determinants on the health dynamics of a population



Source: Mosley & Chen, 1984

The socioeconomic determinants are defined on different levels:

- individual level: *individual productivity*, i.e. skills, time and health, of mothers and fathers, depending on educational level; *traditions/norms/attitudes*, i.e. power relationships within the household, value of children, food preferences, beliefs about disease causation.
- household level: *income/wealth*, e.g. quality of water supply, housing conditions, food availability, clothing/bedding, fuel/energy availability, transportation, purchase power, access to information.
- community level: *ecological setting*, i.e. climate, temperature, altitude, season, rainfall, *political economy*, i.e. organization of food production, infrastructure, political institutions, *health system* variables, e.g. intervention programs

The proximate determinants that directly influence the risk of morbidity and mortality of children are dependent on the socioeconomic determinants and are grouped into five categories:

- Maternal factors: age at birth, parity, birth interval
- Environmental contamination: contamination by air, food/water/fingers, skin/soil/inanimate objects, insect vectors, or due to household size
- Nutrient deficiency: availability of calories, protein, micronutrients (vitamins and minerals) for children, pregnant women, and lactating mothers
- Injury: accidental, intentional, and injury-related disabilities
- Personal illness control: personal preventive measures, medical treatment, e.g. immunization or antenatal care

The model by Mosley and Chen is “intended to advance research on social policy and medical interventions to improve child survival” (Mosley and Chen, 1984).

In this study emphasis is put on the application of the ICDS program as a socioeconomic determinant. One of the community level variables regarding the socioeconomic determinants is the health system variable. The health system variable is presumed to operate in several ways of which ‘Institutionalized (imposed) actions’ is one way. Institutionalized actions are disease-control measures that are imposed by governments in order to improve the health of a population. The ICDS program is an example of such an institutionalized action which makes this model appropriate for this study.

### **3.3 Conceptual model**

Figure 3-3 shows the conceptual model for this study.

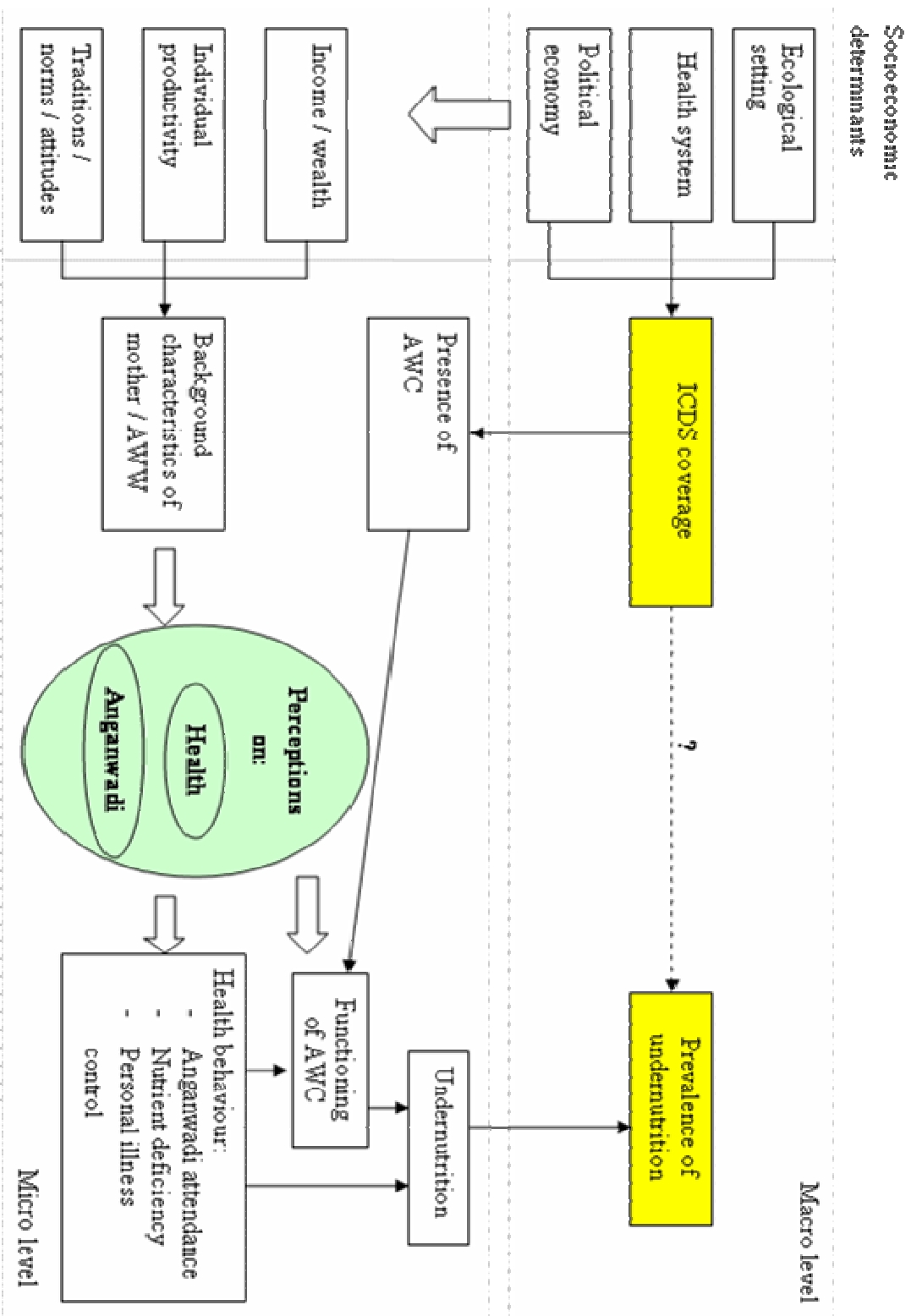
The main relationship that is the subject of this study is the presumptive association between the ICDS program and undernutrition among young children. In the quantitative analysis this relationship will be explored.

The underlying factors determining the outcome of the ICDS program on the prevalence of malnutrition that are considered in this study are on the micro level as depicted in Coleman's social theory. Both mothers of young children and AWWs will be the focus of the qualitative part of this research.

Coleman's social theory and the model by Mosley and Chen can be functionally merged for our conceptual model. The social context of this setting is defined by several socioeconomic determinants. On the macro level the health system, the ecological setting, and the political economy are determinative for the implementation of the ICDS program, whereas on the micro level income and wealth, individual productivity, and traditions, norms and values are defining the individual background characteristics of the mothers and the AWWs. This specific background, derived by the socioeconomic determinants, is contributing to the women's individual perceptions on health in general and on the Anganwadi program, or more specific the AWC which obviously should be present in the study villages. It is expected that the mother's perception leads to certain individual health behaviour, which for instance includes Anganwadi attendance of her children, feeding behaviour and personal illness control. Besides, it is expected that the AWW is prone to manage the AWC in a certain way which stems from her individual perception on the Anganwadi program and on health care. Thus both the mother's and the AWW's perceptions and behaviour are of great influence on the functioning of the AWC.

Ultimately the health behaviour and the functioning of the AWC may lead to the possibility of children being undernourished. On the macro level this can result in a social outcome such as the prevalence of undernutrition.

Figure 3-3 Conceptual model





## 4 Methodology

This chapter deals with the methodology of the research. It describes, explains and justifies the methods used for this research and furthermore discusses the conceptualization and operationalisation of concepts, the data sets and data collection, the selection of the villages and respondents and the data analysis.

In the first paragraph the concepts and the operationalisation of the concepts are elaborated upon. The methods used for the quantitative and the qualitative part of this research are subject of the second paragraph. This is followed by a discussion on the different data sets that are used and a clarification on the collection of the primary data during the fieldwork by means of in-depth interviews. Furthermore the selection of the villages and the selection of the respondents is explained in the fourth and in the fifth paragraph.

### **4.1 Conceptualization and operationalization**

Below follow the definitions of the concepts from the conceptual model and their operationalization.

#### *Socioeconomic determinants*

The socioeconomic determinants are defined on macro level, i.e. ecological setting, health system and political economy, and on micro level, i.e. income/wealth, individual productivity and traditions/norms/values. All together they comprise the social context and individual background of the units of analysis. The concepts of interest for this study are the ICDS program, which stems from the macro level socioeconomic determinants, and the background characteristics of mothers and AWWs, which are related to the micro level socioeconomic determinants.

#### *Background characteristics of mothers and AWWs*

The background characteristics of mothers and AWWs include many variables. Educational level, religion, caste, ethnicity, household composition and health status can be thought of here.

#### *ICDS coverage*

The ICDS program is examined by its coverage in the quantitative part of this study. This is simply measured by the presence of an AWC in the villages in our sample.

#### *Presence of AWC*

This is the simple fact of the presence of an AWC in a village. Thus, either true or not true.

#### *Perceptions*

In the qualitative part of this study perceptions of AWWs and of mothers of children under-6 will be examined. Of particular interest for this study are their perceptions on health, by which especially child health and taking care of health are meant, and their perceptions on the Anganwadi program and AWC.

### *Health behaviour*

Health behaviour implies the health behaviour of mothers of children under-6 that is of influence on the health of their children. Sending the children to the AWC, but also attending the AWC themselves is a key element of health behaviour. Nutrient deficiency aims at the intake of nutrients, which can be seen as a result of the feeding behaviour of the mothers. Another aspect of health behaviour is personal illness control. Do mothers for example get immunization for themselves and for their children, what do they do to prevent illness, or do they receive antenatal or postnatal check-ups.

### *Functioning of the AWC*

This concept involves the performance of the AWC on its service provision to children and women. It is dependent on various factors like the attendance of children, the training of the Anganwadi worker and the targeting of the food supplementation for example.

### *Undernutrition*

Undernutrition is specified by the child's anthropometric features, either low height-for-age, low weight-for-height or low weight-for-age.

### *Prevalence of undernutrition*

Because the prevalence of both stunting and wasting are very high in Uttar Pradesh and both can imply different causes of undernutrition, both indicators, i.e. height-for-age and weight-for-height, will be used in this study for describing the prevalence of undernutrition in our sample. However, weight-for-age, reflecting both height-for-age and weight-for-height, will be used for testing the significance of the presumed relationship between ICDS coverage and undernutrition (see section 5.3).

## **4.2 Research design**

This explanatory study is divided in two parts, a quantitative part and a qualitative part. Both parts are different in character – the quantitative part contains a comparative cross-sectional analysis and the qualitative part contains an analysis on possible explanations for the functioning of the Anganwadi centre. The following paragraphs elaborate more upon the separate parts of the study.

### **4.2.1 Quantitative analysis**

The first objective of this study is to examine if the ICDS program is succeeding in meeting its target of reducing the prevalence of child undernutrition in rural Uttar Pradesh. The first research question that is formulated '*Can the high prevalence of undernutrition among children under-3 in rural Uttar Pradesh partly be explained by the low coverage of the ICDS program in this region?*' implies a relationship between program coverage and the prevalence of child undernutrition. To examine such a presumed relationship one can compare villages in which the ICDS program is implemented with villages in which the program is not implemented on the prevalence of child malnutrition. Most efficient and effective for this analysis would be a longitudinal

study on child malnutrition in a selected area in rural Uttar Pradesh. By means of a longitudinal research it is feasible to find possible trends in the prevalence of child malnutrition in the different ICDS and non-ICDS villages. However, since longitudinal data are not available and is obviously not achievable on short notice longitudinal research could not be conducted for this study.

Therefore the research has to be adjusted to the available datasets. In this case the most appropriate data to use are the data from the National Family Health Survey of 1998-99, the NFHS-2. Because the NFHS-2 data are cross-sectional data it is not possible to examine any trends in the prevalence of child undernutrition. It is only possible to make a comparison at one point in time which will be 1998-99 since these are the most contemporary data available. A comparative analysis will be made on the prevalence of child undernutrition in the research population, children living in villages covered by the ICDS, and the control group, children living in villages without ICDS coverage.

Besides the program coverage the analysis has to include possible correlations between undernutrition and other variables in order to control for the differences in underlying causes of undernutrition between and within the research group and the control group.

The statistical methods for this analysis will be extensively discussed in paragraph 4.6.1.

#### **4.2.2 Qualitative analysis**

The second research question '*What underlying factors can be distinguished for the functioning of the Anganwadi centre?*' is based on the other objective of this study, which is considering possible explanations for the impact of the ICDS program. In this study the functioning of the AWC is considered as a major feature for the functioning of the ICDS program. Therefore the qualitative analysis focuses on the functioning of the AWC. As explained in section 1.2 mothers and AWWs play a key role in the functioning of the AWC. Mothers of young children potentially send their children to the AWC and have the possibility to go there themselves, e.g. for health and nutrition education, and AWWs have the responsibility of running the AWC. The functioning of the AWC is thus highly dependable on these mothers and AWWs.

The qualitative part of this research will therefore focus on individual perceptions and behaviour regarding the ICDS program. By means of in-depth interviews, that will be taken during a field work in rural Uttar Pradesh, the knowledge and perceptions on the AWC of mothers with young children will be studied. The aim is to examine their awareness and understanding of the Anganwadi program and to find out the reasons for sending their children to the AWC or the reasons for not sending their children. In addition the AWWs, or Anganwadi helpers, in our sample villages will be interviewed for information on the functioning of the AWC and their personal opinion on the Anganwadi program.

More information on conducting the in-depth interviews can be found in paragraph 4.5.3. Furthermore paragraph 4.3.4 explains the questionnaires, paragraph 4.5.1 the selection of

the respondents, and finally in paragraph 4.6.2 the method for analyzing the interviews is clarified.

### **4.3 Data sets and data collection**

Several data sources have been used for this study. For the quantitative analysis mainly the NFHS-2 data have been used and for the qualitative analysis we collected the principal data ourselves in the study villages by means of in-depth interviews. Furthermore Census of India 2001 data were obtained and consulted, especially for the selection of the research area. Many other secondary data sources, consisting of scientific articles, reports, books, and internet websites, have been used for the assembly of this study. In the following three sections the main data sources will be introduced.

#### **4.3.1 National Family Health Survey**

The main dataset that was used for the quantitative analysis is the National Family Health Survey 1998-99, or abbreviated NFHS-2. Two, because it is the second round of the survey. The first round took place in 1992-93 and the third round in 2005-06. Unfortunately the results of the latest round of the NFHS were not yet available at the time of this study. The NFHS-2 dataset was obtained from Measure DHS, a USAID funded organization specialized in performing demographic and health surveys in developing countries.

The NFHS is a large-scale survey that is conducted in a representative sample of households throughout India. Information is collected by state among ever married women in their reproductive age, e.g. 15-49. Two standard questionnaires are used, a Household questionnaire and a Women's questionnaire, which are processed in a separate Household data file and a Individual data file. In this survey additional information was gathered which is presented in a children's data file and a village data file. The sample size of the NFHS-2 is 92486 households and 90303 ever married women.

For this study the NFHS-2 data on Uttar Pradesh were used. In Uttar Pradesh 9292 women were interviewed and the household sample size is 8682. The survey data are mainly on marriage, family planning, reproductive health, child health, and HIV/AIDS. In addition to the standard questionnaires information on anthropometry of children aged 0-35 months, household maternal mortality, and anaemia among others were collected for the NFHS-2.

One of the data sets that are used for the analysis is the Uttar Pradesh Child data set. In this file data on pregnancy, birth, and health is presented for children born in the month of the interview up to 31 months preceding the survey. Also data on the mother of each child is contained in this file and each of the 4324 cases in the file represents one child. Anthropometric measurements are included, as well as immunization coverage, and recent occurrences of diseases for example. A total of 960 variables are comprised in the file.

The other data set which is used is the Uttar Pradesh Village data set. This file contains data on facilities and services in the village that can affect health and family planning. The size of the sample is 323 and is consisting of 89 variables.

### **4.3.2 Census of India**

The Census of India 2001 was consulted for background information and for the selection of the main village. Digital copies of the Primary Census Abstract and the Village Directory of Uttar Pradesh were obtained at the Office of the Registrar General in New Delhi. The Census of India 2001 provides data on state, district, sub-district, city and town, and village level. The Primary Census Abstract holds data on numbers of households, population, sex ratio, literacy rates, Scheduled Caste and Scheduled Tribe population, and data on the workforce. The Village Directory gives data on the available amenities in every village in Uttar Pradesh. These amenities include educational, medical, recreational and cultural, commercial, and agricultural amenities for example, but also different facilities such as power supply, drinking water, post and telegraph, availability of newspapers and magazines, and distances to educational or medical facilities for example.

### **4.3.3 In-depth interviewing**

The purpose of the in-depth interviews with the AWWs and the mothers of young children who potentially attend the AWC is to get to know their personal perceptions on the AWC and their behaviour regarding the AWC and eventually to try to identify some possible determinants for the functioning of the AWC. Therefore a list of topics will be discussed with the respondents. Because the AWW and the mothers are related in a different manner to the AWC, the AWW from a more professional point of view and the mothers more as a 'customer', it is necessary to have different question lists for both. If there are mothers who do not send their child to the AWC it is important to interview them as well, because they are likely to have a different perception on the AWC. A separate question list for mothers with young children that do not attend the AWC is included.

To come to a certain view on the different perceptions and behaviour regarding the ICDS program in rural Uttar Pradesh the in-depth interviews were conducted in a selected village that had an AWC (section 4.4.2). Furthermore, in-depth interviews with AWWs and mothers were conducted in some randomly picked villages in the same area in order to identify possible similarities and differences in the functioning of AWCs and to come to a broader regional perspective. In the four villages the AWWs, and in one case the Anganwadi helper, were interviewed and a total of 14 mothers of young children, 2 grandmothers, and one father were interviewed.

This fieldwork was conducted in December 2006 in Hathras district, Uttar Pradesh in collaboration with the *Centre for the Study of Regional Development* of the *Jawaharlal Nehru University* (JNU) in New Delhi. Khera Firozpur is the selected main village and

additionally three more villages, i.e. Ramnagar, Nagla Tal, and Gopalpur Urf Bhootpura, were visited (section 4.4.2).

#### *Preparing the fieldwork*

For the fieldwork it was necessary to use an interpreter because of a language barrier. The most important requirements for the interpreter were a good understanding of Hindi and English, an academic background, and preferably of female gender. Because the respondents were women living on the countryside a female interviewer seemed appropriate to achieve the best response. A JNU student who fitted the requirements was found, a Hindi speaking MA in Political Sciences with experience in doing fieldwork in rural areas in India.

To prepare for the fieldwork the research was discussed with the interpreter and she was asked for her ideas on the fieldwork. The purpose of the fieldwork was explained, and she was asked for her input in the questionnaires. Furthermore the selection of the respondents was discussed. The main point was that she understood the objective of the interviews. The questionnaires were adjusted by the interpreter's suggestions in addition to professor Kulkarni's (JNU) advice.

#### **4.3.4 Questionnaires**

Different questionnaires were composed for the AWWs and for the mothers. Each questionnaire is built up in several blocks. Each questionnaire starts of with a block of questions on the background of the respondent. The AWW's questionnaire than contains a block of questions on general information on the AWC, a block of questions on working as Anganwadi worker and finally a block of questions on the functioning of the Anganwadi centre.

The mothers questionnaires also contain three more blocks containing questions on the mothers health and behaviour, on the development and health of their child(ren), and on their knowledge of the Anganwadi centre. However, two different mothers questionnaires have been made, one for mothers with children who attend the AWC and one for mothers with children who do not attend the AWC.

The questionnaires can be found in Appendix A.

#### **4.4 The research area and the sample villages**

In this paragraph the research area for both the quantitative analysis and the qualitative analysis will be introduced. A global circumscription of the characteristics of the research area and the sample villages is given. Furthermore the selection of the research villages is explained.

##### **4.4.1 The research area**

The state of Uttar Pradesh is by far India's most populous state with a total population of 166,1 million which is 16,2% of India's population (Census of India, 2001). It occupies a territory of 7,3% of the countries area, i.e. 240.928 square kilometer (Planning

Department UP, 2005). The capital is Lucknow and the principal languages spoken are Hindi and Urdu.

Uttar Pradesh lies in the north of India and is enclosed by the states Uttaranchal and Himachal Pradesh in the north, Haryana, Union Territory Delhi and Rajasthan in the west, Madhya Pradesh in the south, Bihar in the east, and bordering to Nepal in the north. The state can be crudely divided into two distinct geological regions, namely the Southern hills and the Gangetic Plain (Research, Reference and Training Division, 2006).

Historically, Uttar Pradesh has a positive reputation in the field of religion and education. It is associated with the originating of Jainism and Buddhism in the sixth century BC.

Later, in the medieval period, Uttar Pradesh became well-known for its intellectual centers of learning and for the synthesis of Hindu and Islamic cultures.

Under British colonial rule Agra and Oudh were combined to the United Provinces of Agra and Oudh, or shortly United Provinces since 1935. After independence the state was renamed to Uttar Pradesh (Research, Reference and Training Division, 2006). In 2000 Uttar Pradesh lost 18% of its territory and 5% of its population to the newborn state Uttaranchal (Planning Department, 2005).

The fertile soils of the Gangetic Plain make Uttar Pradesh pre-eminently suitable for agriculture. 73% Of its population is occupied in agriculture which produced a total of 38 million metric tonnes of food grains (i.e. rice, wheat and pulses) in 2001 which is about 18% of the total Indian production. Additionally Uttar Pradesh has a large share in the production of sugar cane which accounts for a little more than half of the nations production (Research, Reference and Training Division, 2006).

Industrial undertakings include sugar production, textile manufacturing, automobile industry and software technology. Another major economical branch is the mining sector and mineral based industries. Among the most important mined minerals are limestone, magnesite, coal, rock phosphate, dolomite and silicon-sand (Research, Reference and Training Division, 2006).

In the Annual Plan 2006-07 by the Planning Department of the Government of Uttar Pradesh (2005) the state is divided into four economic regions, namely Western, Central, Eastern, and Bundelkhand. The report gives a region-wise comparative status of development in Uttar Pradesh for these four regions by using 38 development indicators in seven different fields: population, health and education, infrastructural facilities, agriculture and allied, industry and minerals, banking and finance, and employment and manpower. The comparison in development between the economic regions shows some large disparities. In general it can be said that Bundelkhand is the most backward region of Uttar Pradesh and Central Uttar Pradesh is the most average region when comparing the scores of the region on the different indicators to the scores for entire Uttar Pradesh on these indicators. Western Uttar Pradesh seems to be the most developed region with the most developed agricultural sector, the largest industrial sector and the highest per capita income. On the contrary Eastern Uttar Pradesh is lacking a little behind on all seven fields. It has the smallest industrial sector of the four regions.

Table 4.1 shows some basic population data on Uttar Pradesh. To provide a better image of Uttar Pradesh the data for India are also shown in the table in order to compare the numbers and percentages.

**Table 4.1 Population data Uttar Pradesh**

		India	Uttar Pradesh
Population	Persons	1.028.610.328	166.197.921
	Males	532.156.772	87.565.369
	Females	496.453.556	78.632.552
	Sex ratio	933	898
0-6	Persons 0-6	163.819.614	31.624.628
	Males 0-6	84.999.203	16.509.033
	Females 0-6	78.820.411	15.115.595
	Sex ratio	927	916
SC & ST	% SC Population	16,2%	21,1%
	% ST Population	8,2%	0,1%
Literacy rate	Total	64,8%	56,3%
	Male	75,3%	68,8%
	Female	53,7%	42,2%
Workforce	Total	402.234.724	53.983.824
	Male	275.014.476	40.981.558
	Female	127.220.248	13.002.266
	% Cultivators	31,7%	41,1%
	% Agricultural labourers	26,5%	24,8%
	% Household industry workers	4,2%	5,6%
	% Other workers	37,6%	28,5%

The table shows that the sex ratio is more in favor of males in Uttar Pradesh than in all India, 898 females per 1000 males against 933 females per 1000 males. For children under-6 the discrepancy is slightly less with 916 in Uttar Pradesh against 927 in all India. Uttar Pradesh has a larger proportion of Scheduled Caste population than all India, i.e. 21,1% against 16,2%, but a smaller share of Scheduled Tribe population, i.e. 0,1% against 8,2%. Furthermore the literacy rate clearly lacks behind in Uttar Pradesh compared to India with an overall literacy rate of 56,3%. Especially for women the literacy rate in Uttar Pradesh is drastically smaller compared to all India, i.e. 42,2% against 53,7%.

Uttar Pradesh has a larger share of its workforce participating in agriculture compared to the Indian average. About 66% of the working population works as a cultivator or as agricultural laborer (Census of India, 2001a).

For the quantitative analysis the focus will be on the rural areas of the entire state of Uttar Pradesh.

#### **4.4.2 Selection of the villages**

Because the qualitative analysis in this study comprehends only one main village, a careful selection of the main village and the district the village lies within has therefore been made. The intention of this study is to give an image of a common village in Uttar



Pradesh and not one that is characterized or shaped by some unusual features. This means for example that the village should not be situated in a mountainous region, it should not have a much larger or smaller per capita income than the average per capita income of Uttar Pradesh, it should not be located in the urban fringe of a large city or town, or it should not have an extremely divergent number of employees working in the industrial sector, etc. Besides the main village three more villages in the same area were randomly picked. The purpose of this random selection of neighboring villages was to identify possible similarities and differences in the functioning of AWCs and to come to a broader perspective of the functioning of the ICDS program in this area.

#### *District selection*

The used data for this study did not contain information on the presence of AWCs by village name. The village recode of the NFHS gives information on the presence of an AWC in the sampled villages, but the village name is not used in this data. Census 2001 data contains data for all villages, by village name, but does not provide information on the availability of AWCs. Furthermore the Directory of ICDS Projects (DWCD, 2000) gives the number and names of ICDS projects per district and the number of sanctioned AWCs per ICDS project. For this reason it was decided that first a district that takes part in the ICDS program was selected and after that the village was selected. An advantage of this method was the fact that there was a vast amount of data available on districts and on the development of the districts. Besides the region-wise comparative status of development of Uttar Pradesh in the Annual Plan 2006-07 (2005) the report also contains an inter-district disparity analysis of Uttar Pradesh. This analysis uses 29 indicators in the fields of agriculture and allied activities, economic infrastructure, social infrastructure, the industry sector, population, literacy, the workforce, and per capita domestic product to calculate a Composite Index of Development (CID) for each of the 70 districts of Uttar Pradesh. By assuming the level of development of the state on these 29 indicators as 100 the CID's for each district have been calculated and placed in five classes ranging from 120 or more as Most Developed districts to 80 or less as backward districts. This classification was used as a criterion for the selection of the district in this study. The region that was chosen for the analysis is Western Uttar Pradesh because of linguistic reasons. It is the most suitable region for a Delhi-based interpreter because the differences in language are not too big between the two places.

Examination of the classification list showed that 14 out of 22 of Western Uttar Pradesh districts are classified as High Medium Developed Districts (CID 120-100) and 3 districts of Western Uttar Pradesh fall in the Low Medium Developed Districts (CID 100-80) category. When narrowing the query of CID values to the range of 105-95 only four districts are left, namely Bagpat, Firozabad, Shahjahanpur, and Hathras. The district which has the most average score, thus closest to 100, is Hathras with a CID of 100,32. Hence, Hathras was chosen as the district for this study.

Hathras district is situated in the south-western part of western Uttar Pradesh. Table 4.2 gives some basic population data for Hathras district. For comparison the data for Uttar Pradesh is included in the table. Hathras district has a population of 1,34 million persons with a sex ratio of 858 females for 1000 males. For children under-6 the sex ratio is 886. A quarter of the population is classified as Scheduled Caste. The literacy rate in the

district is slightly higher than the literacy rate for Uttar Pradesh, i.e. 62,5% of the population older than 6 is literate. Especially male literacy is higher in Hathras compared to Uttar Pradesh. Like in all Uttar Pradesh the majority of the workforce is occupied in agriculture. However, this proportion is lower than in all Uttar Pradesh, i.e. 57,8% against 65,9%.

**Table 4.2 Population data Hathras district**

		Hathras	Uttar Pradesh
Population	Persons	1.336.031	166.197.921
	Males	718.930	87.565.369
	Females	617.101	78.632.552
	Sex ratio	858	898
0-6	Persons 0-6	255.055	31.624.628
	Males 0-6	135.265	16.509.033
	Females 0-6	119.790	15.115.595
	Sex ratio	886	916
SC & ST	% SC Population	25,2%	21,1%
	% ST Population	0,0%	0,1%
Literacy rate	Total	62,5%	56,3%
	Male	76,3%	68,8%
	Female	46,3%	42,2%
Workforce	Total	391.970	53.983.824
	Male	330.102	40.981.558
	Female	61.868	13.002.266
	% Cultivators	33,1%	41,1%
	% Agricultural laborours	24,7%	24,8%
	% Household industry workers	6,8%	5,6%
	% Other workers	35,4%	28,5%

#### *Village selection*

For the selection of the village for the study several criteria have been adopted. The most important criteria are the presence of an AWC and the rural nature of the village.

For the selection of the village in the Hathras district in Western Uttar Pradesh the village data from the Census of India 2001 has been used. The Primary Census Abstract of Uttar Pradesh provides data on state, district, tehsil, town, ward and village level. The village level data was used in combination with the Village Directory of the Census 2001, a village level database on available amenities (Census of India, 2001b). By merging the Primary Census Abstract data on Hathras district with the Village Directory of Hathras district a database on population, literacy, employment, educational facilities, medical facilities, and a wide range of other facilities was created that enclosed all the villages in Hathras district. This database made it possible to make an estimation of an average village in this district which would be suitable for use in this study. By maintaining a list of criteria on the most relevant aspects for this study the database was analyzed. The criteria were derived from the median values on these different aspects of all villages in Hathras combined:

- Population size: 1000-1200 (median population size of Hathras villages: 1114)

- Presence of primary school (76% of villages in Hathras have a primary school)
- Without medical facilities (80% of villages in Hathras have no medical facilities)
- Bus service within 5km (38% of villages in Hathras have bus services within 5km)
- Power supply available (85% of villages in Hathras have power supply)
- 30-40% of total population is SC (median SC percentage in Hathras villages: 24%)
- 30-50% of workers involved in agricultural sector (median percentage of workers involved in agricultural sector in Hathras villages: 40%)
- 45-55% of total population is illiterate (median percentage of total population that is illiterate in Hathras villages: 50%)

After applying all these criteria to the database two villages were left that conformed to all the criteria, namely Khera Firozpur and Rasid Pur. But, because there was no information available on the presence of an AWC in each of these villages the final step in the village selection was to contact the Anganwadi program officers in Hathras district for this information. This was also necessary to ask for permission to visit the AWCs in some of the district's villages. It turned out that both villages had an AWC, but Rasid Pur was very difficult to reach. Therefore it was decided to select Khera Firozpur as the main research village.

Furthermore, the three other villages were randomly picked. The criteria for the selection of these villages was that they are villages in the near surroundings of the main village, Khera Firozpur, and the presence of an AWC was required.

#### **4.4.3 The villages**

The main village selected for this study is Khera Firozpur. Apparently the village consists of two separate parts, Khera and Firozpur, which are about half a kilometer apart, but are under the same Panchayat. The village was visited on two consecutive days.

The second village visited was Ramnagar, neighboring village of Khera Firozpur. The village was visited one day.

The last two villages were randomly picked and visited by surprise. The villages are located close to the town of Sasni, within a range of 5 kilometer. The first village visited was Nagla Tal and the second village was Gopalpur Urf Bhootpura, or better known as Bhootpura. We approached the mothers of the children who are targeted by the Anganwadi program first instead of going to the AWW first in this village. The village lies next to Nagla Tal and has significantly less agricultural workers than the first two villages.

Table 4.3 gives some basic population indicators for the four villages. Data are missing for Nagla Tal. This village was not mentioned as a separate village in the Census 2001 data.

**Table 4.3 Population data study villages**

	Khera Firozpur	Ramnagar	Nagla Tal	Gopalpur Urf Bhootpura
Total population	1083	801		1371
Population 0-6yrs	217	158		232
Number of households	167	111		232
SC population	29,0%	72,0%		56,0%
Literacy rate	66,5%	58,5%		56,9%
Total workers	279	243		411
Workers in agricultural sector	220	192		47

### **4.5 The in-depth interviews**

In order to measure the perceptions on the functioning of the AWC in-depth interviews will be conducted among mothers of children under-6 in the villages and the AWWs will be interviewed. Drawing any conclusions from the interviews on the prevailing perceptions needs a careful selection of respondents. Hence, a sample of the target population is required. A sample is a portion of the target population which is representative for the whole target population and is selected based on a similarity in characteristics conforming to the target population (Ahuja, 2005).

#### **4.5.1 Selection of respondents**

The target population for this research are the AWWs and the mothers of children under-6. For the interviews with the AWWs the target population is obvious. Every AWC in India is operated by one AWW who is supported by one Anganwadi helper (Das Gupta, 2005). All four research villages had an AWC. In the villages Khera Firozpur, Ramnagar and Bhootpura the AWWs were present at the time of our visit and they agreed on giving an interview. In Nagla Tal only the AWH was present and cooperated by giving an interview.

The second population group that is targeted is the group of mothers of children under-6. Because this target population was unknown in advance, the respondents were partly selected from the information that the AWWs provided, and they were partly selected according to the 'snowball' principle. Obviously, the AWW is familiar with the families who send their children to the AWC. But, because of the small population sizes of the villages most villagers know each other or at least know which family lives where and what the composition of the different families in the village is. Therefore the respondents were partly selected by 'snowballing'. This non-probability method of sampling starts with interviewing the few respondents that are known. These respondents give other names of people who meet the criteria of the research, who in turn help with more new names (Ahuja, 2005).

#### **4.5.2 Description of the sample**

Beneath follows a brief description of the sample of respondents by village.

### *Khera Firozpur*

The sample consisted of the AWW, 9 mothers, 1 father, and 1 grandmother. Of the parents 8 respondents were from the Kushwaha caste (OBC), the most dominant caste in the village. One respondent was Balmik (SC), one Jatav caste (SC), and one was Brahmin caste. This means that almost 20% of the respondents belonged to the SC population, which is a slightly less than the proportion SC in the total population of the village. Of the respondents two did not send their children to the AWC. Three respondents had children younger than 6 months and went to the AWC themselves.

### *Ramnagar*

Five persons were interviewed: the AWW, 3 mothers and 1 grandmother who took care of two of her grandchildren. Two respondents were Jat caste (OBC), one was Jatav (SC) caste, and one was Kashyap (Rajput) caste. All of the respondents were sending their children to the AWC.

### *Nagla Tal*

In Nagla Tal only the Anganwadi helper (AWH) was interviewed because the AWW was not in the village. We only interviewed the AWH because we decided to change our strategy by visiting mothers of targeted children first in the next village. This was to avoid mothers being notified of our visit during the interview with the AWW so we could show up unexpected at their houses.

### *Gopalpur Urf Bhootpura*

In this village we interviewed two mothers and afterwards the AWW. The mothers were Harijan and Balmik, both SC. Only one of the mothers sent one of her children to the AWC.

## **4.5.3 Conducting the interviews**

With the help of the interpreter contact was established with the Anganwadi program officers in the selected district. This was necessary to ask for permission to visit the AWCs in some of the district's villages. The first person who was contacted was the Child Development Project Officer (CDPO) of Hathras district who invited us to visit her office first. We decided on interviewing her as well. This would provide us with some additional information on the status of the ICDS program in the district. The interview with the CDPO took place in the office of the CDPO in the Anganwadi district office.

The CDPO had already informed the AWW in Khera Firozpur about our forthcoming visit to the village. She offered to take us to the village in the Anganwadi car which they use for their own visits to the AWCs. Clearly the CDPO and the AWW had prepared for our visit because the Supervisor, the ICDS officer that operates on the level between the CDPO and the AWW, was present and many women from the village as well. About 35 children were present at the AWC and a lot of food was prepared for us in advance.

Because it seemed rude to interview the AWW in private without the CDPO's presence, and it would probably create a non-cooperative situation, we had to interview the AWW

in the presence of the CDPO, the Supervisor, and a group of interested women with some of the children. But first we interviewed the Supervisor who could not be left out obviously.

We had decided on letting the interpreter do the interviews because this seemed the most efficient way of interviewing: the interpreter didn't have to translate all that was being said at once, which saves a lot of time for the interviewers but moreover for the respondents. And, besides this, this would stimulate the respondent more in talking because the interview would not be interrupted all the time for translation. However, for the researcher this proved to be a tricky method because the researcher has no control or knowledge on what is discussed. It is not possible to check if the interpreter has obtained enough and proper information from the respondent. The researcher is almost entirely dependent on the interpreter.

After interviewing the Supervisor and the AWW, in the presence of many village women and children, and the CDPO, the respondents for the interviews with the mothers had to be selected. Because we had no information on the location and the composition of the different households in the village, we had to rely on the AWW and the villagers for information on where to find households with children under-6.

Most households in the village were Kushwaha caste, thus most women we interviewed were Kushwaha caste. These households were suggested by the AWW, but we insisted and succeeded on visiting households from different castes for a more representative sample of the study population.

Accompanied by the AWW, the AWH, and the Supervisor we interviewed 11 respondents in Khera Firozpur. In addition 4 respondents and the AWW in Ramnagar, the AWH in Nagla Tal, and 2 respondents and the AWW in Gopalpur Urf Bhootpura were interviewed.

Most of the interviews were conducted in or in front of the respondents' houses. We tried to take the respondents apart for the interview, but this turned out to be impossible because of the AWW's presence, the mother-in-law's presence, and many other interested women and children's presence. No matter how we insisted on the necessity of interviewing the women in private, this was practically impossible.

During the interviews in Khera Firozpur the AWW gave many of the answers instead of the respondents, but when asked for their opinion most of the respondents answered for themselves. Also, many times during the interviews other women who were present started to discuss the questions. On a few occasions the interviews looked more like a focus group at some of the questions.

All of the AWWs, and many other respondents, thought we were researchers from the World Bank making a report for the Indian government.

In Gopalpur Urf Bhootpura none of the villagers was expecting our visit. This meant that nobody could have been informed by the CDPO, Supervisor or AWW, and moreover the mothers could not feel awkward or intimidated by the presence of the AWW during the interview. We suspected this had happened in Khera Firozpur and Ramnagar based on our own observations and on reports from people outside of the village.

## **4.6 Data analysis**

This paragraph explains the methods of analysis for both parts of the research. The first section is about the handling of the NFHS data, the different variables, and the use of logistic regression and loglinear modeling for the quantitative analysis. The second section describes the method used for the analysis of the in-depth interviews.

### **4.6.1 Quantitative analysis: logistic regression and loglinear model**

Logistic regression and loglinear modeling have been applied in the quantitative analysis. Before these methods were applied the data had to be cautiously prepared.

#### *Data handling*

The NFHS-2 data sets are already checked for errors and inconsistencies, but for this study we checked the data again by running frequencies of the variables used in the analysis. This way missing values could be identified and examined for incompleteness and inconsistency. At the same time this helped to get acquainted with the data.

#### *Merging the data files*

Because we want to compare the prevalence of child undernutrition between villages with an Anganwadi centre and villages without an AWC it is required to match the Children's data file with the Village data file. By matching these files it is possible to identify children who live in a village with an AWC and children who live in a village that goes without an AWC.

The relationship between the village file and the children's file is a 'one-to-many' [1:0-N] relationship, i.e. more than one child can be associated with one village. Therefore the base file, i.e. the primary file which establishes the unit of analysis, will be the children's file. This way the village characteristics are assigned to the children. The common identification variable determined for this match is the village number. This is the variable 'VVILLAGE' from the village file and 'SLOCAL' from the children's file (Rutstein and Rojas, 2006).

The irrelevant variables for this study were deleted from the data file in order to create a smaller and easier to handle data file. Furthermore the children's data file contained information for children from urban areas as well which was filtered out of the new merged data file. Not all cases, i.e. children, in the merged data file are associated with one of the villages from the village data. Therefore we selected only the children which are associated to a village in the data file. All children for which no village data was

represented in the file were deleted from our sample. After applying all the criteria the sample that was left comprised of 3630 children from 308 different villages.

Some variables needed to be categorized before they could be applied in the loglinear analysis. By means of the recode function and the visual bander function the variables were processed into categorical variables.

#### *Identification of variables*

By making cross-tabulations between the dependent variable and possible independent variables an estimation could be made on possible relationships between these variables. The choice for the independent variables was derived from one of the theoretical models used for this study, i.e. the Mosley and Chen model, and from previous research on this topic. Based on the cross-tabulations a selection of key variables was made for the loglinear analysis. These variables are sex, age, ethnicity, highest educational level of the mother, household standard of living index, immunization, recent disease and of course the availability of an AWC.

#### *Logistic regression*

In the following chapter logistic regression has been chosen for testing some of the presumptive relationships for significance. The method is similar to linear regression, but is used as the dependent variable is dichotomous. The model for logistic regression has the following form:

$$\log\left(\frac{P(y=1)}{1-P(y=0)}\right) = \beta_0 + \beta_1 x$$

In this model  $P(y=1)$  is the probability of success, i.e. an event happening, and

$1-P(y=1)$  is the probability of failure, i.e. an event not happening. The term

$\left(\frac{P(y=1)}{1-P(y=0)}\right)$  is the odds of having success, i.e. a ratio of probability.

The model can be rewritten as:

$$\frac{p}{1-p} = e^{\beta_0} * e^{\beta_1 x}$$

in which  $e^{\beta_1}$  is the change in the odds if  $x$  changes one unit, and  $e^{\beta_0}$  is the constant in this model. If  $e^{\beta_1}$  is smaller than 1 the probability of success becomes smaller, and if  $e^{\beta_1}$  is larger than 1 the probability of success increases. If  $e^{\beta_1}$  is equal to 1 the odds do not change.

By means of maximum likelihood the model is tested (Van Wissen, lectures on Demographic Survey Analysis, 2006).



### *Loglinear modeling*

Because we have a set of categorical variables that can be associated with each other in multiple ways the method of loglinear modeling has been chosen. A loglinear model can analyze complicated cross tables with multiple associations. This method gives a test of association among the variables, it provides parameter estimates of the strength of the associations, it detects the correlation structure among multiple variables and it handles interactions between 2 and more variables (Van Wissen, lectures on Demographic Survey Analysis, 2006).

If we would set out the dependent variable and the independent variables in a cross tab and would question what the frequencies would be if there were no relationships between the variables, i.e. the null hypothesis, we can expect that the frequencies would proportionately reflect the totals of the rows and columns in the cross tab, i.e. the marginal frequencies. In other words, if we have a cross tab with the observed frequencies we can calculate the expected frequencies for each cell. The cross tab with the expected frequencies reflects a model in which the variables are independent of each other. If this cross tab is compared with the cross tab with the observed frequencies and significant deviation occurs for the observed and expected frequencies than the null hypothesis can be rejected, i.e. there is dependence between the variables. This way multi-way frequency tables can be examined for various main effects, but also for interaction effects between the different variables. Furthermore the loglinear model gives parameters that describe the direction of the relationship, as well as the strength of the relationships (Van Wissen, lectures on Demographic Survey Analysis, 2006).

### **4.6.2 Qualitative analysis: grounded theory**

The interviews were all recorded by using a digital voice recorder. This made it easy to store and backup the data. The interviews were then completely translated and transcribed in English by the interpreter. Silences, reiterations and other behaviour, like laughter, are included in the transcriptions. In addition field notes were made about the setting, and what was said and done during the interviews.

The analysis of the interviews have been done by means of grounded theory methods. This means that a theoretical framework is induced through the systematic collection and analysis of data. This theory presumes that “data are narrative constructions, they are reconstructions of experiences” (Denzin & Lincoln, 2000). Therefore the transcriptions of the interviews are being coded. Specific codes are given to specific issues that the respondents talk about. After the coding the answers pertaining to specific codes are filtered out of the transcripts and are put together in a document by code. This makes it possible to analyze the interviews by different themes. The analysis of the interviews can be found in chapter 6.

## 5 ICDS coverage and the prevalence of child undernutrition in rural Uttar Pradesh

This chapter contains the results of the quantitative analysis. The research question for this part of the study is rephrased beneath:

*Can the high prevalence of undernutrition among children under-3 in rural Uttar Pradesh partly be explained by the low coverage of the ICDS program in this region?*

This question raises several questions that need to be attended before an answer can be given. Five questions come forward:

- How is the ICDS program distributed across rural Uttar Pradesh?
- How is the prevalence of child undernutrition distributed across the child population in rural Uttar Pradesh?
- What are the most important causes of child undernutrition in rural Uttar Pradesh?
- Are there any interaction effects between these causes?
- Is there any relationship between child undernutrition and ICDS coverage in rural Uttar Pradesh?

An answer to the main question will be provided in the conclusion of this chapter, but first the other five questions will be examined in the next paragraphs. The first two paragraphs explore the placement of the ICDS program across the state, and patterns of the prevalence of undernutrition among children and give some descriptive statistics. In the third paragraph possible determinants of child undernutrition in Uttar Pradesh will be assessed and checked for interaction effects. Moreover, the coverage of the ICDS program and the prevalence of undernutrition will be assessed for a significant relationship. In the final paragraph of this chapter the results of the first three paragraphs are summarized and discussed.

### 5.1 ICDS coverage

One of our questions is '*How is the ICDS program distributed across rural Uttar Pradesh?*'. The merged data file (see section 4.6.1) was used to analyze, which gives a representational image of the distribution of Anganwadi centers across rural Uttar Pradesh. 308 Out of 323 different villages from the village file are represented in the merged file.

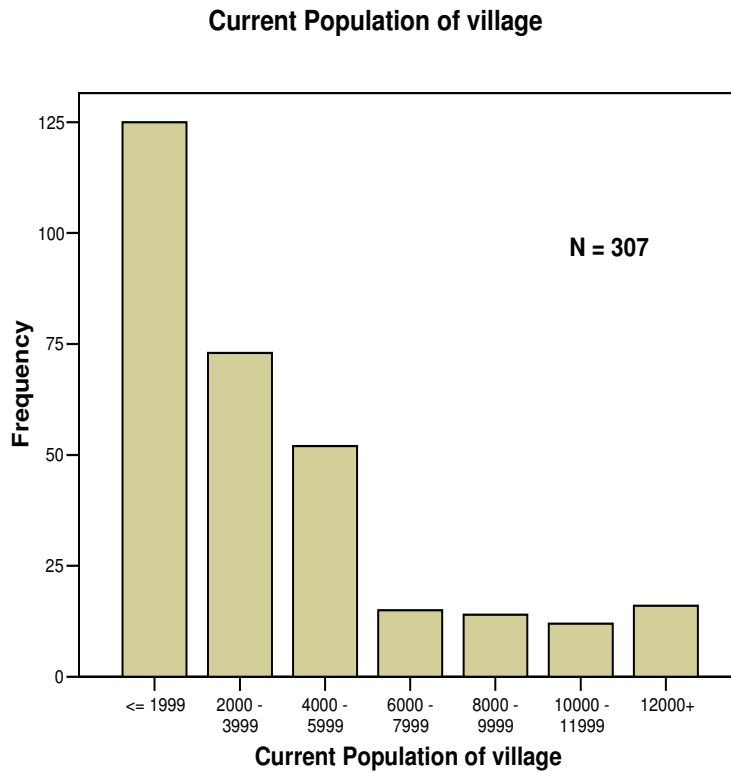
The distribution of AWCs was assessed by availability in all villages and by population size of the villages.

First the duplicate villages were filtered out of the data, because some villages are represented more than once in the data file. Since every case in the merged data file represents one child, and more than one child in the file can be associated with one village it is obvious that a number of children share variables of the same village.

Out of 308 separate villages 39.3% had an AWC in the village and 60.3% did not have an AWC.

**Figure 5-1 Current population of village**

When we look at the current population size of the sample villages we can see that a vast majority of the villages, i.e. almost 65%, has a population size smaller than 4000. The largest share of villages, i.e. 40%, doesn't count more than 2000 inhabitants. The slightly larger size of the 12000+ group, compared to the previous group 10000-11999, is caused by the fact that all villages ranging in population size from 12000 to the highest, approximately 28000, are taken together in this group (figure 5.1).



The availability of an AWC in a village set out in a cross tab against the population size seems to indicate that the smaller the population size of the village the smaller the chance of having an AWC in the village (table 5.1). However, as the number of villages is much smaller in the higher population size categories, this presumptive association should be cautiously checked for significance.

**Table 5.1 Availability of AWC by current population of village**

			Availability of AWC in the village	
			No	Yes
Current population of village		N		
	<= 1999	125	68%	32%
	2000-3999	73	67%	33%
	4000-5999	52	42%	58%
	6000+	57	53%	47%
Total		307	61%	39%

The dependent variable, i.e. the availability of an AWC in the village, is dichotomous and the independent variable, i.e. the population size of the village, is an interval variable. By

applying logistic regression a possible relationship can be tested. Because the higher population size categories are very small the last four categories are taken together. This provides for a more powerful analysis.

The logistic regression model outcomes in table 5.2 show that, when using the population size 6000+ as reference category, the odds of not having an AWC in the village is higher for villages in the two smallest population size categories and smaller for villages in the 4000-5999 population size category. However, only the first category, i.e. population size < 1999, gives a significant outcome. Thus, in other words, the villages with a population size smaller than 1999 are the villages least likely to have an AWC available. The odds of not having an AWC in the village is 1.9 times higher (Exp(B)) for villages with a population size <1999 than for villages with a population size >6000. What also shows from these numbers is that the ICDS criterion of having one AWC per approximately 1000 persons is not reached in rural Uttar Pradesh.

**Table 5.2 Results of relationship between population size of the village and the availability of an AWC in the village**

	Sig.	Exp(B)
Population size <= 1999	0,048	1,912
2000-3999	0,095	1,837
4000-5999	0,282	0,660
6000+		

## **5.2 Prevalence of undernutrition**

In this section the question ‘*How is the prevalence of child undernutrition distributed across the child population in rural Uttar Pradesh?*’ will be examined. To give an overview of the distribution of undernutrition in the child population, i.e. children under-3, in rural Uttar Pradesh the merged data file was used. A selection was made of children living in rural areas who had their height and weight measured. A sample of 1961 children under-3 was left. In the first paragraph a brief description of this sample is given. Following, the prevalence of child undernutrition in this sample is described by several distinguishing features, namely age, sex, religion, and ethnicity. Ethnicity refers to the possibility of being classified as Scheduled Caste, Scheduled Tribe, or Other Backward Caste (OBC).

### *Sample description*

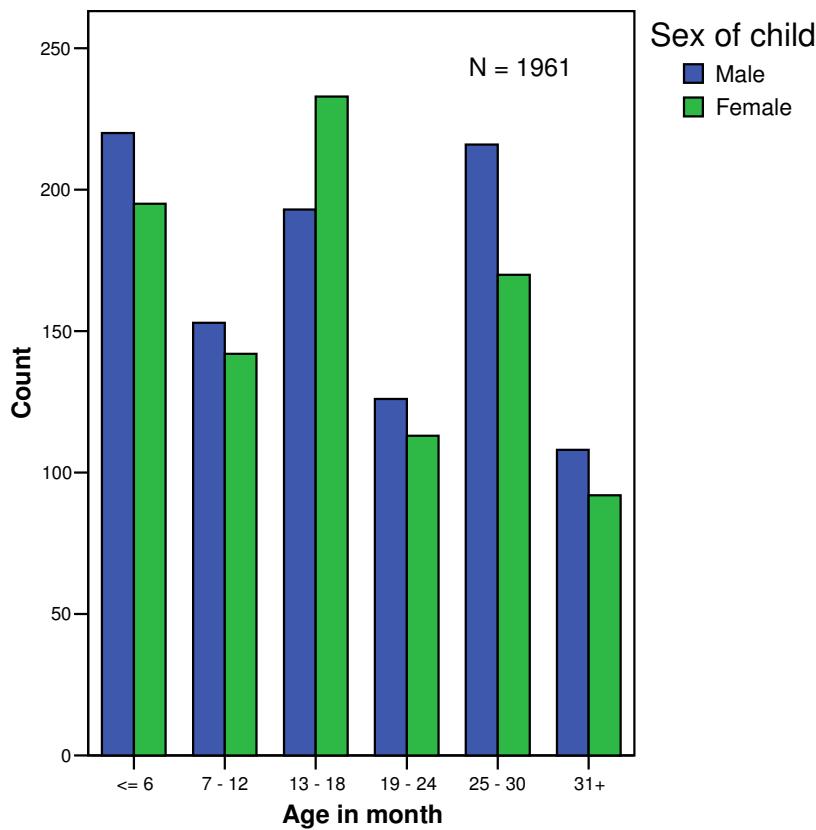
The sample consists of 1961 children under-3 of which 1016 are boys and 945 are girls. The ratio boys-girls in this sample resembles the ratio boys-girls in the children’s data file. Thus, the sex ratio in the sample is 930 girls per 1000 boys (table 5.3).

When the age-distribution is examined by sex of the child a striking pattern occurs in figure 5.2. First, the age categories <6 months, 13-18 months, and 25-30 months are notably larger than the 7-12 months, 19-24 months, and 31-36 months age categories. This is confirmed if the month of birth for all the cases in the sample are examined. Most children are recorded as being born in the last six months of a year. A reasonable

explanation for this can be found in the seasonality of births. Seasonal fluctuations in birth, i.e. months in which birth levels peak and months in which the level of births is below the mean monthly level, are a universal phenomenon<sup>4</sup>.

Second, the number of boys in each age category is higher than the number of girls, except in the 13-18 months category. A remarkable larger number of girls are represented in the 13-18 months age group. The in general slightly higher number of boys is also a normal universal pattern in populations.

**Figure 5-2 Age composition boys and girls**



The children in the sample can be clearly divided by religion. A vast majority of the children is Hindu, namely 86.3%. The second largest group is the Muslim group with 13.3% of the sample children. Other religions represented in the sample, i.e. Christianity, Sikhism, and Buddhism/Neo Buddhism, are of negligible value, only 9 out of 1958 children are associated with these religions (table 5.3).

<sup>4</sup> See for example the article ‘*Seasonal patterns of reproduction in Matlab, Bangladesh.*’ by Becker, Chowdhury, and Leridon (1986)

**Table 5.3 Sample description by sex, religion and ethnicity**

		Frequency	Percentage
Sex	Male	1016	51,8%
	Female	945	48,2%
Religion	Hindu	1689	86,3%
	Muslim	260	13,3%
	Christian	1	0,1%
	Sikh	7	0,4%
	Buddhist/Neo-Buddhist	1	0,1%
Ethnicity	Scheduled caste	461	24,6%
	Scheduled tribe	51	2,7%
	Other backward caste	588	31,3%
	None of them	776	41,4%

In Indian policy a division is made between different castes and their pertaining socioeconomic status. As explained in section 2.2 a distinction is made between Scheduled Caste (SC), Scheduled Tribe (ST), Other Backward Caste (OBC), or none of these castes which implies the socially and economically better off castes. Table 5.3 shows that a minority of the children in the sample belong to the latter group, i.e. 41,4%. Most children thus belong to the more disadvantaged groups in the Indian society. The share of children pertaining to SC, ST, or OBC is respectively 24,6%, 2,7%, and 31,3%. For 85 children data was missing on their ethnicity.

*Prevalence of undernutrition by sex of child, age, religion and ethnicity*

But how is the prevalence of undernutrition distributed in this sample? As explained in section 2.1 a value of -2 standard deviations or -2 Z-scores, compared to the NCHS/WHO international reference population indicates undernourishment, and a value of -3 SD, or Z-scores, indicates severe undernourishment. Hence, in case of height-for-age we speak of stunting and severe stunting, in case of weight-for-height we speak of wasting and severe wasting, and in case of weight-for-age we speak of underweight and severe underweight.

Table 5.4 shows that the prevalence of stunting and severe stunting is very high in our sample. Almost a quarter of the children is stunted and one third is severely stunted. So in sum 57% of the children in the sample falls more than 2 SD below the international reference curve. The mean value of the sample is -2.22 SD of the reference median.

**Table 5.4 Height-for-age distribution in sample**

	Frequency	Percentage
Severe stunting	652	33,2%
Stunting	472	24,1%
Normal	807	41,2%
Tallness	30	1,5%
Total	1961	100,0%

When we consider weight-for-height (table 5.5) it is obvious that the prevalence of wasting is much less dramatic than the prevalence of stunting. Two percent of the

children can be regarded as severely wasted and nearly 10% as wasted, a total of almost 12%. However, in non-disaster areas, i.e. areas that are not affected by acute food shortages or outbreaks of infectious diseases for example, low weight-for-height is relatively constant prevalent, usually by less than 5% (WHO, 1995). If we assume that rural Uttar Pradesh can be appointed as a non-disaster area, then the prevalence of wasting is more than twice as high as in the average non-disaster areas. The mean level of low weight-for-height in our sample is -0.80%.

**Table 5.5 Weight-for-height distribution in sample**

	Frequency	Percentage
Severe wasting	40	2,0%
Wasting	186	9,5%
Normal	1702	86,8%
Overweight	33	1,7%
Total	1961	100,0%

The prevalence of low weight-for-age (table 5.6), indicating either stunting, wasting, or both, is also high in the sample. Almost 54% of the children fall more than 2 SD below the reference median, i.e. underweight, and 23,3% of the children fall more than 3 SD below the reference median, i.e. severely underweight. The mean weight-for-age is -2.0 SD below the reference median.

**Table 5.6 Weight-for-age distribution in sample**

	Frequency	Percentage
Severe underweight	457	23,3%
Underweight	599	30,5%
Normal	888	45,3%
Overweight	17	0,9%
Total	1961	100,0%

In the next cross tabulation, table 5.7, the anthropometric indices are set out against the previously discussed characteristics of the sample population. Religion has been brought down to two categories, namely Hindu and Muslim, because the percentage of children pertaining to other religions is insignificant in this sample, i.e. less than 1%. From this table the following observations can be made:

*Sex of child*

The percentage of girls that are severely stunted is higher than the percentage of severely stunted boys, i.e. 35,6% against 31,1%. On the other hand an almost equal percentage of girls and boys, about 24%, fall between -2 SD and -3 SD in height-for-age of the reference population. In sum the prevalence of stunting is higher among girls, it exceeds the prevalence of stunting among boys by almost 4% with 59,2%. This is reflected in the prevalence of low weight-for-age. Five percent more girls than boys are severely underweight. The prevalence of low weight-for-height is almost similar for boys and girls.

**Table 5.7 Anthropometric indices by sex, age, religion and ethnicity**

		N	Height-for-age		Weight-for-height		Weight-for-age	
			Severe stunting	Stunting	Severe wasting	Wasting	Severe underweight	Underweight
Sex of child	Male	1016	31,1%	24,5%	2,0%	9,3%	20,9%	30,8%
	Female	945	35,6%	23,6%	2,1%	9,7%	25,9%	30,3%
Age in months	<= 6	415	5,8%	15,7%	0,5%	5,1%	4,1%	12,0%
	6 - 11	295	23,1%	23,4%	2,4%	11,5%	23,7%	29,8%
	12 - 17	426	36,9%	32,6%	3,5%	13,6%	27,0%	39,7%
	18 - 23	239	58,6%	21,8%	4,2%	15,1%	38,5%	33,1%
	24 - 29	386	39,6%	25,4%	0,8%	5,7%	25,4%	35,2%
	30- 35	200	55,0%	24,5%	1,5%	7,5%	32,5%	38,5%
Religion	Hindu	1689	33,2%	24,6%	2,1%	9,7%	22,9%	31,3%
	Muslim	260	35,0%	21,2%	1,5%	8,5%	26,9%	27,3%
Ethnicity	SC	461	38,2%	25,8%	2,6%	8,2%	25,6%	35,8%
	ST	51	39,2%	31,4%	2,0%	7,8%	31,4%	27,5%
	OBC	588	34,9%	22,8%	2,9%	12,6%	26,5%	30,1%
	Non	776	28,9%	22,7%	1,2%	8,0%	18,8%	28,1%
Total sample		1961	33,2%	24,1%	2,0%	9,5%	23,3%	30,5%

### *Age in months*

Stunting and severe stunting seem to be the least prevalent among children younger than 6 months. Furthermore children between 18 and 23 months and 30-35 months are most likely to be severely stunted. More than half of all the children in these age groups are severely stunted. Again this can be seen in the prevalence of severe low weight-for-age which peaks in these two age groups.

A peak in the prevalence of low weight-for-height shows in the categories 12-17 months and 18-23 months. According to the WHO (1995) this is typical in populations with a high prevalence of wasting.

Overall it can be said that children younger than 6 months are less likely to be stunted, wasted, or underweight than the older children.

### *Religion*

When we assess undernutrition by religion a slightly awkward picture appears. The differences in undernutrition for Hindu children and Muslim children are not so big, but give reason for cautious examination. Muslim children are less likely to be stunted, but more likely to be severely stunted. The same can be said for low weight-for-age. Muslim children are less likely to be underweight, but more likely to be severely underweight. However, Muslim children are less likely to be wasted or severely wasted.

### *Ethnicity*

As for ethnicity, stunting and severe stunting are most prevalent among Scheduled Caste children and Scheduled Tribe children. Also Other Backward Caste children tend to be more often severely stunted than the sample average, but a slightly smaller proportion of OBC children is stunted than the sample average. Low weight-for-height is most prevailing among OBC children.

While severe underweight is most prevalent in the ST group, the prevalence of 'regular' underweight is the smallest for ST children, even smaller than for non-SC/ST/OBC



children who score the lowest prevalences on almost all other indices. Non-SC/ST/OBC children are less likely to be undernourished than SC, ST and OBC children.

If a Chi-square test (table 5.8) is run for the different factors set out against the three anthropometric indices as in the cross table we find that there are several significant relationships. For the Chi-square test all 5 initial categories of Ht/A, Wt/Ht, and Wt/A have been used, i.e. smaller than -3 SD, -3 SD to -2 SD, -2 SD to 2 SD, 2 SD to 3 SD, and 3 SD or more.

Apparently the sex of the child and weight-for-age are significantly related to each other. But also height-for-age, weight-for-height and weight-for-age are significantly related to the age of the child. Furthermore height-for-age and weight-for-age appear to be significantly related to ethnicity. For religion and any of the anthropometric indices there seems to be no significant relationship. It must however be noted that for all the Chi-square results that are significant more than 20% of the expected cell counts is less than 5 and for some results the minimum expected cell count is less than one which may produce an invalid result. Furthermore the significance of these relationships says nothing about the direction of the relationship.

**Table 5.8 Pearson Chi-square test on sex, age, religion and ethnicity as determinants of anthropometric indices**

		Height-for-age	Weight-for-height	Weight-for-age
Sex of child	Chi-square	6,630	1,613	9,658
	Sig.	0,157	0,807	0,047
Age in months	Chi-square	424,411	75,474	355,323
	Sig.	0,000	0,000	0,000
Religion	Chi-square	1,549	0,918	3,730
	Sig.	0,818	0,922	0,444
Ethnicity	Chi-square	26,241	19,853	35,438
	Sig.	0,010	0,070	0,000

### **5.3 The relationship between ICDS coverage and the prevalence of undernutrition**

In this paragraph three questions stand central. The first question that will be assessed is ‘*What are the most important causes of child undernutrition in rural Uttar Pradesh?*’. In the former paragraph we found that the children’s anthropometric status is probably related to sex, age and ethnicity. But obviously there are more possible determinants of child undernutrition. Therefore an assessment of the most important causes of child undernutrition is made in this section.

Second, it is useful to test the determinants of undernutrition for interaction effects. It may be possible that different variables interact with each other. For example, low weight-for-age can be determined by the age of the child, but in the meantime the child’s ethnicity or the type of toilet facility the child uses can also be of effect on weight-for-age and modify the effect of sex on weight-for-age. In other words, main effects between the dependent variable and independent variables can be modified by various other independent variables. Therefore the question ‘*Are there any interaction effects between*

*these causes?*’, which refers to the most important causes of child undernutrition in the previous question, will be assessed. It is especially essential to check for interaction variables that can modify a possible relationship between weight-for-age and the coverage of the ICDS program.

Finally we come to the most important question that leads to an answer to the main research question of the quantitative analysis. The question ‘*Is there any relationship between child undernutrition and ICDS coverage in rural Uttar Pradesh?*’ should provide an answer to the question whether the high prevalence of undernutrition among children under-3 in rural Uttar Pradesh can be partly explained by the low coverage of the ICDS program in this region.

#### *Weight-for-age cross tab*

From the theoretical framework and the available variables in the dataset a selection of independent variables was derived that are most likely to be of influence on the prevalence of child undernutrition in rural Uttar Pradesh.

In table 5.9 the anthropometric index weight-for-age is set out against a range of variables that are likely to be of influence on the nutritional status of children. Weight-for-age was chosen as the anthropometric index for the loglinear analysis because it reflects both stunting and wasting. Also, due to the complexity of the multivariate analysis it is easier to use one indicator for anthropometry instead of multiple indicators to avoid interpretation errors. The explanation of most variables is clear from the table, but for some of the variables a description is given below.

Weight-for-age has been re-categorized into two groups, namely children who are underweight and children who are not underweight. Because we want to know by which factors the possibility of being undernourished can be explained it is sufficient to use a binary dependent variable, i.e. underweight or not underweight, instead of looking at different gradations of undernutrition.

The variable ‘Highest educational level’ gives the highest educational level the mother of the child has attended.

‘Gave child plain water’ refers to the feeding of plain water to the child in the 24 hours before the survey. Because the values in the cross tab for this variable are striking this variable has been taken into account. It is reasonable to assume that mothers who gave their child plain water in the last 24 hours give their child plain water more often. Besides, water is a major source of possible contamination with infectious diseases. Therefore this variable is treated as a possible determinant of undernutrition.

The variable ‘Household Standard of Living index’ is a composite variable which is calculated out of several variables, i.e. house type, toilet facility, source of lighting, main fuel for cooking, source of drinking water, separate room for cooking, ownership of house, agricultural land, irrigated land, livestock, and durable goods. The index scores are differentiated into three categories, a low, medium, or high standard of living (IIPS and ORC Macro, 2001a).

The variable 'Source of drinking water' has three categories. The first category 'Piped water' includes piped water in the residence, yard or plot, and public taps. Well water includes hand pumps and wells, either in the residence, yard or plot, or public hand pumps and wells. The third category 'Surface water' includes springs, rivers, streams, ponds, lakes, and dams.

For the variable 'Ever had vaccination' we made two categories, children who never received any immunization and children who have received at least one vaccination, or at least have been reported by their mother as having been immunized even though no health card could be shown. The constructed variable 'Ever had vaccination' includes BCG, DPT, Polio and measles vaccinations.

**Table 5.9 Possible determinants of undernutrition by weight-for-age**

		Weight-for-age		
		Underweight	Not underweight	N
Highest educational level	No education	57,8%	42,2%	1.376
	Primary	54,6%	45,4%	293
	Secondary	36,9%	63,1%	222
	Higher	27,1%	72,9%	70
Months of breastfeeding	<= 5	14,8%	85,2%	378
	6 - 10	48,4%	51,6%	318
	11 - 15	66,7%	33,3%	378
	16 - 20	62,4%	37,6%	343
	21 - 25	69,0%	31,0%	229
	26 - 30	66,1%	33,9%	180
	31+	81,1%	18,9%	95
	Never breastfed	63,0%	37,0%	27
Gave child plain water	No	30,6%	69,4%	359
	Yes	59,0%	41,0%	1.596
Household Standard of living index	Low	62,6%	37,4%	658
	Medium	52,3%	47,7%	1.057
	High	34,0%	66,0%	206
Number of household members	<= 5	58,6%	41,4%	403
	6 - 10	54,9%	45,1%	1.030
	11 - 15	46,5%	53,5%	372
	16 - 20	50,0%	50,0%	104
	21+	57,7%	42,3%	52
Source of drinking water	Piped water	46,9%	53,1%	98
	Well water	54,5%	45,5%	1.831
	Surface water	40,6%	59,4%	32
Type of toilet facility	Flush toilet	40,5%	59,5%	42
	Pit/latrine	40,4%	59,6%	166
	No facility/field/bush	55,5%	44,5%	1.748
Ever had vaccination	No	50,3%	49,7%	612
	Yes	55,4%	44,6%	1.349
Child was ill recently	No	49,8%	50,2%	951
	Yes	57,6%	42,4%	1.010
Availability of AWC in the village	No	53,3%	46,7%	1.071
	Yes	54,6%	45,4%	878
<b>Total</b>		<b>53,9%</b>	<b>46,1%</b>	<b>1.961</b>

'Child was ill recently' gives the number of children who had diarrhoea, fever or cough in the two weeks prior to the survey.

The table (5.9) shows that some of the variables are most likely to have an effect on undernutrition among children under-3. Clearly the variable 'Highest educational level' of the mother shows a decline in the prevalence of underweight for higher educated mothers. The prevalence of child underweight is highest for non educated mothers, i.e. 57,8%, compared to the lowest prevalence for higher educated mothers, i.e. 27,1%.

For the duration of breastfeeding the pattern of weight-for-age seems quite awkward. The lowest prevalence of underweight is found among children who have been breastfed for less than 5 months, i.e. 14,8%. Then the prevalence of underweight rises, but is more or less stable at around 62-69% for children who have been breastfed between 10 and 30 months. The largest proportion of underweight children is found among children who have been breastfed for over 30 months, i.e. 81,1%. Only 27 children in the sample have never been breastfed and a proportion of 63% of these children is underweight.

Most mothers gave their child plain water during the 24 hours preceding the survey interview. Of the children who received plain water 59% was underweight which is almost twice as high as for children who did not receive plain water (30,6%).

The Household Standard of Living index shows a sharp decline in prevalence of underweight for an increasing standard of living. Households with a low standard of living have the highest numbers of undernourished children, i.e. 62,6%. This proportion declines to 52,3% for medium standard of living, and 34% for a high standard of living. Most households have a medium standard of living (1057).

When the number of household members is assessed the table shows a decline in the prevalence of underweight for an increasing number of household members first, i.e. from less than 5 up to 15 household members the prevalence of underweight decreases from 58,6% to 46,5%. But the proportion of underweight children increases up to almost 58% again when the number of household members increases to 21 or more. However, the number of cases in this last category (52) is rather small compared to the number of cases in the other categories. The largest category is 6-10 household members which counts 1030 cases.

The next variable shows that the prevalence of underweight is highest among children whose household source of drinking water is well water. 54,5% Of these children are underweight in comparison to the categories piped water (46,9%) and surface water (40,6%). However, the size of the latter two groups is much smaller than the first group which can indicate that these two groups might not give a proper reflection of the prevalence of underweight in these groups. The same can be said for the different categories of the 'Type of toilet facility' variable. Again the largest group, i.e. the households without any toilet facility, has a higher proportion of children who are underweight (55,5%) than the other groups, i.e. flush toilet (40,5%) and pit/latrine (40,4%) who are much smaller in size.

Remarkably, the proportion of underweight children is smaller among children who never received any vaccination compared to children who have been immunized at least once, i.e. 50,3% against 55,4%. One would assume that children who have been immunized will be ill less often and, considering the relationship between illness and undernutrition (see section 3.2), would also be less likely to be undernourished. However, this relationship between illness and undernutrition is more or less reflected by the variable ‘Child was ill recently’ in the cross tab. Of the children who were suffering from diarrhoea, fever or cough in the two weeks before the survey almost 58% was classified as underweight. Among children who were reported as not having suffered of any of these symptoms the prevalence of underweight was almost 8% lower with 49,8%.

The final variable used in this cross tab is the variable “Availability of an AWC in the village’. The values in the cross tab give not much difference for the prevalence of underweight among children who live in a village with an AWC or without an AWC. Apparently there is even a slightly larger proportion of underweight children living in villages with an AWC, i.e. 54,6%, than the proportion of underweight children living in villages without an AWC, i.e. 53,3%. Hence, our first impression is that the coverage of the ICDS program does not have a significant relationship with the prevalence of undernutrition. This will however be examined in more detail in the following loglinear analysis.

**Table 5.10 Pearson Chi-square test on possible determinants for undernutrition**

		Weight-for-age SD
Highest educational level	Chi-square	54,246
	Sig.	0,000
Months of breastfeeding	Chi-square	331,683
	Sig.	0,000
Gave child plain water	Chi-square	94,985
	Sig.	0,000
Household standard of living index	Chi-square	54,064
	Sig.	0,000
Number of household members	Chi-square	13,021
	Sig.	0,011
Source of drinking water	Chi-square	4,402
	Sig.	0,111
Type of toilet facility	Chi-square	17,073
	Sig.	0,000
Ever had vaccination	Chi-square	4,444
	Sig.	0,035
Child was ill recently	Chi-square	11,934
	Sig.	0,001
Availability of AWC in the village	Chi-square	0,299
	Sig.	0,584

A Chi-square test (table 5.10) on the previous cross tab indicates that two of the possible determinants of undernutrition in the cross tab are not significantly related to weight-for-

age of the children, i.e. the source of drinking water and the availability of an AWC in the village.

For the loglinear analysis the variables 'Source of drinking water' and 'Type of toilet facility' have been left out of the model, because both variables have already been incorporated in the Household Standard of Living index and the distribution of cases in the various categories of these variables is predominantly towards one category. The number of cases in the other categories is too small in comparison to the main category to test the variable properly for significance. Furthermore the number of household members has been left out of the model because the direction of a possible relationship with undernutrition is not clear from the cross tab. This will only complicate the interpretation of the loglinear model too much and will likely lead to erroneous conclusions.

### *Loglinear model*

After assessing a range of independent variables in the previous sections a selection of those variables will be used in the loglinear analysis. Age and ethnicity are the child's characteristics that will be used, because these have the most significant effect on weight-for-age in table 5.8 in paragraph 5.2. Sex of the child has been left out the loglinear analysis because it is the least significant associated to undernutrition in table 5.8. Highest educational level of the mother (Education), months of breastfeeding (Breastfeeding), gave child plain water (Water), household standard of living index (HHSoL), ever had vaccination (Immunization), child was ill recently (Illness), and availability of AWC in the village (AWC) are the other variables that will be used in the loglinear model. Together with the variable weight-for-age (Wt/A) these variables will be assessed for mean effects and interaction effects.

However, if all of these variables would be put into one loglinear model the outcome of the model would be incomprehensible. The cross table that results from the cross-classification of all of the variables of interest would consist out of several thousands of cells which would all be likely to have a value close to or equal to zero considering the sample size. The smaller the expected frequencies in the table, the less powerful the analysis becomes. Furthermore, it would be quite impossible to say something on for example a probable 5-way interaction effect.

Therefore, the analysis is split up in four loglinear models. Because we want to examine the relationship between ICDS program coverage and child undernutrition and want to control for other determinants of undernutrition each loglinear model contains the variables 'AWC' and 'Wt/A'. These two variables are in each model joined by two of the other eight remaining variables that seem logic to interact with each other.

To make the loglinear analysis more comprehensible the variables 'Age' and 'Breastfeeding' have been recoded into variables with three instead of respectively six and eight categories. For the variable 'Breastfeeding' the category 'never breastfed' has been left out, because it is only a proportion of 1,4% of the total N and does not add much significance to the model.

The following loglinear models have been produced:

- Age, Ethnicity, AWC, Wt/A
- Immunization, Illness, AWC, Wt/A
- Education, HHSoL, AWC, Wt/A
- Water, Breastfeeding, AWC, Wt/A

For the loglinear analysis in SPSS the ‘Model selection loglinear analysis’ procedure was used. This procedure helps finding and describing associations between the categorical variables. By using the method ‘Backward elimination’ for this procedure we start with the most complex model including all interaction effects, i.e. the saturated model, and eliminate effects that are not significant one-by-one until the best model is generated. This means that SPSS calculates the significance of all interaction effects, from 4-way effects down to main effects.

*Immunization\*Illness\*AWC\*Wt/A*

The loglinear model with the variables immunization, illness, AWC and Wt/A contains 1949 cases. All variables are limited to two categories.

Table 5.11 shows that the Likelihood Ratio Chi-Square (LR Chisq) improves by 321,577 when all first order affects are included in the model. The level of significance is smaller than 0,000 thus the hypothesis that the first order effects are zero can be rejected. There is a first order effect. The same goes for the second order effects. Adding the second order effects to the model improves the LR Chisq by 20,590 and has a significance level of 0,002. However, the addition of third and fourth order effects does not improve the model. The level of significance is more than 0,05 for these effects.

**Table 5.11 Results of *Immunization\*Illness\*AWC\*Wt/A* loglinear model**

	K	df	Likelihood Ratio	
			Chi-Square	Sig.
K-way and Higher Order Effects(a)	1	15	347,479	0,000
	2	11	25,901	0,007
	3	5	5,311	0,379
	4	1	1,122	0,289
K-way Effects(b)	1	4	321,577	0,000
	2	6	20,590	0,002
	3	4	4,189	0,381
	4	1	1,122	0,289

a. Tests that k-way and higher order effects are zero.

b. Tests that k-way effects are zero.

Table 5.12 gives the step summary of the backward elimination procedure. Step 0 shows that elimination of the fourth order effect *Immunization\*Illness\*AWC\*Wt/A* produces a chi-square change of 1,122 and has a significance level of 0,289. The hypothesis that this effect is zero is not rejected, thus the fourth order effect can be removed from the model. The next step in the model only tests all the three-way effects. Elimination of the effect *Immunization\*Illness\*AWC* produces the smallest effect on the model with a chi-square of 0,420 and a significance level of 0,517. This effect is removed next.

**Table 5.12 Step summary of backward elimination procedure for *Immunization\*Illness\*AWC\*Wt/A* loglinear model**

**Step Summary**

Step <sup>b</sup>		Effects	Chi-Square <sup>a</sup>	df	Sig.	Number of Iterations
0	Generating Class <sup>c</sup>	Immunization*Illness*AWC*Wtforage	,000	0	.	
	Deleted Effect 1	Immunization*Illness*AWC*Wtforage	1,122	1	,289	3
1	Generating Class <sup>c</sup>	Immunization*Illness*AWC, Immunization*Illness*Wtforage, Immunization*AWC*Wtforage, Illness*AWC*Wtforage	1,122	1	,289	
	Deleted Effect 1	Immunization*Illness*AWC	,420	1	,517	3
	2	Immunization*Illness*Wtforage	,828	1	,363	3
	3	Immunization*AWC*Wtforage	,841	1	,359	3
	4	Illness*AWC*Wtforage	2,057	1	,152	3
2	Generating Class <sup>c</sup>	Immunization*Illness*Wtforage, Immunization*AWC*Wtforage, Illness*AWC*Wtforage	1,542	2	,463	
	Deleted Effect 1	Immunization*Illness*Wtforage	,863	1	,353	3
	2	Immunization*AWC*Wtforage	,982	1	,322	3
	3	Illness*AWC*Wtforage	1,977	1	,160	3
3	Generating Class <sup>c</sup>	Immunization*AWC*Wtforage, Illness*AWC*Wtforage, Immunization*Illness	2,405	3	,493	
	Deleted Effect 1	Immunization*AWC*Wtforage	,938	1	,333	3
	2	Illness*AWC*Wtforage	1,895	1	,169	3
	3	Immunization*Illness	1,356	1	,244	2
4	Generating Class <sup>c</sup>	Illness*AWC*Wtforage, Immunization*Illness, Immunization*AWC, Immunization*Wtforage	3,343	4	,502	
	Deleted Effect 1	Illness*AWC*Wtforage	1,968	1	,161	3
	2	Immunization*Illness	1,430	1	,232	3
	3	Immunization*AWC	1,789	1	,181	3
	4	Immunization*Wtforage	4,304	1	,038	3
5	Generating Class <sup>c</sup>	Illness*AWC*Wtforage, Immunization*AWC, Immunization*Wtforage	4,773	5	,444	
	Deleted Effect 1	Illness*AWC*Wtforage	1,972	1	,160	3
	2	Immunization*AWC	1,865	1	,172	2
	3	Immunization*Wtforage	3,947	1	,047	2
6	Generating Class <sup>c</sup>	Illness*AWC*Wtforage, Immunization*Wtforage	6,638	6	,356	
	Deleted Effect 1	Illness*AWC*Wtforage	1,972	1	,160	3
	2	Immunization*Wtforage	4,011	1	,045	2
7	Generating Class <sup>c</sup>	Immunization*Wtforage, Illness*AWC, Illness*Wtforage, AWC*Wtforage	8,610	7	,282	
	Deleted Effect 1	Immunization*Wtforage	4,011	1	,045	3
	2	Illness*AWC	,967	1	,325	2
	3	Illness*Wtforage	12,102	1	,001	2
	4	AWC*Wtforage	,387	1	,534	2
8	Generating Class <sup>c</sup>	Immunization*Wtforage, Illness*AWC, Illness*Wtforage	8,997	8	,343	
	Deleted Effect 1	Immunization*Wtforage	4,012	1	,045	2
	2	Illness*AWC	,879	1	,349	2
	3	Illness*Wtforage	12,014	1	,001	2
9	Generating Class <sup>c</sup>	Immunization*Wtforage, Illness*Wtforage, AWC	9,876	9	,361	
	Deleted Effect 1	Immunization*Wtforage	4,011	1	,045	2
	2	Illness*Wtforage	12,014	1	,001	2
	3	AWC	19,143	1	,000	2
10	Generating Class <sup>c</sup>	Immunization*Wtforage, Illness*Wtforage, AWC	9,876	9	,361	

a. For 'Deleted Effect', this is the change in the Chi-Square after the effect is deleted from the model.

b. At each step, the effect with the largest significance level for the Likelihood Ratio Change is deleted, provided the significance level is larger than .050.

c. Statistics are displayed for the best model at each step after step 0.



This procedure continues until only the significant effects are left in the final model which in this case includes the second order effects *Immunization\*Wt/A* and *Illness\*Wt/A*. Furthermore, all first order effects are included in the model. The first order effect *AWC* is included in the table because the two-way effects that are left in the model do not imply a main effect of the availability of an AWC in the village even though this effect is present in the model.

Finally a goodness-of-fit test (table 5.13) indicates how well the final model fits the data. The relative small chi-square values, compared to the sample size, indicate that the model fits the data well.

**Table 5.13 Goodness-of-fit test for *Immunization\*Illness\*AWC\*Wt/A* loglinear model**

Goodness-of-Fit Tests			
	Chi-Square	df	Sig.
Likelihood Ratio	9,876	9	,361
Pearson	9,864	9	,362

It can be concluded that immunization as well as illness are significantly associated with weight-for-age. Thus, children who have been ill with diarrhoea, fever or cough in the two weeks prior to the survey are more prone to low weight-for-age than children who were not reported as ill. Children who never had any immunization are more harmful to underweight than children who received at least one immunization. However, illness has a stronger association with weight-for-age. In step 9 of table 5.12 *Illness\*Wt/A* has the highest level of significance.

Furthermore it can be concluded that there is no significant association between the availability of an AWC and weight-for-age of children in this four variable model. Also immunization and illness are not significantly associated with the availability of an AWC.

*Education\*HHSoL\*AWC\*Wt/A*

When Education, HHSoL, AWC and Wt/A are put in a loglinear model the model contains 1909 cases. Education is divided in four categories, i.e. no education, primary education, secondary education and higher education. Household Standard of Living includes the categories low, medium and high.

From table 5.14 it can be concluded that all k-way order effects are significant. Including the first and second order effects in the model improves the model the most, respectively by a LR Chisq of 2501,328 and 431,737. But, also the third and fourth order effects are adding significant improvement to the model, only less significant. Not all third order effects seem to be significant, which is reflected by the LR Chisq change of 24,754 that is not significant, but the fourth order effect seems to add significant improvement to the model.

In other words, the educational level of the mothers, the household standard of living, the availability of an AWC and the weight-for-age of the children seem to be significantly

associated with each other. However, the level of significance is not very high, i.e. 0,02. For third and fourth order effects it is necessary to have strong evidence, stronger than a significance of 0,02.

**Table 5.14 Results of *Education\*HHSoL\*AWC\*Wt/A* loglinear model**

	K	df	Likelihood Ratio	
			Chi-Square	Sig.
K-way and Higher Order Effects(a)	1	47	2.972,862	0,000
	2	40	471,535	0,000
	3	23	39,798	0,016
	4	6	15,045	0,020
K-way Effects(b)	1	7	2.501,328	0,000
	2	17	431,737	0,000
	3	17	24,754	0,100
	4	6	15,045	0,020

a. Tests that k-way and higher order effects are zero.

b. Tests that k-way effects are zero.

Because a four-way interaction effect is very complicated to understand and the level of significance was not very high the variables were re-assessed in separate loglinear models containing only three of the variables that were used in this model. Four different combinations were made and examined for interaction effects. This resulted in the identification of three second order interaction effects and one third order effect. The highest educational level of the mother is significantly associated with the household standard of living, but also with weight-for-age. Household standard of living is also significantly associated with weight-for-age. All three interaction effects have a high level of significance, i.e. <0,000, but the change in LR Chisq is the highest for removal of the education\*HHSoL effect (318,947) out of the model. Thus, the association between highest educational level of the mother and household standard of living is the strongest of these three.

Furthermore one 3-way interaction effect seemed to be significant, which is the association between household standard of living, the availability of an AWC and weight-for-age. However, the significance of this effect is only 0,037, which is not strong enough evidence for such an interaction effect.

**Table 5.15 Availability of AWC, Household standard of living, Weight-for-age cross tab**

				Weight-for-age		
				Underweight	Not underweight	Total
Availability of AWC in the village	Yes	Household Standard of living index	Low	63,1%	36,9%	306
			Medium	51,5%	48,5%	454
			High	42,6%	57,4%	101
	No	Household Standard of living index	Low	62,0%	38,0%	345
			Medium	53,2%	46,8%	598
			High	25,7%	74,3%	105

In sum it can be concluded that the higher the educational level of the mother, the higher the household standard of living in our sample. Besides, a higher educational level of the mother means a lower risk of being underweight for the children. And a higher household standard of living also decreases the risk of being underweight for children.

Furthermore very small evidence was found that a high household standard of living combined with the availability of an AWC actually increases the risk of underweight among children under-3 (table 5.15). For a low or medium household standard of living the availability of an AWC does not seem to be of any influence on the risk of being underweight. But, it must be stressed that the statistical evidence for this association is not strong enough to say that it is an acceptable association. This is even more true for the small significance that was found for a 4-way interaction effect.

*Water\*Breastfeeding\*AWC\*Wt/A*

The next loglinear model is specifically feeding-related and consists of the variables water, breastfeeding, AWC and Wt/A. In table 5.16 we see that this model seems to have significant associations on the third order interaction level.

**Table 5.16 Results of *Water\*Breastfeeding\*AWC\*Wt/A* loglinear model**

	K	df	Likelihood Ratio	
			Chi-Square	Sig.
K-way and Higher Order Effects(a)	1	23	1.647,029	0,000
	2	18	653,648	0,000
	3	9	18,246	0,032
	4	2	3,797	0,150
K-way Effects(b)	1	5	993,381	0,000
	2	9	635,401	0,000
	3	7	14,449	0,044
	4	2	3,797	0,150

a. Tests that k-way and higher order effects are zero.

b. Tests that k-way effects are zero.

By running the backward elimination procedure a minor level of significance is found for the third order effect *Water\*Breastfeeding\*Wt/A*. To make this association more clear the following table 5.17 shows how these variables are related.

**Table 5.17 Gave child plain water, Months of breastfeeding, Weight-for-age cross tab**

				Weight-for-age		
				Underweight	Not underweight	N
Gave child plain water	Yes	Months of breastfeeding	0 - 11	38,3%	61,7%	433
			12 - 23	65,8%	34,2%	743
			24 - 35	68,8%	31,2%	385
	No	Months of breastfeeding	0 - 11	21,5%	78,5%	297
			12 - 23	72,3%	27,7%	47
			24 - 35	72,7%	27,3%	11

Children who received breastfeeding for less than 12 months are the least likely to be underweight although children in this category who received plain water are more likely to be underweight than children who did not receive plain water. The categories of children who received breastfeeding for more than 12 months, i.e. 12-23 months and 24-35 months, are the most likely to be underweight. For these categories this situation seems to be the other way around: children who received plain water are less likely to be underweight than children who did not receive plain water. But, the same counts here as for the supposed interaction between household standard of living, the availability of an AWC and weight-for-age. The level of significance is not high enough to prove a strong association. Furthermore the assumption of giving the children plain water regularly must be kept in mind while the variable only indicates giving plain water in the 24 hours preceding the survey. This makes the analysis less strong.

Moreover, there is no significant association between any of the variables and the availability of an AWC.

*Age\*Ethnicity\*AWC\*Wt/A*

The last loglinear model includes the variables Age, Ethnicity, AWC and Wt/a. Table 5.18 shows that the 4<sup>th</sup> and 3<sup>rd</sup> order effects in the model have a low LR Chisq and are not significant. This means that the hypothesis that the 4<sup>th</sup> and 3<sup>rd</sup> order effects are zero cannot be rejected.

**Table 5.18 Results of *Age\*Ethnicity\*AWC\*Wt/A* loglinear model**

	K	df	Likelihood Ratio	
			Chi-Square	Sig.
K-way and Higher Order Effects(a)	1	47	1.107,906	0,000
	2	40	262,066	0,000
	3	23	16,089	0,851
	4	6	6,845	0,335
K-way Effects(b)	1	7	845,840	0,000
	2	17	245,977	0,000
	3	17	9,244	0,932
	4	6	6,845	0,335

a. Tests that k-way and higher order effects are zero.

b. Tests that k-way effects are zero.

If the interaction effects are eliminated step-by-step the best model for representing this data contains two 2-way associations, i.e. *age\*Wt/A* and *ethnicity\*Wt/A*. Thus what was already expected from table 5.7 in paragraph 5.2 is confirmed by this loglinear model. Being a child between 12-23 months and 24-35 months means being more at risk of undernutrition compared to children aged 0-11 months. And, being classified as SC, ST or OBC is significantly associated with being underweight. Both associations are highly significant, i.e. <0,000, but the LR Chisq change for removal of the effect *age\*Wt/A* (201,581) is much larger than for *ethnicity\*Wt/A* (27,282) which means that the association between age and Wt/A is stronger.

No evidence was found for a significant association of the availability of an AWC to any of these variables.

## **5.4 Summary and conclusion**

For the main research question for this part of the study '*Can the high prevalence of undernutrition among children under-3 in rural Uttar Pradesh partly be explained by the low coverage of the ICDS program in this region?*' we assessed various sub-questions.

Answering the first question showed that out of our sample of 308 villages 39% had an AWC in the village. Most villages in our sample have a population smaller than 4000 and a logistic regression analysis showed that the smallest villages in the sample are the least likely to have an AWC.

The second question pertained the distribution of undernutrition in the population of children under-3 in rural Uttar Pradesh. Out of 1961 children, with a sex ratio of 930, 54% are underweight of which 23% are severely underweight. Severe stunting and severe underweight are slightly more prevalent among girls. Children younger than 6 months are the least likely to be undernourished. However, more than half of the children aged 18-23 months and 30-35 months are severely stunted. Children aged 12-23 months are the most likely to be wasted. The prevalence of stunting, wasting and underweight is highest for Hindu children, but on the other hand severe stunting and severe underweight is more prevalent among Muslim children. Furthermore, non-SC/ST/OBC children are the least likely to be undernourished.

Third, the most important causes of undernutrition in rural Uttar Pradesh and possible interactions between these determinants have been assessed. The loglinear analysis on the selected variables revealed some significant associations with undernutrition:

- Illness increases the risk of being underweight
- Immunization decreases the risk of being underweight
- The higher the educational level of the mother, the lower the risk of being underweight for children
- A higher household standard of living decreases the risk of being underweight for children
- Children who received breastfeeding for 12-35 months are most likely to be underweight
- Giving a child plain water increases the risk of being underweight
- Children older than 12 months are most likely to be underweight
- SC/ST/OBC is significantly associated with low weight-for-age

Additionally we found that a higher educational level of the mother is significantly associated with a higher household standard of living.

But, most important, we found no evidence that was significant enough to associate the availability of an AWC with the prevalence of low weight-for-age. Considering the

compositional character of weight-for-age, i.e. reflecting both height-for-age and weight-for-height, and the fact that we found no interactions between the availability of an AWC and the used determinants of undernutrition in this analysis we can conclude that the availability of an AWC in a village has no significant effect on the prevalence of undernutrition in this village. In other words, having an AWC available is not reducing the risk of being undernourished for children under-3 in rural Uttar Pradesh.

Thus, the answer to the research question that comes forward from this analysis is negative. We found no statistical evidence that the high prevalence of undernutrition among children under-3 in rural Uttar Pradesh can be partly explained by the low coverage of the ICDS program in this region.

## **6 Functioning of the Anganwadi centre**

The aim of this chapter is to answer the second research question on what underlying factors can be distinguished for the functioning of the Anganwadi centre.

What possible explanations for the functioning of the AWC can be identified from the perceptions of AWWs and mothers on the Anganwadi program? As explained in the introduction this qualitative analysis is intended to examine the perceptions of mothers of young children and of AWWs on the Anganwadi program and to relate their perceptions to the functioning of the program. The functioning of the program, i.e. the performance of the AWCs on the provision of the ICDS services, will in this case be seen as an outcome of different factors like the attendance of children, the training of the AWW and the targeting of the food supplementation for example. Thus, in fact an explanation for the impact of the ICDS program will be examined in this chapter: why does the ICDS program in rural Uttar Pradesh have such poor results when it comes to the prevalence of malnutrition among small children?

In the following paragraphs the results from the analysis of the interviews will be presented. Paragraph 6.1 deals with the perception of the Anganwadi worker on the functioning of the AWC followed by paragraph 6.2 on the perceptions of mothers on the functioning of the AWC. Finally the results from the chapter will be summarized and discussed in the last paragraph followed by a conclusion.

### ***6.1 Perception of the Anganwadi worker on the functioning of the Anganwadi centre***

In this section the sub-question ‘What is the perception of the Anganwadi worker on the functioning of the Anganwadi centre?’ will be examined. The AWW is responsible for the everyday functioning of the AWC. The duties she has to undertake on a day-to-day basis include supplementary nutrition-related activities, preschool education, growth-promotion, health and nutrition education, home visits, referral services and meeting with the community (Gragnolati et al, 2005). Obviously, the AWW must have an own perception on the tasks she is supposed to carry out and on the possible other duties she is expected to take care of. From the AWW’s views on these matters more insight can be obtained on the functioning of the AWCs in Hathras district. What are the bottlenecks for the effective and efficient functioning of the AWCs? Or what can be considered as positive aspects of the current ICDS implementation in Hathras district? This section aims at answering these kind of questions and, in effect, to relate the AWW’s perceptions to the functioning of the ICDS program.

In the villages Khera Firozpur, Ramnagar and Bhootpura the AWWs were interviewed during the fieldwork. Only in Nagla Tal the Anganwadi helper was interviewed instead of the AWW because the latter was not present at the time of our visit.

### 6.1.1 The Anganwadi centre: physical infrastructure and facilities

An initial vital asset for the functioning of the Anganwadi program is the housing of the AWCs. Several studies on the ICDS program have taken the physical infrastructure and the facilities of the AWC into account as factors that contribute to the functioning of the program. The location of the building, the construction of the building, and the available facilities are considered in these studies, but also the ownership of the building.

Although the different studies have different outcomes the main points are comparable. In rural Uttar Pradesh a large majority of AWCs are located in a building that is usually owned by the AWW's or AWH's family. About two-third of the AWCs in India have a *pucca*<sup>5</sup> building or are semi-pucca constructions. This is unfortunately not specified for Uttar Pradesh. Most AWCs in Uttar Pradesh do not have a toilet and a kitchen, but on the contrary most AWCs do have drinking water facilities, mostly piped or pumped water (CIRCUS, 2006 and Gragnolati et al, 2005).

#### *Ownership and physical characteristics*

In our study villages we found that three of the AWCs are situated in a building that is owned by the family of the AWW. The other village, Bhootpura, has the AWC located within the premises of the primary school. The own-building AWCs in Khera Firozpur and Nagla Tal are using just the porch of the building as AWC. On the porch the children can sit on the ground and have a roof over their heads, but there are no walls on the outside to protect them from wind or rain. The other own-building AWC in Ramnagar is located in a small one-room building that was built for this purpose. In our sample all four AWCs are housed in a *pucca* building. All buildings are also equipped with a toilet and water is available from a hand pump at all AWCs.

#### *Suitability*

For the AWCs in Khera Firozpur, Nagla Tal and Bhootpura can be said that the available space is not sufficient to shelter all the children and equipment conveniently. This is what one of the AWWs said:

B No difficulties madam, the only problem is that the room we get is very small. No safety for our children's toys etc. We need a larger room.

Efforts have been made to find a more suitable place to locate the AWC or to get support from the Panchayat, a body on municipal level that functions as a unit of self-governance in a village or a group of villages (Research, Reference and Training Division, 2006), in at least three sample villages, but in all three villages this remained without any result.

For example in Khera Firozpur:

F I told the Panchayat to give the Panchayat-ghar [Panchayat house]. But they said that they can use it only for marriage purposes etc....not for Anganwadi. They said, find your own means. Ask the government if you want.

Or the respondent from Ramnagar:

R I've got this room build, on my own. No help given by government or Panchayat.

And in Bhootpura:

B No madam. The Panchayat-house is always locked. We asked to allow using it, but they won't. So we have to sit here.

---

<sup>5</sup> Brick and mortar type of construction



Only in Ramnagar the AWW told us that the building they use as AWC is actually convenient for their purposes:

R Well madam, earlier the Anganwadi was running in the school premises. But the area was more like a jungle. Property was destroyed often, locks broken etc. So I shifted out here. This place is very convenient.

### *Location*

Not all AWCs are located inside the village . The AWCs in Ramnagar and Bhootpura are located slightly outside the village and the AWC from Khera Firozpur is located in Firozpur, which is at some distance from Khera, the other part of the village. While people from Khera explained that the AWC is located too far from their houses the AWW replied that the AWC is very convenient for everyone to come. Two other respondents also replied that the AWC is located in a convenient place.

### *Operational years*

The AWCs from Khera Firozpur, Ramnagar, Nagla Tal, and Bhootpura were operational since respectively 10 years, 11 years, 7 years, and 10 years. All three AWWs were managing the AWC since the opening of the centre and the AWH from Nagla Tal had been working for 4 years at the AWC at the time of interviewing. So each of the respondents had at least four or more years of experience and the AWCs were fully operational when we visited the villages.

To summarize, all AWCs are located in a *pucca* building, have a toilet and hand pump for water, but not all AWCs are located inside the village. Most AWCs are housed in a building owned by the family of the AWW and one is located within the primary school building. The available space is mostly insufficient. All AWCs are operational for at least 7 years.

## **6.1.2 Functioning of the AWW or AWH**

The functioning of the AWC depends for a great deal on the functioning of the AWW. She has the responsibility of running the centre, getting the children to come to the AWC, teaching the ICDS beneficiaries, maintaining the registers, providing health services, and so on. Her tasks are very demanding and thus require capable women to perform the them.

### *Social background*

In the report '*Focus on children under six*' (FOCUS) by the Citizens' Initiative for the Rights of Children Under Six (CIRCUS, 2006) social background characteristics of a sample of 203 AWWs and AWHs in six states, including Uttar Pradesh, are given. When these statistics are compared to the background characteristics of the AWWs and AWH in this study a quite comparable image comes out. The majority of AWWs from the sample of the 'FOCUS' report belong to the 31-45 years age group, are married and live in the village where they work in the AWC. This counts for all three AWWs in our sample as well. Considering religion and caste our sample fits as well: all four, AWWs and AWH, are Hindu, and only the AWW from Bhootpura is an SC woman which matches the proportion within the FOCUS sample. The only deviations are the slightly young AWH in Nagla Tal and her Brahmin descent, and the educational level of the

AWWs and AWH which are a little higher than would be expected from the FOCUS sample. The AWWs from Khera Firozpur and Ramnagar have (almost) obtained BA degrees and the AWW from Bhootpura and the AWH from Nagla Tal went to school until 8<sup>th</sup> grade.

### *AWW training*

The training AWWs and AWHs should receive can be divided in three components, 'pre-service' training, or job training, 'refresher' training, and other training. The pre-service training is the initial training the AWWs and AWHs follow before starting their work in the AWC (CIRCUS, 2006). In 2005 the Department of Women and Child Development has reduced the duration of the pre-service training from 52 days to 30 days in order to reduce the 'heavy backlogs' in job training and refresher training for AWWs as perceived by the department (Ministry of Women and Child Development, 2007). Earlier the job training was made up of one or two three month programs. Part of this pre-service training is an on-the-job training, thus training in the AWC itself. Yet, AWWs attend refresher courses occasionally, but there are no strict rules in following these courses. Besides refresher courses there are also state-specific and innovative other trainings. Other trainings are often special programs on immunization, breast-feeding, community mobilization, pre-school education, or training of adolescent girls for example (CIRCUS, 2006).

All three AWWs in our study said they had followed at least one pre-service training program before starting as an AWW. According to the AWW from Khera Firozpur there had been two training programs before she started the job. This was altered by the AWW from Ramnagar who claimed that there were three job training programs. However, she told us she did attend the second three month training but did not attend a third 15-day training because she just had a baby at that time. The AWW from Bhootpura had followed only one pre-service training. She did not mention a second training. They all mentioned that the training was made up of three month programs. When the AWWs from our sample started their jobs 10 to 11 years ago this was still the curriculum. Unfortunately they did not specify what type of training programs these were. Also, the interviewed AWH received pre-service training, although she did not specify the length and the contents of this training. Thus apparently only one AWW had followed the assumed two necessary/compulsory pre-service training modules before she started working as an AWW.

The same thing was the case for the refresher courses. The AWW from Khera Firozpur had attended some refresher courses of which she showed us the certificates. However, the last refresher course she followed was already six years ago. The other two AWWs and the AWH had not followed any refresher courses. Nonetheless, all AWWs did attend 'polio training' occasionally. This training is intended for practicing the skills for giving polio drops to children and is held every month according to the AWWs from Khera Firozpur and Ramnagar. They both told us that they attended these trainings every month. The AWH from Nagla Tal told us that the AWW from Nagla Tal did attend the polio training regularly, but she herself did not.

The AWWs told that the pre-service training took place in Mathura and the polio training in Sasni, both cities at considerable distance, more than 10km, from the villages.

Thus, all respondents in our sample received pre-service training before starting their jobs at the AWC, but none of the AWWs completed all of the preset training modules. Just one AWW followed some refresher training, but no clear guidelines have been specified for this by the Department of Women and Child Development. Polio training was mentioned as the only other training regularly visited by the AWWs.

### *Daily routine*

For the functioning of the AWC it is important that a good and consequent daily routine is maintained at the centre. For example, is the centre open at regular times, do children receive supplementary nutrition at the centre or does the AWW teach the children?

The daily routine in the four AWCs of our study did not differ very much. In Khera Firozpur, Ramnagar and Bhootpura the AWWs gave a similar description of the everyday practice in their centers, like this one from the AWW in Ramnagar:

R We open the centre at 9am. The AWH cleans the AWC and goes to get the children. Many times she has to get them cleaned and ready and then get them. We then have a prayer of all children. Oh, we do take great interest in our work. Small children like our own. After saying prayers, we get them to sit and then teach some alphabets... Then poems and stories, as I feel like....or counting number 1, 2, 3, 4...After that with toys we teach them colors – children what colour is this toy, etc. Till that time, it's almost past 12. Then we give Panjiri and send them home.

And the AWW from Bhootpura:

B First they say prayers. Then they have word-knowledge given. Then, information about birds, animals, games we tell children, we also tell stories and sometimes listen to children's stories. Poems....of just 4 lines, for children. Then we give Panjiri to children. They get small plastic bags. In that we give.

For the AWC in Nagla Tal the daily routine was slightly different. Instead of opening the AWC from 9 to 12 in the morning the AWH told us they opened the centre at around 10:45 in the morning during the winter because people don't like to go outside on cold winter mornings. And, most striking, the AWH explained that the children usually only stayed for about 30 minutes in the winter months to receive their share of Panjiri and are send home immediately after that.

What's important is that parents know at what time the AWC opens so they know when children are expected and should be ready. Still, in our sample this frequently appears to be somewhat off reality. In Khera Firozpur and in Ramnagar children are often not ready when the AWH arrives at their houses to pick them up, even though the centers open at regular times in the morning. In such cases the AWH has to wash and dress the children before she can take them to the AWC.

At the time of our unexpected visit to the AWC in Nagla Tal it was striking as well that the AWW was not present in the village that morning. The AWW lived in the nearby town of Hathras and commuted to the village everyday. While being dependent on the public transport to the village, a horse-towed chariot, the AWW was not so reliable to make it in time every morning.

The routine in the AWCs in Khera Firozpur and Ramnagar is very similar. Children are being picked up at home, say prayers, get education, play and finally get supplementary nutrition. However, children are often not ready in the morning to go to the AWC. In Nagla Tal's AWC another routine was retained during the winter and the only service provided was usually supplementary nutrition. This was the only village in our sample that did not have an AWW from the village.

### *Working attitude*

The working attitude of the AWWs or AWH gives a closer look on their motivation to do their jobs and to run the AWC properly. This can say something on the quality of the services they deliver for the ICDS program. A highly motivated AWW is more likely to carry out her job as good as possible than a less motivated AWW. This can have its impact on the functioning of the Anganwadi program.

When we asked the respondents about their feelings about the job we got some differing answers. Three of the respondents thought the work is quite differing. Variation in game-play, different day-programs and the attendance of women on Saturdays made the work varying for them. The AWW from Ramnagar thought that the work was almost the same everyday. She said that she had gotten accustomed to the work in the period she worked as an AWW and that she felt like she did not do enough for the children:

R No. No problems. Habituated to things after 9-10 years. I rather think I should rise up, get ahead in work and do more for children.

Even though she felt she was falling short she still seemed motivated for her job:

R ... Oh, we do take great interest in our work. Small children like our own...

Each of the AWWs had her own favorite part of the work, but what they all shared in this was the fact that they all favored teaching children, playing with children or telling stories and poems to children. Apparently child-related pre-school activities were favorite under the AWWs. The AWW from Khera Firozpur favored teaching for example and clearly put emphasis on the education of children:

F Best thing I like is the teaching. When children learn, that is what I like. I teach them many things and many times they are so good that they are given admission in 1<sup>st</sup> standard rather than kindergarten. we tell them about leaves and flowers, about colors and things we find in our environment etc.

I What do you think can be done about improving the Anganwadi? More resources, people or what?

F Yes, the work is too much for one person to handle. And I will like if government gives more resources. I like teaching and will teach the kids more.

The AWW from Khera Firozpur seemed very motivated for her job. Besides her preference for teaching she also mentioned that she was rather concerned with the women and children's health and, if necessary, took them along with her to the health centre in the nearest town or arranged medicines for them. She also visited women with undernourished children at home to advise them about health and nutrition. Even though home-visits are part of the job, not all AWWs in our sample made home-visits.

Likewise, the AWW in Ramnagar said she visited the women in the village to inform them on health programs, the AWC, or to give them health and nutrition advice. And, besides her polio immunization training every month she also supported women's self help groups in the village. She also spoke of some other of her incentives to make the program work; the AWC was located in her own building for example and:

R At times, I go and get toffees and biscuits to be given with Panjiri. What else to do? Only then will children come. Children think that why the same thing everyday.

The AWH from Nagla Tal unfortunately did not speak very much, a dominant older woman tried to do most of the talking, so it was difficult to find out more on her motivation and working attitude. She did nonetheless respond the following on our question what she liked most about her job:

N Now, how can we say? I like all work, because anyway I have to do it. But I like children, so I feel good.

In Bhootpura the mentality of the AWW seemed somewhat different from the AWWs in the other villages. Although she told us that she tried to inform and advise women on health and on the Anganwadi program and that she wanted more children to come to the AWC her efforts in trying to reach all beneficiaries did not really speak from her replies:

B All those who come here everyday, get it everyday. Well, it cannot happen didi, that I'll leave out 4 children and give the others? If children come here, they'll surely get panjiri. Those who won't come, won't get.

And on immunization by the ANM:

B Yes, she gives.....to all those who come, she gives. Those who don't come, miss out. Besides, the children were not being picked up from their houses in the morning by the AWH like in the other villages. Children were supposed to come on their own.

Another point that made her working attitude look different from the other AWWs was her mentality towards the women in the village. This is what she replied to the respective questions on convincing women to get immunizations and convincing them on the benefits of Panjiri:

B Well, we try telling them. Those who are understanding, they understand. There are those who just don't understand, howmuchevever you tell them.

B ... Village women are different, they don't understand.

Her opinion on village women seems rather pessimistic from these replies.

In our sample the working attitude of the AWWs and AWH varied. Especially in Khera Firozpur and in Ramnagar the AWWs seemed very motivated by the concern they showed for women's and children's health and other initiatives. All four respondents indicated that they like to work with children, each in her own way. The AWW from Bhootpura made a rather helpless impression in reaching the ICDS beneficiaries.

### **6.1.3 Functioning of the AWC**

As mentioned before the functioning of the AWC deals with the performance of the AWC on the services the ICDS program should provide to children and women and how this performance is established. This section deals with a range of factors that are of

importance for the functioning of the AWC and reflects the view of the AWWs and AWH on these different aspects.

*Anganwadi attendance of beneficiaries*

The ICDS program makes a distinction between two groups of beneficiary children, i.e. children under-3 and children aged 3-6 years. For the former group of children it is often not practical to attend the AWC daily, because they are too small to come to the AWC on their own and some might need their mothers to feed them. The latter group is the group that should receive pre-school education and ready-to-eat food supplementation at the AWC (see section *Supplementary nutrition*). Usually mothers of children under-3 receive 'take-home rations' weekly to supplement the feeding of their under-3 child(ren) (CIRCUS, 2006). Nonetheless, children under-3 attend the AWC as well.

In all villages except Bhootpura it is common to let the AWH collect the children from their homes to bring them to the AWC. From the responses we got it seemed obvious that this is necessary to get the children to come to the AWC. For example in Ramnagar:

R Well, children hardly come on their own. Our helper goes and gets them.

Parents are not always eager to send their children to the AWC. Sometimes getting the children to come to the centre turned out to be quite an effort for either the AWH or the AWW. This is what the AWW from Khera Firozpur had to say about this:

F No, there are no problems for people to come. The Anganwadi is very close by. But sometimes women don't like to send their children. When the Anganwadi Helper goes to get children, they are not ready, or the mother says – you just give Panjiri every day, why should we send the children. The Panjiri is also not really good. In such cases, I go to their house and tell them that it is a very good thing, the government has made for children and healthy for children. That is what we do.

One family in Firozpur did not want to send their child anymore due to a bad immunization experience at the AWC:

F Yes, actually, the hand got swollen and there was an infection. From that time, she got scared and would not come near the place. That's why she doesn't send her child here.

Also in Bhootpura the AWW gave us the impression that it was not always easy to get children to come to the AWC:

B Well, if some people don't like to send the children, our helper talks to them. (.....) ...we tell children to come, get up and come to the Anganwadi in time....we tell their mothers to send their children clean and after taking a bath. We want more children to come.

The AWH did however not go by the children's houses in the morning to pick them up for the AWC.

The number of children that attend the AWC is varying by village. In Khera Firozpur the AWW told us that most children who are eligible come to the centre. However, these were only children from Firozpur and not children from Khera, the other part of the village. When the AWW was asked if the AWC is also supposed to be for children from Khera she replied:

F No. I mean, yes, it is supposed to be, but they don't send their children. It is kind of far, you know, so they say our children will not come here to study.

Whether the AWW misunderstood the question in first place or expressed her own opinion by saying 'No' is not clear, but the fact is that children from Khera do not attend the AWC that is also supposed to be for them.

As far as the number of children is concerned there were 37 children at the AWC on the first day we visited Khera Firozpur. Though, on the second day we visited the village there were maybe 20-25 children present. Earlier, before the private school in the village was established, much more children came to the AWC according to the AWW:

F Well, when there was no school in the village, we used to have almost 80 or more students coming. But since this Montessori school [the private primary school] has started, we don't have that many students coming here. Also, they have a scheme – If there is an elder brother or sister in the school they let the younger child accompany that child for free.

Besides, she mentioned that children from lower castes and upper castes also attend the AWC in Khera Firozpur.

When we look at the Census 2001 data the population of children aged 0-6 years in Khera Firozpur is 217. Of course, we visited the village in December 2006 for our study, but the Census 2001 data give an indication of the size of the population 0-6 years old children in the village. Therefore the number of children that attend the AWC seems quite small.

In Ramnagar the AWW told that the number of children who come to the centre had remained constant for the years she has been working as an AWW. She showed us some of the registers containing the lists on child attendance. According to the registers the centre is visited very regular by about 23 children under-6 and about 10 children under-3. Again, this village should also have a lot more child beneficiaries when we look at the Census 2001 data. In 2001 there were 158 children under-6 in this village.

In Nagla Tal the AWH (N) and one older woman (O) who was present at the time of interviewing were rather confusing about the number of children who attended the AWC:

O Many children come. More than 20, maybe 25.

N Well, there are 40 children.

O Oh, 40, is it?

I Do all 40 children come to the Anganwadi everyday?

N No, around 30 maybe.

Unfortunately this village was not known in the Census 2001, so an estimation of the number of eligible children is not possible.

The presence of the children is registered at every AWC. Even though this should give a clear impression of the participation of children the registers do not always give the actual numbers. In Bhootpura the AWW explained us the following:

B Yes, well, sometimes they don't come to the Anganwadi if they are not very well. Sometimes they just come late. So, at times they are not marked present because they come after the attendance is taken.

So, obviously the number of children attending the AWC does not always correspond to the number of registered children. Besides, the AWW seemed rather overtaken by our visit. Upon our question if we can see the registers she explains that she now keeps them at home since they were stolen before.

In sum, what the AWWs and AWH made clear in the interviews is the difficulty they often encounter in getting children to attend the AWC. Parents may not be willing to send their children to the centre, they might have bad experiences with the AWC or the distance to the AWC seems insurmountable in their opinion. Furthermore, the number of children attending the AWC is, according to the respondents, depending on factors as the presence of a primary school in the village or on their own method of recording the presence in the registers.

Besides the children there's the attendance of pregnant women and lactating mothers as well. They visit the AWC only on Saturdays in general. The ICDS services they are theoretically entitled to are antenatal and postnatal check-ups, immunization, micronutrient supplementation, health and nutrition education and supplementary nutrition (Gragnolati et al, 2005). However, in practice not all of these services are offered at every AWC and eligible women do not always visit the AWC.

In Khera Firozpur for example women from Khera do not go to the AWC, just like they don't send their children. No reason was given by the AWW for their absence.

F No, mother's also don't come. Earlier they used to come.....one or two women did come, but now they don't. They say we won't come here..

On the other side, the AWW told us that the eligible women from Khera do come to Firozpur for immunization drives.

Another occurring problem is the housebound status of newly-wed women. If a girl in a rural traditional society gets married she inherently moves in with her husband's family. Often, a new daughter-in-law is expected to stay inside the house. This means that these women cannot go to the AWC and miss out on some of the Anganwadi services. The AWW from Ramnagar gave the following answer when we informed on the attendance of women in general:

R Well.....some come. But some just send their children or some woman relative.....and we give the Panjiri to them.

AWH A new daughter-in-law usually doesn't step out of the house.

R Yes.

Time was also mentioned by the respondents as a constraint for the women to visit the AWC. For example in Nagla Tal:

N They come as they get time.

Or in Khera Firozpur:

F Women come whenever they have to take immunization doses. For themselves or children. Also they come every Saturday to take their own Panjiri. At times, we have to give them in the evening, because they don't always find time to come in the daytime due to work.

The AWW from Bhootpura explained that women from the village only come to the AWC sometimes to see their children playing. She told us that she only provided Panjiri to the pregnant women and lactating mothers at her own home after the AWC closes. Other Anganwadi services were not mentioned by her as important elements of the Anganwadi program.



Aforementioned indicates that there is a group of women who don't visit the AWC and who are very likely to miss out on valuable assets like health and nutrition education or health check-ups.

The AWC was not always indicated as the preferred place of contact between AWW and women. In Ramnagar for example the AWC is located slightly outside of the village, on about a 10 minute walk. According to the AWW the women from the village objected to come to the AWC for immunization. Instead the immunization takes place in the village now once a month. This distance barrier did not account for the immunization visits only, but for the weekly AWC visits as well.

The respondent from Khera Firozpur mentioned health education and immunization as important aspects of the Anganwadi program, especially for pregnant women. She explained the importance of the Anganwadi attendance of pregnant women:

F Yes, we tell women about how to take care of their health. Especially in pregnancy. And any pregnant women are there, we see that they come on the day the ANM [Auxiliary Nurse Midwife] is visiting and get their prescribed immunization doses. That time itself, if they have a problem, they tell the ANM.

The AWW tried to make sure that the pregnant women visit the AWC to get their immunizations and health education.

Summarized, in practice the eligible women do not always visit the AWC for several reasons. The reasons explained by the AWWs and AWH were a distance barrier, the housebound status of newly-wed women, and the lack of time by women.

#### *Auxiliary Nurse Midwife*

As a result from the cooperation between the ICDS program and the Reproductive and Child Health program (RCH) it is set that each AWC is supposed to be visited by an Auxiliary Nurse Midwife (ANM), employed in the RCH program, monthly. The ANM is supposed to conduct general health check-ups of ICDS beneficiaries, give immunizations, dispense medicines and contraceptives, and provide assistance to AWWs in their health-related duties (Gragnolati et al, 2005). Her cooperation is thus an essential element for the functioning of the Anganwadi centre.

In all four villages of our study the respondents told us that an ANM visits their AWC once a month. All three AWWs and the AWH said that the main, and mostly only, reason the ANM comes is to give immunizations.

In Ramnagar the AWW and AWH explained that the ANM only comes to give immunizations, and nothing else:

I Does she look into all women's health problems? Or only pregnant women?

AWW Only pregnant women.

I And she does that well.....?

AWH Yes, she only gives immunization, but she does it well.

AWW Yes, she comes every time, and give TT [tetanus toxoid] injections to pregnant women. This time, we had also done them for adolescent girls.

Apparently the immunization of pregnant women was going well according to the AWW and additionally the immunization of adolescent girls is a new incentive. But, the AWW

and AWH indicated that the ANM limits her services to immunization exclusively. This was not only the case for this village, but also for Nagla Tal and Bhootpura.

Thus, the ANM's main concern in our sample villages is the immunization of ICDS beneficiaries once a month. Only in Khera Firozpur the AWW explained that the ANM also conducted health check-ups for pregnant women besides the regular immunization.

### *Immunization*

A very important aspect of the ICDS program is the immunization of children under-6 and pregnant women. The aim is to immunize children against poliomyelitis, diphtheria, pertussis, tetanus, tuberculosis and measles, and to give pregnant women tetanus toxoid immunizations. The FOCUS-report indicates that in Uttar Pradesh, despite cooperation between the AWW, the ANM and Primary Health Centers or sub-Centers in the field of immunization, still a minority of children and pregnant women receive the prescribed immunizations (CIRCUS, 2006).

The respondents in our sample explained that they all provide immunizations for ICDS beneficiaries. An ANM comes once a month at all four AWCs to give the pregnant women tetanus toxoid (TT) immunizations and in some occasions she helps with polio immunization for children as well. As far as children's immunization is concerned we did not obtain specified information on the different kind of immunizations they received, but all respondents explicitly mentioned polio immunization. According to the AWWs and AWH from Khera Firozpur, Ramnagar and Nagla Tal national polio immunization days, in which they participated, are regularly organized.

The place of immunization is mostly the AWC, but in Ramnagar the AWW explained that the women from the village objected to come to the AWC (see section *Anganwadi attendance of beneficiaries*). Ramnagar has the AWC located outside the village. Instead the immunizations are arranged inside the village once a month.

Surprisingly, the AWW from Khera Firozpur told us that women from Khera do visit the AWC for immunization. Earlier she had elucidated that women and children from Khera do not attend the AWC. Apparently, the pregnant women do come for immunization according to the AWW.

Two AWWs explained that they tried to stimulate and convince the ICDS beneficiaries to come and get their immunizations. The AWW from Khera Firozpur told us she used the help of another trained woman to give immunizations and to reach out to the villagers:

F        This lady here, she also helps. She's got a training and when there is polio day then she goes to each family to get children and give them doses...at times if the family is not ready to send children then she convinces them. (...) ... And any pregnant women are there, we see that they come on the day the ANM is visiting and get their prescribed Immunization doses.

The AWW from Bhootpura was perhaps less persistent in convincing the pregnant women and children to get their immunizations, but she said she was trying to:

I        And does the nurse give immunization injections/doses?

B        Yes, she gives.....to all those who come, she gives. Those who don't come, miss out.

- I Don't you think that if people are told to come and get themselves inoculated or get children immunized, they would not come?
- B Well, we try telling them. Those who are understanding, they understand. There are those who just don't understand, howmuchevery you tell them.

Immunization seems to be provided in all of the sample villages, mostly once a month at the AWC by the ANM, but also on regularly organized polio immunization days in some villages. Sometimes beneficiaries need to be convinced to get immunizations.

### *Growth monitoring*

Growth monitoring is another service that should be provided by the ICDS program. To check their health and nutrition status children under-3 should be weighed once a month and elder children once a quarter. The measured weights are to be registered in growth charts that enable the AWWs to detect growth faltering (CIRCUS, 2006).

In our sample three respondents indicated to take weights of the children regularly. In Bhootpura it was not clear if the AWW measured the children's weight. Both AWWs in Khera Firozpur and in Ramnagar explained that they faced difficulties in taking weights of especially the youngest children:

- F We are supposed to take weight every time. But when we go to the houses, women don't like it. They say that it is bad, inauspicious, and brings ill-fate, '*nazar lag jaanaa*'. Why you weigh our children? And there are some women who are very ready, they say, take the weight. ... Yes, we have records of weight. Not height. Monthly records, because we take it every month. Children who go to school or older we can take easily, but 0-6 months babies, the mothers don't like us to take the weight of children. According to them it brings ill-fate. The Hindi term '*nazar lag jaanaa*' means 'bring evil eyes upon'. Apparently this is part of the religion or superstition of the people in these villages.

Except for the problem of ill-fate for the youngest children the respondents indicated that the growth monitoring was being carried out without any problems.

### *ICDS cooperation*

Considering the many governmental schemes for young children, like the National Nutrition Mission, the Reproductive and Child Health scheme, the Strengthening of National Immunization Program, and the Polio Eradication scheme for example, it is not surprising that the ICDS program is cooperating with some of these other schemes or programs. Besides cooperation with other schemes and programs the ICDS program is also meant to be cooperating with Primary Health Centers or sub-Centers to provide health services, as mentioned in the previous section. What's more, NGOs that work in the area of child health and child survival are sometimes partners of the ICDS program as well (CIRCUS, 2006).

Recently a new initiative under the National Rural Health Mission has been developed, called the Accredited Social and Health Activist program (ASHA). This program aims at a better convergence between ICDS and health services for ICDS beneficiaries in rural communities (CIRCUS, 2006).

It is evident that the ICDS collaboration with the RCH scheme is implemented in all of our sample villages (see previous section *Auxiliary Nurse Midwife*). This is perhaps the

most crucial cooperation in the ICDS program which results in the immunization of ICDS beneficiaries mainly.

Other collaborations were mentioned as well. In Khera Firozpur the respondent told us about the ASHA program:

F Well, there is another scheme called ASHA, but it has not become operational. The forms have been filled, but nobody has been selected as yet. So, all other things, maybe regarding health for polio etc, is done by a third person who has been trained by government. In the other three villages the respondents did not mention the ASHA program.

The cooperation with the Panchayat is inconsistent in the four villages. Only in Bhootpura the Panchayat would let the AWW and ANM use the Panchayat-ghar, i.e. the Panchayat house, for polio immunization. The requests in Khera Firozpur and in Ramnagar to use the Panchayat-ghar as AWC were rejected (see section 6.1).

Two other initiatives that are supposed to run through the Anganwadi were mentioned in two of the villages. The first one is the Kishori Shakti Yojana program in Ramnagar which aims at qualitative improvements in the nutritional and health requirements of adolescent girls. Part of the objectives are the provision of required education, promoting awareness of health, hygiene, nutrition, house management and child care, as well as improving social awareness (ICDS Uttar Pradesh, 2007a). The respondent in our sample mentioned that three girls had been selected for the program and that they were being trained in sewing. No other aspects of the program were indicated by the respondent.

The second scheme that was supposedly implemented in Nagla Tal was the Balwadi Yojana scheme. This was claimed by an elder woman who was present at one of the interviews. However, no evidence was found on a scheme called Balwadi Yojana. Maybe the woman meant the Balwadi Nutrition Program (BNP), but this is a supplementary nutrition program that only runs in areas that are not covered by the ICDS.

In fact, the only program that was referred to, besides the RCH scheme, was the Polio Eradication scheme. All four respondents said that they were working together with the ANM and people of the Polio Eradication scheme to give polio immunization to children.

So, the most important and best executed collaborations seemed to be the ones with the RCH scheme and the Polio Eradication scheme. Other programs still had to become operational or gave the impression of reaching short of the preset objectives.

### *Community participation*

The AWW functions in a position in which she has to implement a centrally-designed “top-down” program in a small community. The program is designed and developed by the national and state governments, but the AWW has to gain the community’s support and involvement in the program. The AWW thus has a great responsibility in communicating with the villagers and in establishing community participation, but she also has the responsibility of exchanging information between the community and the higher level ICDS functionaries. Usually a local woman, who is familiar with the community members, is assigned to the job of AWW (CIRCUS, 2006).

The perceptions of the respondents on community participation reveal that villagers are usually divided in their attitude against the AWC. In general we got the impression from our interviews that a majority of the villagers are in favour of the AWC and are willing to cooperate in the Anganwadi program in Khera Firozpur and in Ramnagar. In the other villages the respondents did not say much on the subject, so it was difficult to gauge the degree of community participation here.

However, there are also those villagers who might not be good enough informed about the Anganwadi program, people who may not want to send their children to the AWC for any particular reason. Some of the respondents told us about this, like the AWW from Khera Firozpur who is quoted in the previous section '*Anganwadi attendance of beneficiaries*'. She explained that some women are not content with the supplementary nutrition the children receive on a day-to-day basis and don't want to send their children to the AWC because of this.

Of course the villagers from Khera, who do not participate in the Anganwadi program in Khera Firozpur, are a good example as well for the occasional lack of community participation.

In Ramnagar the AWW explained about the participation of the eligible ICDS beneficiaries as follows:

R Madam, the atmosphere in the village is different. Whatever you do, even then they'll not speak well of you. There are many people in the village who think that an Anganwadi should run. But there are some who say: "What Anganwadi? No our children don't go." To such grumpy old people we tell that the government is running this program for you. At least take what is rightly yours! But if they are not taking, then what should we do?

On the other hand there are people, besides the ICDS beneficiaries, who are willing to offer their help to the AWC according to the AWWs from Khera Firozpur and Ramnagar:

F ... Like, when we have Polio days, I am supposed to be on duty...and the old CHG who's been trained, and the school master...they all come for help...  
People come, they do, especially in National Polio days etc, they come to help us.

And:

R ... we get support and love of people...

Another form of community participation was found in Ramnagar where women had set up some women's Self-Help Groups. These are groups of women who try to raise awareness and understanding among each other and among other women about, for example, governmental schemes like the ICDS program and the benefits these schemes bring. The respondent Ramnagar explained that they tried to reach the women from the village, but also other AWWs from surrounding villages.

Even though there are people who do not participate in the ICDS program, ICDS beneficiaries as well as other people, it appeared that in two of our sample villages community participation was somewhat satisfying. But, the muteness of the respondents in the other villages and the fact that the AWCs were rather empty at the time of our visit left the impression that community participation was not so obvious here.

### *Funding and supplies*

The funding of the Anganwadi program in Uttar Pradesh is coming from different governmental bodies and a number of bilateral and multilateral funding agencies. The Government of India funds the administrative expenditure of the ICDS program and the Government of Uttar Pradesh takes care of the funding for processing and transportation of supplementary nutrition. The main bilateral and multilateral funding agencies involved in ICDS are the International Development Association (IDA), UNICEF, USAID, the Swedish International Development Agency (SIDA) and NORAD. Furthermore, since 1999 the World Bank is supporting the third phase of the ICDS program, ICDS III, in Uttar Pradesh. In ICDS III emphasis has shifted from the expansion of program coverage to the improvement of the quality of services (Gagnolati et al, 2005).

The respondents indicated that all the funding and supplies for the AWCs are coming from the government. They all referred to the 'centre', 'department' or 'government', meaning that their funding and supplies are coming from the CDPO's office in Hathras district. Nonetheless all respondents knew that the ICDS program is supported by the World Bank as well, because without exception they all suspected that we, the researchers, were employees of the World Bank working on a report on the ICDS program for the Indian government.

The amount of financial support and supplies, for instance supplementary nutrition, they received was not enough according to some respondents, like the AWH from Nagla Tal:  
N Well, there should be more food....we have heard that in Agra children get a lot better food in the Anganwadis.

But on the other hand the AWW from Khera Firozpur said the delivery of goods was regular:

F There is a matador [a type of vehicle] which comes from the department, every month and drops all things that we need. [...] ... it comes very regularly every month, no problem at all.

Except from being rather suspicious on our identity and our objectives the respondents had not much complaints about the funding and the supplies that are coming from the government. They knew that the World Bank supported the program as well. The only thing mentioned was the amount of supplies which was lacking sometimes.

### *Supplementary nutrition*

Panjiri is the supplementary food that is distributed to children, pregnant women and lactating mothers through the Anganwadi centers in our research area. Panjiri is a nutritious powder that is rich in protein and in calories. The table below shows the supplementary nutrition norms set by the ICDS program. According to these norms children under-3 should receive the same amount of supplementary nutrition as children in the age-group 3-6 years, and malnourished children should receive double this amount. Except, children under-3 should not receive ready-to-eat food supplements. Pregnant women and lactating mothers should also receive a double amount and recently adolescent girls have been added as program beneficiaries as well.

**Table 6.1 Supplementary feeding norms**

	<b>Beneficiaries</b>	<b>Calories</b>	<b>Grams of Protein</b>	<b>Ready to Eat food Supplement</b>
1.	Children 0-3 years	300	10-15	NULL
2.	Children 3-6 years	300	10-15	70 Gram
3.	Pregnant & Lactating Women	500	20-25	140 Grams
4.	Adolescent Girl	500	20-25	140 Grams
5.	Malnourished Children	600	20-25	140 Grams

Source: ICDS Uttar Pradesh, 2007b

In principle, the supplementary nutrition component of the Anganwadi program in Uttar Pradesh should consist of two elements, namely an ‘on-site’ feeding arrangement, i.e. a cooked meal or a ready-to-eat item like Panjiri, that is provided and consumed at the AWC and ‘take-home food’ (Gragnotati et al., 2005). Take-home rations are supposed to be for pregnant and lactating women, and for children under-3. The mother should for instance receive rations of nutritious powder regularly which is easy to mix with hot water or milk and should be fed to the children under-3 (CIRCUS, 2006). This should however not be a ready-to-eat food supplement according to the program norms (table 6.1).

In practice the AWCs in our research villages were only providing Panjiri, a ready-to-eat supplement. None of the four AWCs provided cooked meals or any other kind of supplementary nutrition because only Panjiri was supplied by the government of Uttar Pradesh. Some respondents, like the AWW from Ramnagar, indicated that they used to receive biscuits, which the children and the mothers preferred over Panjiri, but that had ended:

R ...children don’t appreciate being given the same thing everyday. Earlier there were biscuits. Now they stopped it. But children are children. At times, I go and get toffees and biscuits to be given with Panjiri. What else to do? Only then will children come. Children think that why the same thing everyday?

Most respondents shared the opinion that Panjiri is beneficial for the children’s and women’s health, but at the same time they told us that part of the women and children did not like Panjiri or believe in Panjiri for several reasons. The AWW from Khera Firozpur told us for example :

F Well madam some women are educated and understand that Panjiri is good for health, but you see there are many women who don’t like Panjiri and think that something else, like biscuits, is better. They think I am keeping the biscuits all for myself and not giving children. I tell them to go ask government if there are any biscuits coming. They think Panjiri is not good enough. We can only give what we get from the government is it not?

Convincing the women of the use and benefits of Panjiri seemed a difficult task for the respondents given their answers. The AWW from Ramnagar:

R Yes, we try to tell village women that panjiri is very good, with calcium etc, but only some who are educated understand.

And from Bhootpura:

B We tell them it is soybean and wheat etc. Village women are different, they don’t understand.

These respondents held the lack of education among village women responsible for the supposed ignorance on Panjiri.

However, during the conversations with the AWWs and AWH there appeared to be much doubt among all of them on the quality of the Panjiri. The AWW from Ramnagar mentioned the varying quality of Panjiri:

R Well, children should get food according to climate... See, last time, even the panjiri we got was not sweet.

And in Nagla Tal and Bhootpura the respondents opted for something else, uttering their distrust on the quality of Panjiri:

N But, we would rather have something else. Something better.

B Panjiri is not so useful, it's better if something else comes instead. Earlier biscuits used to come, now women say that biscuits have also stopped.

The AWW from Bhootpura was the only respondent who did not say anything positive about Panjiri even though she said she distributed the Panjiri daily to the children and on Saturdays to women.

Also, three of the respondents said that they used to make ladoos, small balls of a boiled mix of Panjiri and water. This was supposed to make the Panjiri easier to eat, instead of raw powder, but the supervisor told the AWWs to stop making ladoos after a while:

R Well, earlier I had the system of making ladoos and giving 2 ladoos to every child. But the supervisor madam stopped it.

O They say it sticks, so children choke on it.

This point was reflected by some of the mothers that were interviewed in the village and by the supervisor herself. See section 6.2.2.

The respondents explained that children did not always eat the Panjiri at the AWC, but also take it home. The respondents from Ramnagar and from Nagla Tal said that the children preferred to take it home, so they gave them the Panjiri to take home:

R They start eating as soon as they get it. And walk home eating it.

O Some they eat, some just falls everywhere, some is given or taken by the dogs....they are children.....

N ....they take it home and have it, adding it to water or milk.

The ICDS program policy is to let the children aged 3-6 eat the supplementary nutrition at the AWC and to let the younger children, aged 7 months to 3 years, take the nutrition home or give it to their mothers. The main reason to give the youngest children take-home rations is that they require frequent feeding in small quantities over the day rather than a firm mid-day meal. The elder children are preferred to have their supplementary nutrition at the AWC to avoid them from sharing the food with family members (CIRCUS, 2006). These norms were clearly not accomplished by the AWCs in our sample. In the first place the only available supplementary nutrition, Panjiri, was distributed to all of the ICDS beneficiaries, including children under-3. Second, most times the food was given to take home to all the children, also the 3-6 years old. And third, some of the AWWs and AWH seemed not aware of the norms for double rations of Panjiri. As mentioned before, only pregnant women, lactating mothers, malnourished children, and adolescent girls should receive a double amount. In Khera Firozpur the AWW gave children aged 3 or 4 more Panjiri:

F We have children coming who are 3 or 4 years old. We give them more.



In Ramnagar the respondent said the following:

R See, we have children between 3-6 years coming here. Now we have 80grs of Panjiri to be given to them. Children between 7 months – 3 years old come on Saturday. They are supposed to get double the ration.

And in Nagla Tal the respondent answered our question whether to give malnourished children more Panjiri negative and told us that all children are given the same amount.

Obviously the distribution of supplementary food was susceptible for much improvement. No cooked meals were provided in our sample villages. Beneficiaries were not satisfied with Panjiri according to the AWWs and AWH, but the respondents themselves were also very uncertain about the quality and benefits of Panjiri. Furthermore Panjiri was not distributed according to the norms for age and nutritional status of beneficiaries.

### *Improving the AWC*

As the central person in the Anganwadi program the AWW can give valuable feedback on the functioning of the AWC and the Anganwadi program in general. Therefore we asked the respondents what could be improved about the AWC or the Anganwadi program in general in their opinion.

The AWW from Ramnagar and the AWH from Nagla Tal answered that there should be more, better or other supplementary food for reasons explained in the previous section. There were also two respondents, the AWWs from Khera Firozpur and from Ramnagar, who argued that the workload is too much and that they needed more help in the AWC. Not only more help was asked but also more resources. This not only referred to Panjiri, but also to the housing of the AWCs. Some respondents complained about the small space they had and said they needed a new place for the AWC with tap water, toilet and some place to play for the children.

A more surprising improvement that was suggested by the respondents from Khera Firozpur and Nagla Tal was that there should be more time and means to teach the children. Apparently the educational component of the ICDS program was perceived as insufficient by these women. Yet no remarks were made on health and nutrition education for women.

Another improvement could be achieved in child attendance said the AWW from Bhootpura. She wanted more children to come to the AWC and to have the mothers of the children to make sure that they will send them clean, after taking a bath, and on time.

## **6.2 Perceptions of mothers on the functioning of the Anganwadi centre**

Parents of children play an important role in the functioning of the Anganwadi program – they are the ones to decide whether their children go to the AWC or not. In rural Uttar Pradesh it is in practice mainly the mother who is occupied with raising the children. But not only the attendance of her children to the AWC is of importance, also the mother's own Anganwadi attendance is essential. Pregnant women and lactating mothers are ICDS beneficiaries as well. So, the functioning of the Anganwadi program is highly dependent on the mothers of the children. It is important to know what mothers think about the Anganwadi centre and the Anganwadi program in order to understand why they go or don't go to the AWC and why their children attend the centre or not. Are mothers aware

of the services they can get? How do they feel about the supplementary nutrition that is provided at the centre? Are they able to keep their children healthy and do they know what children need to stay healthy? These are some of the questions that are being discussed in the following section. All together these questions are intended to provide an answer to the question ‘How do mothers perceive the Anganwadi centre?’, and ultimately to determine some of the factors that contribute to the functioning of the Anganwadi program.

First the health of mothers and behaviour regarding health are discussed, then child health and child development, and finally the mother’s knowledge on the Anganwadi program will be discussed.

### **6.2.1 Mothers health and behaviour**

In rural Uttar Pradesh the AWC is usually the first hold for pregnant women and for mothers when it comes to health related issues. At the AWC they should receive advice on child care, utilization of health services, family planning, and so on, but also immunizations and health check-ups (Gragnotati et al, 2005). By interviewing a sample of mothers in Khera Firozpur, Ramnagar and in Bhootpura we tried to get more understanding of the health situation of mothers and of their behaviour regarding health. This can give more insight in the use of the Anganwadi services and thus in the functioning of the AWC.

Several questions were asked about the mother’s health and her health behaviour. In case of one of the two interviewed grandmothers and the interviewed father these questions were asked in regard of the health of the children’s mother because the mother is apparently the main person taking care of the children. As for the other grandmother, she had been taking care of two of her daughter’s children for over two years and was the de facto mother of the children. The questions on health behaviour were directed towards her instead of the mother.

#### *Mothers health*

When asked about their health, in first instance the majority of the respondents claimed they were in *good health*. Almost all of them said they did not have any health problems. But, after prodding the respondents a little, some of them eventually confessed some kind of health problem.

Four of the respondents complained about *pain*. Two of these women referred to their pain as something that is normal for every woman, something that is just part of life. One of the respondents said:

K1 Well, there is pain, but there’s no escaping such things in life. My joints pain, knees and all.

Another woman told the following:

F4 Well, madam, I have a lot of body ache.

In the Indian context ‘body ache’ is often used as a euphemism for about anything that is causing pain in the human body.

Besides the ‘normal’ pain that was experienced by these two women, one respondent had delivered twins in the hospital and was still in pain because of the operation (F8).

Another woman had a problem with her leg, according to the AWW, and was suffering pain from this (R2).

*Weakness* is the second most discussed issue by the respondents. Three women were said to be weak, either by themselves or by other women that were present during the interviews. The woman who had the problem with her leg was indicated as weak by the AWW (R2). One of the other respondents, a very young mother of around 16-17 years old, was also considered weak by other women who were present at the time of interviewing and by the AWW. This respondent had given birth four months earlier. The other respondent told us that she was suffering from weakness and referring to it as an illness:

B2 I had weakness....you know, that illness....so I'm taking medicines.

Furthermore the health problems that were addressed were disability, i.e. a woman couldn't move her left hand (F2), 'white discharge', i.e. leukorrhea, a whitish discharge from the uterine cavity and vagina (F3), and epileptic fits (R2).

So, while most respondents said to be healthy some women said they had health problems to which they referred to as pain, body ache or weakness for example. No significant differences between villages or concentrations in villages of health issues could be distinguished in the sample. Neither for caste or for other characteristics could any difference be found..

### *Pregnancy*

The health of a pregnant woman is important for the health of the baby and for the child's development. The ICDS program also includes pregnant women as one of its target groups. Several services should be available for them, including antenatal check-ups, immunization, supplementary nutrition and health and nutrition education. So, the functioning of the AWC is partly dependent on pregnant women. Therefore we asked the respondents about their pregnancies.

Of the interviewed respondents the majority said they did not have any problems during pregnancy. But three of these respondents mentioned they had been taken to a *hospital* during their pregnancy, although there was no problem according to them (F6, F7, R3). Six respondents told they had problems during their pregnancy, but none of them said what kind of problem there was, other than 'a bit of pain' (F2) and that it was 'difficult' (R3, B2). Of these six women that indicated having problems or being taken to a hospital during pregnancy three women were scheduled caste (SC).

### *Health perceptions*

Taking care of health is one of the main indicators for the respondents health situation. It is important to know what the respondents perceive to be essential to stay healthy or to become healthy. Some of the questions addressed the issue of taking care of health. In general the respondents said that eating well and eating *healthy food* is the most important asset for one's health. Five of the respondents related taking care of health to taking care of illness and answered that *medicines* should be taken if someone falls ill. In most cases the respondents gave short and even laconic answers, or were clueless what to answer. For example:

F4 Eat good food, play well, and work well. Cleanliness.

- F7 We should have good food, spinach, milk etc ..that's all I know.  
F8 Now, how do you take care of your health? Take all the medicines that have been advised.  
R1 (respondent laughs a lot)...well, what, I work a lot, I eat and I take rest.  
R4 Well, when it hurts/pains we should have to take care. We would have to, wouldn't we? We give medicine, stop something early. That's how we take care.

Some respondents indicated that it is difficult for them to stay healthy because of *poverty* and they do not always have enough resources to feed their families, like this respondent from Bhootpura:

- I What should we do to take care of our health?  
B1 See, we should take good care. If we fall ill, we should take medicines.  
I And what about food etc? Being a mother...?  
B1 Well, all that...how to remember this amidst all our work? And also, it happens – sometimes our hands are tight, sometimes the time is good.

And this respondent from Ramnagar:

- R1 What can one do if one has health problems....you can't distribute it to lessen it. When you are poor, you are bound to fall ill.

Four respondents regarded *work* as a means to stay healthy:

- R3 We just eat and work. Keeps you fit.

Besides this, both *rest* and *hygiene*, which is an environmental determinant of health, were mentioned only once.

So, healthy nutrition was mainly considered as most important factor for health. Besides taking medicines when ill as another health incentive it was striking to hear that some respondents said that they were not fully able of maintaining good health because of poverty.

#### *Mothers Anganwadi attendance*

The Anganwadi program is, besides children under the age of six, also intended for pregnant women and lactating mothers as mentioned before. These women can, in principle, come to the AWC every Saturday to get supplementary feeding, and should additionally receive antenatal and postnatal checkups, immunization, and health and nutrition education (Gragnotati et al, 2005).

At the time of interviewing 10 women in the sample for this study were eligible to make use of the Anganwadi services; all of them were lactating mothers. Of these 10 women 8 were visiting the AWC. The 8 women who were attending the AWC were either from Firozpur, thus not from Khera, or from Ramnagar.

In Khera the respondent kept insisting that there is no AWC in the village. What she meant was that there is no AWC in the part of the village called Khera. Moreover, she mentioned that people from Khera don't go to Firozpur and children from Khera only study in Khera.

Also in the village Bhootpura neither of the two interviewed mothers went to the AWC on Saturdays. One of the mothers said that she had only received Panjiri twice when she

was pregnant, but not after that. She also mentioned a lack of information about the ICDS program in the village:

B1 Nobody ever came, nobody ever explained or nobody ever sat down with us like you, nor did someone talk with us so that we also understand what these things are or what we get. Nobody told us.

Even though the AWC was close to her house she still did not attend it because of the lack of information on the services she is supposed to get and because she does not receive Panjiri anymore.

The other mother said she did not receive any immunization or IFA tablets because it was simply not available at the time she was pregnant.

When we look at all the 17 respondents there are two grandmothers and one father who are obviously not part of the group of beneficiaries of the ICDS program. All the other 14 women are mothers of children under-6. Two of these mothers told us that they did not attend the AWC themselves, but had a mother-in-law who went to the AWC to get Panjiri for them on Saturdays. Of the six women who were not pregnant or not lactating anymore, two used to go to the AWC when they were entitled to the Anganwadi services. Also, the daughter of one of the grandmothers had been visiting the AWC when she was eligible to (F1).

So, in sum, 10 out of 14 women in our sample, when the grandmothers and the father are left out, were or had been visiting the AWC. These 10 women were all from Firozpur and Ramnagar – the respondents from Khera and Bhootpura indicated that they did not visit the AWC. Of the four mothers who said not to be going to the AWC three were SC women. On the contrary two SC mothers, one from Firozpur and one from Ramnagar, did attend the AWC.

### *Immunization*

The ICDS program and the Reproductive and Child Health (RCH) program share some mutual objectives. One of the objectives is the immunization of mothers and children and to maintain records of immunization. For this reason these programs cooperate by the deployment of auxiliary nurse-midwives (ANMs), from the RCH program, in the Anganwadi centers as mentioned in the previous section. Their tasks are to give immunization injections, to conduct general health check-ups of ICDS beneficiaries, and to distribute medicines and contraceptives (Gragnotati et al, 2005).

Out of the 17 respondents 10 mothers received tetanus toxoid immunizations during pregnancy. This number also includes the daughter of one of the interviewed grandmothers and the wife of the interviewed father. Only three women explicitly told that they had not received any immunization injections when they were pregnant. One of them, the respondent from Khera, explained that nobody ever came to her village for immunization, so she never got any immunization injections. Apparently, the relation between Khera and Firozpur was so malicious that it was out of the question for people from Khera to go to Firozpur for medical services or whatsoever:

(OL refers to other lady who was present at the time of interviewing)

I Haven't you heard of this program under which we have an Anganwadi for children? Medicines, injections for women....

R It doesn't come here. It is in Firozpur. They only go there.  
 I Oh, is it?  
 R Yes, only Firozpur. Whatever medicines etc....it is all in Firozpur.  
 I The Anganwadis are giving injections to pregnant women, and for little children....to give injections to children....or going to the Anganwadi school and getting panjiri....  
 R No, there is nothing, no panjiri, no Anganwadi. When there is nothing here, no point asking. The medicine-lady who comes....she comes to another village.....well, if the thing is true, I'll only tell the truth....  
 I Yes, we want the truth. No other things. But, why....why is this? Is the Anganwadi very far?  
 R No! No, no, it is just here.  
 I So, can't you take the children there?  
 R There!!.....no.....  
 I Why would you not? If it is close, you should go...  
 R Here, if we had it in our village....then maybe....we....  
 OL ...it is different village...  
 R ....yes, we are not from that village, we are from this village.

From this section of the interview the reason for not attending the AWC and not getting immunization injections looks comprehensible. The allegedly animosity between the two parts of the village, perceived by the respondent, is causing this supposed lack of health services in Khera according to the respondent. Another woman we spoke in Khera told us the same story; there is no AWC in their village, it is not possible to go to Firozpur, and nobody comes to Khera for giving immunization injections or other health care. The same hostile feeling towards Firozpur was sensed in the latter conversation.

Another respondent who did not get immunization injections during pregnancy was one of the mothers from Bhootpura who claimed that immunization injections and IFA tablets were not available at the time she was pregnant which was approximately 6 years earlier. Of the remaining four respondents it was not clear whether they, or the concerned daughter, had been immunized or not.

In Firozpur many respondents told that the ANM, who visits the AWC once a month, only gives immunizations and some of them mentioned IFA tablets (iron and folic acid). According to them she does not give health check-ups and does not provide other medicines and contraceptives like she is supposed to do:

F9 She only gives immunization injections, nothing else.

But, after probing a little bit the respondent told us that she received IFA tablets as well and threw them away:

F9 Yes, but we don't take them. We just throw them away.

Another respondent said the following about the ANM, which was supplemented by the supervisor (S) who was also present during this interview:

F4 I never went to no ANM or what. What's the use?

S Madam, the nurse who comes is not capable of attending to other health problems. She only gives immunization doses.

In Ramnagar the respondents told the same story about the ANM:

R1 Oh, yes, yes she comes. But she only gives injections and doesn't look at any other problems.

R2 She only gives immunization.

Of the 13 respondents that provided information on their immunization-status 10 women did get the prescribed TT immunization during pregnancy. Two of the three respondents who did not get immunizations were SC women. No significant differences in immunization-status could be found between the villages. IFA tablets are dispensed in Khera Firozpur, but not taken by all beneficiary women.

#### *Use of other healthcare services*

If people in rural areas in India come across a health problem and need to find professional help the first public health facility they can turn to is the Anganwadi centre. Thus the ANM or the AWW is their first referral point. If the services the ANM and the AWW can offer are not sufficient for treatment of the problem the public sector theoretically offers medical services in Sub-Centers on the *Gram Panchayat* level, Primary Health Centers (PHCs) on the block level, Community Health Centers (CHCs) on the *Tehsil* level, and public hospitals on the district level (Bajpai et al, 2005). Nonetheless, in Uttar Pradesh there is a large dependence on the private health care system for many different reasons such as the repeated absence of medical staff at public health facilities, shortages in public health facilities and unhygienic conditions in Sub-Centers, PHCs and CHCs. More than 53% of the poorest people who were ill in Uttar Pradesh in 1998 consulted an untrained health care provider for their first consult, and 43% of the wealthiest people did the same. Only 5% of the population visited a government doctor and a quarter of the people went to a private, qualified doctor (Bajpai et al, 2005).

The women in Firozpur and in Ramnagar told us that the ANM who comes to the village once a month does not give anything else but immunizations and in some cases IFA tablets. Therefore, most of these women have to look for help elsewhere if they, or any relative, have a health problem.

In Firozpur there is a private doctor and a village mid-wife, a so-called '*daai*'. Two of the respondents noted that they had used the help of the '*daai*' for the delivery of their child, and only one of the respondents said that she and her family made use of the private doctor in the village. However, six out of ten respondents in Firozpur stated that they would go to or had been to a doctor or a hospital in the nearby towns of Sasni or Hathras. According to the AWW the villagers would only go to the hospital or a doctor in Sasni or Hathras if the problem is 'really big'. One respondent in Firozpur told us that she could not make use of a hospital, presumably because the family was too poor for this kind of health care.

The respondent from Khera said she had to make use of a private doctor in Chowki, a village nearby.

In Ramnagar three of the four respondents said they were making use of the private doctor in the village. Two respondents needed to go to the hospital, either for a delivery or for an ill child.

Of the two women in Bhootpura, who were not attending the AWC, one woman was seeing an unqualified rural medical practitioner. She referred to this medical practitioner

as the 'vaid'. The so-called unqualified rural medical practitioners, e.g. untrained practitioners, faith healers, traditional birth attendants, priests, and local medicine women and men (The World Bank, 2001), take care of 50-70% of all the primary consultations in India (Misra, 2003).

If we consider this number it is surprising that this respondent was the only one making use of an unqualified rural medical practitioner. Whether the other respondents who said they were making use of a private doctor meant an unqualified or a qualified private doctor is not clear. It may be possible that they meant an unqualified medical practitioner.

It is however obvious that most respondents make use of health care facilities outside the AWC. Fourteen out of 17 respondents indicated to use or to have used health care facilities outside the AWC. The health care facilities that were mentioned included a private doctor, the village mid-wife, the hospital, and the 'vaid'.

## 6.2.2 Child health and child development

The second part of the mother's questionnaire covers child health and child development. By asking for information on child health and child development it is possible to learn more on the perceptions that mothers have on what is essential for the wellbeing and development of their children. This can give an indication on the perceptions the mothers have on the AWC; do they think the Anganwadi program is essential for their children's health or maybe not?

### *Children's health*

The third section of the mother's questionnaire deals with the health and development of their children. The questions concentrate on sickness, growth, nutrition, and perceptions on children's health and taking care of children's health.

The most notable fact from the interviews was that 14 out of the 17 respondents regarded their children as *healthy*. Only two mothers pointed out that at least one of their children was not very healthy. On the contrary, six respondents said that at least one of their children had been ill in the past 12 months and three respondents mentioned that one of their children had been ill earlier than 12 months ago.

What the respondents mentioned most was fever, diarrhoea, weakness, and cold. Most of the respondents regarded these illnesses as '*little illnesses*' and 'nothing serious'. For example:

R2 Well,...the children fall ill with fever and diarrhoea, nothing more.

Also from the other interviews can be concluded that illnesses like these are regarded as very normal, and as something that is bound to happen to every child. Some of the respondents:

F1 Well, they are children. They do fall ill, sometimes with fever, sometimes with cold. Growing up, they are bound to fall ill.

K1 Yes, they are children, they fall ill. And if they do, we give them medicines.

And one of the respondents in Ramnagar, with another lady (OL) who was present at the interview, responded to the question if any of the children had fallen ill:

OL Yes, they too get fever and things like that.



R3 Yes, little illnesses. Only Manish, he had got polio for some time last year. We went to hospitals and treated him.

Of course poliomyelitis is a very serious disease. However, because the respondent indicated that the child was completely all right now, it is doubtful if the child suffered from polio – polio is a disease which can only be prevented, not cured (WHO, 2006)).

*Weakness* was mentioned by three of the respondents. The respondents who indicated this were also the respondents who said that they did not always have enough food to take care of their children.

One of these respondents related the weakness of her children to the fact that they were ill more often. She said:

F8 ...they have been weak, so more vulnerable.

According to the AWW the reason her children were weak was the fact that they had taken polio drops and had fallen ill after that.

Another respondent told us that her children kept falling ill and answered to the question if it happens often:

B1 Yes, maybe. The younger children fall ill.

Apparently the younger children in this family fell ill more often.

Several questions were asked on the *development* of the child and on what the mother perceives as healthy children. Eleven respondents considered the development of their child(ren) as good. Only two respondents said one of their children was lacking behind in development. One respondent on the question if her child(ren) are developing well:

F7 Yes, they are. Except, the girl is not growing well. Not tall, u see.... The child knows her alphabets, she's good. But only height.

And another respondent:

B1 Well, all others are fine. Only the youngest is a bit weak.

The respondents judged the health of their children in differing ways, but mostly by the appearance of the child and by the way the child behaves. These are some of the responses on the question how a healthy child looks:

F3 Healthy and fit, they will be, and look well.

F4 How? Well, they are fat and fresh, and active.

F6 Now what can we say to that? We just understand. If it is ill, we take it to hospital.

F7 The child eats well, plays well...what else?

R1 Well, the child will be restless.

And a daughter of one of the interviewed grandmothers added to this:

R1 Won't you think an ill child will cry? A healthy one will just keep playing.

For the health status of the children no significant differences could be distinguished between the different villages or between respondents from differing castes according to the responses they gave. Most respondents consider their child(ren) as healthy and their development as good. Fever, diarrhoea, cold, and weakness were mentioned as the most common illnesses, but polio and growth retardation were also mentioned.

### *Taking care of children*

Taking care of children has an impact on the health status and nutritional status of children. The way the mother takes care of her children might give a perspective on what

causes a certain health status and nutritional status of children. In turn, the ICDS program is also of influence on the health status and nutritional status of children. By knowing what mothers perceive as important for the health of their children one can consider how the ICDS program fits in or complements their approach of child care.

The questions related to taking care of children addressed the mother's feeding behaviour and other necessary means of keeping the children healthy.

When the respondents were asked about taking care of their children the responses we got were mainly on food. The importance of good and healthy food was occasionally stressed by some of the respondents. Milk in particular was perceived as healthy food:

F2 Yes, and good food. Milk.

K1 Well....they drink milk, eat well. If they'll eat well, they'll stay good.

Several times the respondents told that the children eat whatever the parents eat, because there is nothing more to give.

A few respondents indicated that it was sometimes hard to feed their children properly because they did not have enough resources being members of a poor family. For example:

F1 Well, daily bajra and all is given and they eat it, and at times they get wheat...what can poor people give now? Whatever little food you get, however dry, good or bad it is ...that we give. What we get in our fields and all, at our meager earnings, that we can afford.....Sometimes we give desi ghee [pure home-made ghee].

B2 Food? What to do about food? We take a lot of care, but we should have things to give, isn't it? What we have, we give.

In total six respondents indicated straightforward that they did not have enough resources to take proper care of their children. Moreover, another seven kept silent when being informed on this subject or indirectly verbalized their lack in resources. So, overall most respondents had difficulties in taking proper care of children.

Also medicines were regarded as good for children's health, either to prevent them from falling ill or to cure them.

When one of the lactating respondents from Firozpur was asked about her perception on breastfeeding, the AWW interrupted:

AWW Now madam, he has not started having anything more than mother's milk. That too, I tell them to not fall to superstitions. Earlier they used to throw the first milk of the mother to the ground, but I told them that this milk is good for the child and has many things which protect and nourish the child. So now, they give the milk to the child.

The first milk of the mother right after birth, the colostrum, is in fact very healthy for the child and the mother for several reasons. It provides the child with nourishment and it functions as the first immunization. Besides, it stimulates the production of enough milk for the next feed and it helps to prevent blood loss in the mother for example (CIRCUS, 2006).

Another respondent in Firozpur considered food in relation to 'weakness' when we asked about feeding the children:

F9 Well, someone is just weak. Now, if you get someone like that, what can you do?

This woman believed that so-called 'weakness' could not be prevented or cured by adequate nutrition.

Overall, food was considered most as important asset for children's health. Nonetheless a majority of respondents indicated that they were too poor to provide their children with adequate food. Besides food, medicines were regarded as vital for children's health by some respondents.

Furthermore, the AWW spoke of mothers throwing away their colostrum in the past.

### *Children's Anganwadi attendance*

One fundamental factor for the functioning of the AWC is the attendance of children. The Indian government can place Anganwadi centers in practically every village in Uttar Pradesh or improve the quality of the services provided by the AWCs, but without children attending the centers there will be no impact of the ICDS program on child health. It is thus crucial to know if children go to the AWC, if they go on a regular basis, and why parents of children choose to send their children to the AWC or not.

In Firozpur six out of ten respondents send their child(ren) to the AWC. Besides this, three of the ten respondents were lactating mothers who were making use of the Anganwadi services. Two of these mothers said that they would send their child(ren) to the AWC when they will reach the age to go there. Thus, in sum, nine out of ten respondents were using the services offered by the AWC by sending their children, going to the AWC themselves, or both.

The responses we got on child attendance were quite varying. In spite of the fact that the AWW still accompanied us to the interviews on the second day of interviewing in Firozpur, just like the first day, the people we spoke to had a much more critical view on the AWC than the persons we spoke to on the first day. On the first day all of the respondents told that they were rather satisfied with the AWC. Nobody said they had a reason why they would not send their child(ren) to the AWC. The day after this the respondents, and other people we spoke to, seemed to be more judgmental about the AWC.

For example, the mother-in-law of one of the respondents we interviewed on the second day had got a mixed opinion on the AWC. She said that the family intended to send their children, 4 months old twins, to the AWC when they would be old enough.

R If the children don't go to play, they won't be smart and active.

Meaning that they would send the children to the AWC because there they learn and develop by playing. But, on the other side she said about the benefits of the AWC:

R What benefits? Do you think you people are providing anything? There is nothing and what are you asking...it is pointless. You only give Panjiri and what benefits can come from that?

Apparently this mother-in-law was very negative about the supplementary food and the lack in other services in her opinion. But, on the contrary, she did seem to consider playing and learning in the AWC as beneficial for the children.

Another example during one of the interviews on the second day was an interrupting father-in-law who denied the establishment of an AWC at first. He said that children

rather go to the private primary school in the village where three year old kids can accompany older kids to school. However, later in the conversation he admitted the presence of an AWC by saying that children choke on the Panjiri they are getting there. Furthermore he mentioned that not enough Panjiri is supplied.

The father who was interviewed in Firozpur on the second day said that his children used to go to the AWC because they start learning in the AWC:

F10 Studies start, don't they? Studies start in Anganwadi...

When the father was asked about families who don't send their children, a discussion with the AWW started:

F10 If they don't send, so be it. Why, if one or two don't send, that's a different story. Here, we have all types in the world.

AWW But, in the beginning they all send. Now, since the Montessori [private primary school] has opened small child can accompany an older child to school.

F10 Yes, and with them, they [smaller children] also learn a bit.

AWW One or two families are left, who don't send their children.

F10 In one family, well, the elder girls went.

Allegedly, the primary school in the village is attracting children who are eligible to go to the AWC according to the two respondents in Firozpur. More interviews and conversations in the village learned that this was a growing concern for the AWC. Several children who had reached the age of three were pulled back from the AWC and were sent to the primary school, even though the school was in Khera, the other part of the village.

The respondent in Khera told us that she did not send her children to the AWC. She was quite angry about the fact that there was no Anganwadi in Khera, but only in Firozpur. The mother of 7 children had not send any of her children to the AWC in Firozpur because of the alleged hostility between the two parts of the village, as mentioned in section 6.2.1. She even stated that none of the families from Khera was sending their children to the AWC. This was also assumed by another villager, a young mother. Even though Khera Firozpur is legally spoken one village, the Anganwadi helper does not come to Khera to collect the children for the AWC.

The children under-6 from the respondents in Ramnagar were all going to the AWC in the village. All of the respondents here told us that the children visit the AWC regularly, i.e. every day. In this village the Anganwadi helper collects the children every morning from their houses, like in Firozpur. The AWH makes a round through the village and takes the children back to the AWC if the parents allow them to go.

In Bhootpura one of the two respondents did not send her children to the AWC and the other respondent did send her youngest child. Both the respondents replied that the AWC was established in the primary school, not far from their houses. However, the children only received Panjiri on Saturdays according to them, and lactating mothers did not receive anything. The mother who did not send her children to the AWC told us she only got Panjiri twice when she was pregnant, and moreover, nobody ever informed the women in the village about the Anganwadi centre and the services they can get there. She

also said that the problem is, according to the AWW, that the means needed by the AWC are not provided by the government.

Other villagers made some serious accusations against the AWW in Bhootpura: the centre was open for maybe 15 days a month and the Panjiri was usually being sold by the AWW for Rs.35 per kg. These accusations were confirmed by several people in the village.

Upon our arrival at the AWC only three children were present. It was however almost 12 o'clock, probably right before closing time.

Even though the AWW accompanied us to the interviews in Khera Firozpur some respondents here gave a critical opinion on the AWC. But, the criticism on the supposedly lacking services at the AWC or the strong competition from the primary school in the village did not withhold most respondents of sending their children to the AWC. Nevertheless, mothers from Khera did not seem to send their children to the AWC. Children from respondents in Ramnagar did go to the AWC on a regular basis. But, according to a respondent in Bhootpura not much services were provided at the AWC in her village.

#### *Supplementary nutrition*

As explained in section 6.1.3 the supplementary nutrition provided in our sample villages was Panjiri. The respondent's opinions on the Panjiri were varying in the research villages. In Firozpur, where most of the respondents were making use of the Anganwadi services, there was a general consensus among the respondents that the Panjiri was not good enough, either in quality or in quantity.

According to the respondents Panjiri is provided to all of the children who attend the AWC in Firozpur, regardless of age, sex or caste, as well as to pregnant women and lactating mothers. But, one of the respondents told us that the provision of Panjiri to the children is *irregular*:

F9 Panjiri? What Panjiri? Sometimes she gives, sometimes she doesn't.

Only half of the respondents said the Panjiri is *good* and *beneficial* for the health of their children. But despite the positive comments these respondents also had their criticism on Panjiri.

When it comes to the quantity of the Panjiri a much heard complaint was that the ICDS beneficiaries did *not get enough* Panjiri and they should get more:

F1 We should get more Panjiri and more medicines.

F7 Yes, it is good, Panjiri, but not enough.

People also complained about the, in their opinion, *unfair distribution* of the Panjiri:

F9 But here, what we get now is itself not regular. Some children get 5 [parts] while some get 2 [parts].

However, this was justified by the AWW saying that the Panjiri is distributed in accordance to the number of children in the family. Thus apparently the children in Firozpur who do not attend the AWC also receive Panjiri.

Remarkably, one of the respondents claimed that the Panjiri was not distributed equally to children under-6 as prescribed by the supplementary nutrition norms of the ICDS program:

F3 Well, we have children who are 3 or more years of age, so in such cases we give more food. This statement was not objected by the AWW who was also present during the interview. So it seems that what is regarded in the ICDS scheme as the most crucial group in need of support in their growth and development, children in their early childhood, i.e. children under-3, are receiving less benefit than 3-6 year olds from the supplementary nutrition component of the Anganwadi program in Firozpur.

The respondents and the AWW in Firozpur told us that they only give Panjiri to the children to *take home*. When we were in the village for the research we saw the children going home with a small paper bag of Panjiri. However, this way it is difficult to control if the children eat the Panjiri or perhaps share it or throw it away.

One of the major complaints about Panjiri was the fact that Panjiri was given *dry* to the children, i.e. in powder form. Several respondents mentioned that the children have problems with the dry Panjiri. For example, children spill it over themselves, they have problems digesting it, they choke on it, and some people believed children get diarrhoea from it.

Some illustrations of this:

F4 The Panjiri etc you give is not enough, send biscuits. Children stuff it dry and get choked, it is not good. And also waste it a lot.

Another lady (AL) during one of the interviews:

AL Madamji, send something else ..the Panjiri is not good, it sticks to your tongue, children can't eat it...rather send biscuits or something else...

One respondent and her family were strongly opposed to Panjiri and even disallowed their children to take it:

F9 ...they choke on it and cough up. It's just raw lime powder inside, with a little sugar. [...] At times she gives and children have a problem eating it. They get choked and are coughing by the time they reach home...[...] Yes, so why are you giving Panjiri? Give something better. It should be palatable to the children. Instead of Panjiri...[...] No, nobody eats Panjiri. My boy – he too never eats. We disallowed him from eating it...[...] No! It is not much more than raw flour.

This example also illustrates the presumption among many of the respondents that we, the researchers, were functionaries of the World Bank or the Indian government, but that aside.

Some of the respondents suggested to mix the Panjiri with water or (butter)milk, or to make biscuits out of it in order to make Panjiri more palatable and digestible:

F1 Now when they get Panjiri, they eat it. And when don't get then they don't eat it. Just add water to it, or have it just like that.

Though, what most respondents suggested was to give *something else* instead of or next to Panjiri. Biscuits were the most popular suggestion; they were given in earlier days but at this time not anymore. Children liked the biscuits and could easily eat and digest them:

F4 The Panjiri etc you give is not enough, send biscuits.

F6 Yes, biscuits, or maybe chana [chickpeas] or ...or sweets ..

- F7 Like earlier we used to get biscuits, now we get only Panjiri...so, increase something else....add something else...how will only Panjiri be enough? Something more, like chick peas, cereals, green peas, soybean etc....
- F8 Maybe more food can be given. Earlier they used to give biscuits.

According to the AWW in Firozpur they had already tried to mix Panjiri with water or to make sweets out of it:

AWW We added water to it, and earlier made laddoos [sweets] out of it. What these people started saying is – add ghee [clarified butter] to it. Now from where will I get ghee?

The supervisor (S) who was also present at this time reacted:

S I got people to make these laddoos in front of me. But at times, some children stuffed the whole laddoos in their mouth and choked. So, we had to discontinue. Further there was also a caste problem. If the water was added and laddoos made of the same mixture for children from all castes then their parents didn't allow it.

Thus, besides the *safety issue* for the children caused by laddoos the Supervisor explained that the *caste system* was also of major importance to the consumption of supplementary nutrition. Food that is prepared by somebody from a lower caste cannot be eaten by somebody from a higher caste in most parts of the Indian society. Someone from a higher caste who accepts food prepared by someone from a lower caste would become 'polluted' and suffer a lowering in status.

In Khera the respondent and her children were not making use of the AWC in Firozpur. Obviously the children did not receive any Panjiri because of this even though the mother seemed to know what Panjiri is. Surprisingly one of her daughters responded that Panjiri was not enough and that Parle-G biscuits should be given while none of the children ever attended the AWC.

The respondents in Ramnagar told us that the children eat the Panjiri that is provided. One of the respondents said that children don't take it home and eat it in the AWC, but from the following answer of one of the other women it can be concluded that the children also take Panjiri home and do not always eat it:

R2 Well,...if they like it, they eat it sometimes....sometimes they just throw it to the cows.....well, you know, sometimes it's not good. Does not have enough sugar also...

The Anganwadi worker agreed on the unreliable quality of the Panjiri:

AWW Children get tired of the same thing everyday. Besides, the Panjiri is also not reliably good. At times more sticky, at times less sweet.

These answers suggest that the quality of the Panjiri is irregular and not always good enough. This is reflected in the complaints about the dry nature of Panjiri:

R2 They just eat it dry. Rarely eat it adding water. [laughing] When there is a bit of yoghurt, they might have it with that. Or, if not, it just lies around.

R4 The Panjiri given is all dry. Children spill it over themselves while eating it. Sometimes if they can't digest it, they get diarrhoea. Make laddoos and give. Or rather better, give biscuits.

The suggestion to give laddoos, biscuits or something else was given by all four respondents in Ramnagar. They all agreed that only Panjiri was not enough and not good enough:

R1 Yes, children do eat it, but if something good comes, then we'll also feel better.

R2 There should be something that children like.

R3 Yeah, it's good. Children eat it well and stay healthy. Just Panjiri is not enough. More food is necessary. But Panjiri is also good. [...] Well, if you want to add something that surely will be good. Who says not? Make the service better. [...] Well, now it's only Panjiri, earlier there were biscuits. Now, what can be done to add it again?

One respondent had a rather pessimistic view on the supplementary nutrition component and the possibilities of getting something else:

R4 If there is nothing else, then what will I say? If it comes fine. If not, what matters what we want?

This feeling was expressed more often, also in the other villages. Many respondents tended to feel unheard and powerless against the decision makers of the ICDS program; a feeling that everything is already decided and nobody listens to what they think is necessary.

Most respondents in Ramnagar considered Panjiri as beneficial for the children's health. Nevertheless, a lady (AL) that was present during one of the interviews was saying:

AL Now, what benefit? Children – they walk and play, and eat. What benefit, is it enough to fill your stomach?

Her concern was probably more on the quantity of the provided Panjiri than on the benefits for the children's health, but it points out that some people might not be well enough informed about supplementary nutrition. In this case the woman was presuming that the Panjiri should be equal to a whole meal instead of a supplement on the regular food the children have.

As far as the respondents in Bhootpura are concerned, there should be many improvements in the supplementary nutrition component of the Anganwadi program. Both respondents claim that the children only receive Panjiri on Saturdays and one of them said she only received Panjiri twice when she was pregnant, not after that. According to one of the mothers the AWW apparently keeps telling that the Panjiri is not supplied by the government, so they cannot distribute it to the beneficiaries.

B1 They say that it does not come from above, then what can we do? You are telling me this and that, but they refuse such things....that any such thing is given....

She adds to that that she thinks it will be beneficial to eat Panjiri on a regular basis, i.e. every day. The other respondent also said that Panjiri is good for children.

In sum, about half of the respondents said that Panjiri was good for the children's health. However, a majority of respondents considered the Panjiri to be not enough in quantity and quality. They suggested to give more Panjiri or other supplementary food like biscuits. Furthermore the targeting of the supplementary food was not in favour of the most needy group, the children under-3, according to a respondent from Firozpur. The fact that food is given to take home does not allow good control on the consumption of Panjiri by the beneficiaries. Besides this the provision of dry Panjiri causes problems in the consumption and digestion of it. Many respondents felt powerless and subordinated towards the Anganwadi program.

### **6.2.3 Knowledge on the Anganwadi centre**



### *Anganwadi benefit*

A small majority of the respondents in Firozpur thought the AWC is beneficial for the children's and mother's health. Especially the supplementary nutrition was considered as an important asset. One respondent mentioned the pre-school education as important feature of the program.

This image on the benefits of the Anganwadi program was mostly the same in the other villages. The difference was that the respondents in Ramnagar and in Bhootpura seemed less well informed on the Anganwadi program and the services offered there. This was illustrated by one mother in Ramnagar who explained that she did not know what her children learn in the AWC and that she did not know if her children were benefiting from the Anganwadi program.

### *AWC quality and improvements*

Considering the perceptions on the functioning of the AWC so far it is not surprising that most respondents have an opinion on the quality of the AWC and on improvements that can be made. Only a few respondents in Firozpur qualified the Anganwadi services, as they were at the time of interviewing, as good. Except for one respondent all the interviewees in Firozpur had suggestions for improvements in the Anganwadi services. Most of them said there should be improvements in the supplementary nutrition. While two respondents opted for more Panjiri, six respondents wanted to have different food instead of or in addition to Panjiri. For example:

F3 With just one thing, even we will get bugged. They are children. You should give different food in different climate.

In the previous section a more elaborate discussion on the perceptions on supplementary food can be found.

## **6.3 Discussion and conclusion**

In this paragraph the results from the interviews, as discussed in the previous two paragraphs, will be further examined and discussed. Both sub-questions 'What is the perception of the Anganwadi worker on the functioning of the Anganwadi centre?' and 'How do mothers perceive the Anganwadi centre?' will be answered. These answers should provide information on possible explanations for the functioning of the AWC which is the essence of the second research question 'What underlying factors can be distinguished for the functioning of the Anganwadi centre?'.

The main conclusion from the analysis of the interviews in the four sample villages is that the functioning of the Anganwadi centers is prone to improvement. There are two key areas in which improvements are likely to result in a better functioning of the AWCs. In the first place the provision and quality of services offered by the Anganwadi program are in need of enhancement. Second, the awareness and participation of ICDS beneficiaries needs to become much better. In the following discussion these points will be elaborated upon.

The first thing that really came forward in this analysis was the occasionally insufficient provision and inadequate quality of the services that are offered or should be offered by the Anganwadi program. These services include education on health, nutrition and hygiene for mothers, pre-school education for young children, supplementary feeding for children under six years of age and pregnant and nursing mothers, growth monitoring of children, and offering some basic primary health care services as immunization, and IFA and vitamin A supplementation.

Supplementary nutrition, considered a key element of the Anganwadi program by mothers and AWWs, bore the most criticism. Mothers, but also AWWs, were discontented by the quality of the Panjiri. Children had trouble eating and digesting it as raw powder. Besides, the quantity was considered as too small by many respondents. Some mothers even misunderstood the function of the Panjiri, being a supplement to the regular meals, and thought of it as a complete meal. Panjiri was also not distributed according to the norms for age and nutritional status of beneficiaries in the villages. Furthermore, frequently the Panjiri was given to take home by the children, instead of eating it at the AWC as is the norm of the ICDS program, so it could not be verified by the AWW if the children ate the Panjiri themselves or perhaps shared or wasted it.

When it comes to education the AWCs in our sample seemingly could improve, especially on health and nutrition education for mothers. In some villages this did not seem to be carried out. Interviewed mothers in these villages indicated that they did not receive any education or advice on health and nutrition. In other villages however the AWWs did seem to make an effort on health and nutrition education by making home visits to pregnant women and lactating mothers in order to advise them for example. The pre-school education component was implemented in most villages. Yet, in one of the villages children did not receive pre-school education during the winter because of the aversion of villagers of leaving the house on cold winter mornings. On the contrary, pre-school education was given to all children while it is actually meant for children between 3 and 6 years of age. This way the younger children already started to learn a little bit what might be an advantage at older age.

Other services that could be improved were the health services at the AWCs. Of all health services immunization was the most performed service. At all four AWWs of our sample at least immunization against polio and TT immunization were provided. Vaccination seemed quite common among women and children, but could still improve a lot. Especially in Khera, where immunization seemed unusual, and in Bhootpura. Besides regular immunization at the AWCs polio immunization days were also organized at some of the AWCs. Polio immunization is usually done by the AWWs, who all pointed out to follow polio immunization training, with the help of an ANM or other trained people from the village.

One of the tasks of the ANM is to provide immunizations, but she should also conduct health check-ups for pregnant women and lactating mothers. Even though an ANM visited all four villages once a month, as prescribed by the ICDS program, the only service provided seemed to be immunization in three of our four sample villages. Only in Khera Firozpur the AWW explained that the ANM additionally does antenatal health

check-ups and provides IFA tablets. On the other hand the ANM was considered as incapable of attending health problems by the supervisor in Khera Firozpur. If in the other villages no health check-ups were provided and if the ANM did not dispense any medicines and contraceptives in the villages, as the respondents in Ramnagar indicated, this means a serious failing in the functioning of the AWC.

Growth monitoring seemed to be implemented in at least three of the four sample AWCs. The registration of children's growth is an important data source for the monitoring of the program. By evaluating the growth cards it is possible to check if the AWCs are obtaining the ICDS goal of reducing the prevalence of malnutrition among children. Therefore an accurate maintenance of growth cards can help improving the ICDS program. A minor problem in our study villages was the women's believe that the weighing of small children brings ill-fate upon them. Especially babies between 0 and 6 months of age were therefore not weighed.

A second striking matter was the participation of women and children in the Anganwadi program. When we compare the size of the population of children under-6 with the number of children visiting the AWC, at least in Khera Firozpur and in Ramnagar, it is clear that a minority of the eligible children attends the AWCs. Too much distance to the AWC, the presence of a primary school that children can attend from the age of three, a lacking registration of attending children, the bad quality of Panjiri, and the lacking distribution of Panjiri were all reasons brought forward by the interviewed mothers and AWWs for the non-attendance of children. The AWH collecting children from their homes in the morning seemed a good initiative because mothers tend to let their children stay at home otherwise. Not in all villages the children were being picked up from their homes.

Also the attendance of pregnant women and lactating mothers seemed rather poor in some villages. The housebound status of newly-wed women, time constraints, and lacking Anganwadi services were considered as reasons for this. What's more, we found that many women were hardly aware of the different services offered at the AWC, the benefits of these services, and some women were even not aware of the Anganwadi services at all. A reason for this lack of awareness and information could be the great amount of work the AWW is supposed to do which limits her capabilities of performing all of these duties sufficiently. Furthermore, a somewhat meager motivation and working attitude of the AWW might as well cause a low attendance level. It was for example disturbing to find an AWC where only three children were present, the AWW claimed to have the registers at home, the AWW being accused of selling the Panjiri and opening the AWC for maybe 15 days a month, and the respondents in the village telling malicious stories on the AWC. However, the seriousness of these matters could not be verified.

Besides occasionally insufficient provision and inadequate quality of Anganwadi services and insufficient awareness and participation of women and children in the Anganwadi program we found other issues that might concern the functioning of the AWC.

For one thing, although the AWWs and AWH in our sample were well educated, it was striking that none of them finished the complete pre-service training program and they hardly took any refresher training. For the functioning of the AWC this might be problematic because the skills of the AWW depend partly on these trainings.

Second, a good cooperation with the Panchayat can help facilitating more public awareness of the Anganwadi program but also play a role in monitoring the program and improve program quality. The current failing cooperation with the Panchayats in our sample is susceptible for much improvement.

In third place, most Anganwadi centers in our sample seemed to be quite successful in the cooperation with the Reproductive and Child Health scheme and the Polio Eradication scheme. Other schemes implemented through the Anganwadi program that were mentioned turned out to be not operational yet, i.e. the ASHA scheme in Khera Firozpur, or to reach short of the preset objectives, i.e. the Kishori Shakti Yojana program in Ramnagar. The mutual objectives between these schemes and the ICDS program, e.g. improving health status and nutritional status among ICDS beneficiaries, can create an advantageous situation for the beneficiaries.

Fourth, some AWCs were lacking the necessary resources sometimes, e.g. no resources were supplied by the government to provide a cooked meal for the children at the AWCs. Finally, the location and building in which the AWCs are located was not in all cases sufficient. While all sample AWCs are located in a *pucca* building, have a toilet and hand pump for water, not all AWCs are located inside the village. The distance to the AWC was sometimes considered as too much. Also, all AWWs and AWH complained about a lack of space.

## 7 Conclusions and recommendations

In this chapter the results of the study will be summarized and discussed. Ultimately, an answer to the research questions will be provided, and recommendations for future policy and further research will be made.

### 7.1 Summary and discussion of results

This study started with two main research questions. The first question ‘*Can the high prevalence of undernutrition among children under-3 in rural Uttar Pradesh partly be explained by the low coverage of the ICDS program in this region?*’ was brought down to several sub-questions which added up to a conclusion on this question. Based on these questions in the quantitative analysis of this study it can be concluded that we found no significant statistical evidence for ICDS coverage as a determinant for the prevalence of undernutrition among children under-3 in rural Uttar Pradesh. Although we found several determinants for the prevalence of undernutrition no evidence was found for a relationship between ICDS coverage and the prevalence of undernutrition.

The separate loglinear analyses indicated that the children who had suffered from diarrhoea, fever or cough in the two weeks prior to the survey are more likely to be underweight than children who were healthy in this period; children who did never receive any kind of immunization are at higher risk of being underweight; the higher the educational level of the mother, the lower the risk of being underweight for children; a higher household standard of living decreases the risk of being underweight for children; children who received breastfeeding for 12-35 months are at higher risk of being underweight than children who were breastfed up to 12 months; children who received plain water are more likely to be underweight than their counterparts who did not receive water; children older than 12 months are at higher risk of being underweight than children younger than 12 months; and SC/ST/OBC children are also more likely to be underweight than non-SC/ST/OBC children. What’s more, the different variables were checked for interaction effects, but no strong enough statistical significance was found for third order or higher interaction effects.

These results partly confirm what Das Gupta et al. (2005) conclude in their study on the ICDS program and also confirm some of the results from the study by Kielmann et al. (1983). Exposure to disease makes children more vulnerable to undernutrition and caste is also of effect on the nutritional status of children. Sex and religion were also assessed as determinants of undernutrition, but their effect on undernutrition was apparently not as significant or not significant at all even though girls and Muslim children are slightly more likely to be severely underweight. Thus, the conclusion by Kielmann et al. that sex is of influence on the nutritional status as well is not convincingly supported by our conclusions.

Furthermore we found a significant relationship between village population size and the presence of an AWC in the village. The smallest villages in Uttar Pradesh are the least likely to have an AWC. This can imply that children from the smaller villages are less likely to go to an AWC.

Although several determinants of undernutrition have been identified in our analysis, we must be cautious about these conclusions. It was not possible to put all the variables into one loglinear model and to be able to interpret the results of this model. By making several loglinear models not all of the variables have been taken together to check for interaction effects, thus we might have missed out on possible interaction effects. But, on the other hand the relationship of interest, between ICDS coverage and the prevalence of undernutrition, did not come forward from any of the loglinear models. It is therefore quite safe to conclude that there is no relationship between ICDS coverage and the prevalence of undernutrition among children under-3.

Furthermore there are most likely more determinants of the prevalence of child undernutrition than we have assessed in this study. It is however difficult to identify all of these determinants considering the limitations of our data and the scale of this study. Nevertheless we do believe that we have identified the most important determinants for the prevalence of child undernutrition in our data.

The second part of the research focused on the underlying factors that determine the functioning of the AWC. The research question for this qualitative analysis on the micro level was '*What underlying factors can be distinguished for the functioning of the Anganwadi centre?*'. By assessing the perceptions of both mothers of children under-6 as well as AWWs we came to several conclusions.

Two main findings came forward. First, the provision and quality of the Anganwadi services were rather poor. There were problems with the quality and the quantity of the supplementary nutrition, which was often considered as respectively too poor and too small by the respondents. But also the distribution was often failing with supplementary nutrition not being distributed according to the norms for age and nutritional status of the beneficiaries and being given to take home. The responses on education showed that the educational component of the Anganwadi program was not always sufficient. In some villages mothers did not receive health and nutrition education, whereas in other villages mothers did receive education. Pre-school education was given to all the AWC attending children in the villages instead of only the children aged 3-6 years. However, in one occasion children did not receive pre-school education during the winter. Providing immunization, especially against polio and TT, seemed to be widely implemented in our study villages, but still many respondents indicated not to have received immunizations for either themselves or their children. Also the health services that should be provided by the ANM, i.e. immunizations, health check-ups for pregnant women and lactating mothers, and dispensing medicines and contraceptives, were most often not provided by the ANM. Growth monitoring was mentioned to be carried out in three out of the four villages, but the weighing of children under-6 months seemed occasionally problematic due to certain cultural beliefs.

Second, there seemed to be a lack of awareness and participation on the Anganwadi program. Several reasons were mentioned by the respondents for not letting the children go to the AWC including an insurmountable distance to the AWC, the preference of letting the children aged 3-6 go to the primary school, the poor quality and distribution of

supplementary nutrition and a careless registration. Nonetheless children were usually being picked up by the AWH in the morning which appeared to be a good initiative. Anganwadi attendance by pregnant women and lactating mothers was regularly deficient because of the housebound status of newly-wed women, time constraints, and a disbelief in the Anganwadi services. Furthermore, many respondents were hardly aware of the services that are offered or should be offered at the AWC and the benefits of these services. The AWWs seemed to have a huge amount of work and besides this they did not always show a great motivation or working attitude for the job which could contribute to a limited flow of information towards the ICDS beneficiaries.

Other noticeable findings were the incompleteness of the AWW pre-service training, which none of the AWWs had completed, and the lack in refresher training. Furthermore the cooperation with the Panchayats seemed to be rather poor in the villages. The cooperation with other schemes as the Reproductive and Child Health scheme and the Polio Eradication scheme was however, according to the respondents, going well. Other initiatives in the field of health and nutrition were said to be implemented. We were also informed on the occasional lack of resources for the AWCs and the insufficient location and buildings of the AWCs.

Thus, the main conclusions from the in-depth interviews with the AWWs and the mothers of children under-6 are an erratic provision and quality of Anganwadi services and a lacking awareness and participation of Anganwadi beneficiaries on the Anganwadi program. This matches the findings by Kielmann et al. (1982) that the impact of nutritional intervention is highly dependable on community participation, but also the findings by Das Gupta et al. (2005) that low attendance levels cause disappointing results of the Anganwadi program. The lack of Anganwadi attendance by ICDS beneficiaries in our study villages might be of influence on the prevalence of child undernutrition in the study area. This observed lack of participation is besides backed up. When we compared the number of children under-6 in two of the villages, derived from the Census 2001 data, to the attendance registers of the AWCs we found that a minority of the eligible children attended the AWC.

In their study on the Narangwal Nutrition Project in India Kielmann et al. (1983) conclude that supplementary nutrition alone or in combination with health care can significantly improve growth of children. In our sample the health care component seemed to be insufficient. Also the supplementary nutrition was not very satisfying. This is also something that might explain the high prevalence of undernutrition in rural Uttar Pradesh assuming that our sample is representational for all rural Uttar Pradesh.

Furthermore we came across several findings that correspond to the findings of the study by Das Gupta et al. (2005). Inadequate training of AWWs, erratic provision of supplies, and the poor targeting of food supplementation. These are all possible contributing factors to a high prevalence of child undernutrition.

The results from the quantitative analysis and the qualitative analysis are corresponding. Because we found no significant relationship between ICDS coverage and the prevalence

of malnutrition, we may conclude that the ICDS program is not functioning properly in the places it is implemented in. The reasons for this are most likely to be found in the findings from the qualitative analysis: a poor provision and quality of Anganwadi services and a lack of awareness and participation of the Anganwadi program by the ICDS beneficiaries.

## **7.2 Recommendations**

Based on our conclusions the main recommendation is for the ICDS program to focus more on the quality of the program instead of the quantity. We did not find any significant evidence that the coverage of the program is contributing to a decline in the prevalence of child undernutrition in rural Uttar Pradesh. Furthermore we concluded that the service provision and service quality is lacking in our sample for the qualitative analysis, so the most obvious recommendation is to improve the quality of the ICDS program first instead of increasing the coverage. Of course it is also necessary to work on a better program coverage, but if the presence of an AWC in a village does not affect the prevalence of undernutrition in this village, it is of no use to increase the coverage first. Some essential improvements in the quality of the service provision can for example be made in the immunization of children and women, but also in the quality, quantity and distribution of supplementary nutrition.

Furthermore raising more awareness on the ICDS program and its benefits is another important recommendation. Once women are better informed on the ICDS program and they know what services they are entitled to and what the benefits are, it seems obvious that attendance levels would go up. Of course the quality of the services plays a major role in this as well.

Another thing is to find a solution for the huge workload of the AWWs. From our interviews it seemed that the AWWs had too much work to take care of. Maybe a more extensive training of the AWHs could facilitate a shift of some of the AWW's tasks to the AWH.

Finally, it must be stated that the scale of the qualitative analysis in this study is very limited. The conclusion only count for the small research area it covers. These conclusion can therefore be merely interpreted as an indication of how the situation concerning the ICDS program in rural Uttar Pradesh can be. They are not conclusions that depict the situation in entire rural Uttar Pradesh. Therefore it is recommended that more and more comprehensive research on this subject should be conducted in order to give a more complete image of the status of the ICDS program in rural Uttar Pradesh.

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# Appendix A

## Anganwadi worker question list

1. Background information of the respondent
  - Name?
  - Age?
  - Place of birth?
  - Religion?
  - Caste?
  - Marital status?
  - Children? Age children?
  - Type of family? Nuclear/joint? Other relatives?
  - Primary source of income for the family?
  - Other sources of income?
  - Education?
  - Education children?
  - Do/did children attend Anganwadi?
2. General information on Anganwadi centre
  - Since when is the Anganwadi centre operational?
  - Where is the Anganwadi centre located? Central place?
  - What kind of housing? Own building/rented/other?
  - Facilities available? Water/electricity/toilet/etc.
  - Special facilities? Vaccination/anthropometric measurement/educational/etc?
  - Accessibility of the centre? Easy to reach for the children?
  - Collaborations? Integrated Nutrition and Health Project II approach, Reproductive and Child Health program?
  - Does your Anganwadi centre organize NHD's?
  - Do you make use of 'change agents' to inform families? (change agents: volunteers assigned to visit families to provide health and nutrition information, promote positive health behaviors and encourage ICDS participation)
3. Information on working as Anganwadi worker
  - How long have you been working as an Anganwadi worker?
  - Did you receive any special training/education?
  - What does an average day of work look like for you?
  - Is that everyday the same?
  - What do you like about your job?
  - Are there things you dislike about your job?
  - Difficulties in the job?
4. Information on functioning of the Anganwadi centre
  - Financial funding available? Sufficient?
  - Provision of supplies? Vaccination, food, etc.
  - How many days a week is the centre opened?
  - Child attendance? In the past/present

- Mother attendance?
- Community participation?
- What kind of supplementary food is offered? (ready-to-eat snack, cooked meal or take-home food)
- Targeting of food supplementation? All children (age group, sex, caste, etc.)? More food for undernourished children?
- Growth monitoring?
- Auxiliary Nurse Midwife or Lady Health Worker working at Anganwadi centre?
- Preschool education?
- Health and nutrition education?
- What to improve?

### **Question list for mothers with young children attending the Anganwadi centre**

1. Background information of the respondent
  - Name?
  - Age?
  - Place of birth?
  - Religion?
  - Caste?
  - Marital status? Age marriage?
  - Children? Age children? Names?
  - Type of family? Nuclear/joint? Other relatives?
  - Primary source of income for the family?
  - Other sources of income?
  - Education?
  - Education husband?
  - Education children?
  - Do/did children attend Anganwadi?
2. Information on the mothers health and behaviour
  - Do you have any health problems? What were the problems? What did you do?
  - What is needed to stay healthy?
  - Did you have health problems during or after pregnancy (of the concerned child)?
  - Are you attending the Anganwadi centre? Why/why not?
3. Information on the development and health of their child(ren)
  - Are your children healthy?
  - How can you see this? What does a healthy child look like?
  - Is your child often sick?
  - Does your child grow normal?
  - Is there enough food to feed your children?
  - What does a child need to stay healthy?
  - Do you have all the means to keep your child(ren) healthy?

- Do you notice any changes/development in your child since going to the Anganwadi centre?
4. Information on their knowledge of the Anganwadi centre
- How often does your child attend the Anganwadi centre?
  - How far is it from your house to the Anganwadi centre?
  - Why are your children going to the Anganwadi centre?
  - What do you know about the ICDS program?
  - What should children receive at the Anganwadi centre? (Food, education, immunization)
  - Do you know what your child(ren) receive at the Anganwadi centre? (Food, education, immunization)
  - Do you know if all the children (regarding age group, sex, caste, etc.) receive the same?
  - What is the quality of the offered services of the Anganwadi centre like?
  - Are there things to improve about the Anganwadi centre?

**Question list for mothers with young children not attending the Anganwadi centre**

1. Background information of the respondent
- Name?
  - Age?
  - Place of birth?
  - Religion?
  - Caste?
  - Marital status? Age marriage?
  - Children? Age children? Names?
  - Type of family? Nuclear/joint? Other relatives?
  - Primary source of income for the family?
  - Other sources of income?
  - Education?
  - Education husband?
  - Education children?
  - Do/did children attend Anganwadi?
2. Information on the mothers health and behaviour
- Do you have any health problems? What were the problems? What did you do?
  - What is needed to stay healthy?
  - Did you have health problems during or after pregnancy (of the concerned child)?
  - Are you attending the Anganwadi centre? Why/why not?
3. Information on the development and health of their child(ren)
- Are your children healthy?
  - How can you see this? What does a healthy child look like?
  - Is your child often sick?
  - Does your child grow normal?
  - Is there enough food to feed your children?

- What does a child need to stay healthy?
- Do you have all the means to keep your child(ren) healthy?
- 4. Information on their knowledge of the Anganwadi centre?
  - Why is your child not going to the Anganwadi centre?
  - How far is it from your house to the Anganwadi centre?
  - What do you know about the ICDS program?
  - Do you know what services the Anganwadi centre offers?

### **CDPO Questionnaire**

1. ICDS general
  - What are the ICDS targets in Hathras district?
  - Are the targets reached?
  - Why/why not?
  - How is the program coverage in the district?
  - How is the distribution of the program? (i.e. equitable according to region, necessity, etc)
  - How is the attendance of the targeted population?
  - How is the community participation in the district?
  - Are there enough qualified Anganwadi workers?
  - Are the Anganwadi workers trained?
  - How is the monitoring and evaluation of the program in Hathras? (e.g. sufficient information from the Anganwadi centers, good administration at the Anganwadi centers, use of computer)
2. ICDS services
  - What services are offered at the Anganwadi centers? (same for every centre?)
  - How is the food supply to the Anganwadi centers?
  - Are any other activities outside the Anganwadi centre organized to promote health and nutrition? (e.g. antenatal checkups in all areas, national immunization days)
3. Program funding
  - How is the funding of the program in Hathras district?
4. Collaboration
  - Is there cooperation with other health programs? (e.g. Reproductive and Child Health program)