UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Social, economic, health and environmental determinants of child nutritional status in three Central Asian Republics

A Thesis submitted in partial fulfilment of the requirements of the Degree of Doctorate of Philosophy (DPhil) in Sociology with specialization in Demography

at the

University of Pretoria
Department of Sociology

by

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October 2007

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ABSTRACT

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This study highlights the importance of national factors in explaining the wide variations in child malnutrition that exists among population groups in the three Central Asian Republics under study, and as an avenue through which the investigation of the processes by which other factors influencing child malnutrition can be executed. This study has been guided by the proposition that the effects of socio-economic, health and the environmental factors vary by province of residence. The suggested theory underlying this proposition is the *structural violence theory,* which stems from the evidence of differences in malnutrition levels among provinces of residence within the three countries under study.

Against the background of this theory, the study explores and compares the effects, on child malnutrition of sixteen covariates of malnutrition within these countries. The study assessed, first, the nutritional status of children below 3 years using the three anthropometric indices, weight-for-age, height-for-age and weight-for-height. Secondly, it examined the confounding factors that influence nutritional status in the Central Asian Republics.

The DHS data for Kazakhstan, Kyrgyzstan and Uzbekistan were used. The data of the countries were combined in order to create a more usable dataset for multivariate analyses. This descriptive analysis was done on all relevant variables in order to get a better understanding of the dynamics involved in the data. A binary logistic regression analysis estimating models using the stepwise forward method (based on Wald statistics) on the pooled dataset was carried out controlling socio-economic, health and environmental characteristics. Separate analysis was carried out to study the odds of being underweight, and stunted

among children in the study population. Analyses for the odds of being wasted were not performed because the percentage of wasted children was too low.

The main results indicate that province of residence within a country, country of residence, number of people in a household, household wealth, birth weight, age of child, knowledge of ORT, maternal education, number of children under five years, and source of drinking water, are strong predictors of child nutritional status in the three Central Asian Republics. Furthermore, it has revealed that chronic malnutrition (stunting), which is long-term undernutrition, is most prevalent in all three countries but at varied levels.

An unexpected finding is that fully vaccinated children were highly likely to be malnourished compared to children who were partially vaccinated. Since stunting appears in early ages in Central Asian children many of the children in this study may be stunted before they receive all the recommended vaccinations. This could also be influenced by the poor nutritional status of the mother who cannot provide nutritious breast milk.

Another unexpected finding was that breast-feeding especially in children more than six months old had a strong negative association with stunting and underweight. Women who breastfeed longer may be doing so because they lack the resources and nutritional knowledge to provide their children with adequate nutrition. Another explanation for the observed adverse association of breastfeeding and nutritional status beyond infancy is that of reverse causality, where mothers continue to breastfeed children who appear small for their age.

In summary, the results from both the descriptive and binary logistic regression analysis are similar in terms of the explanatory variables and the statistical significance in the models. The study recommends more area-specific (province) policies for the development of nutritional intervention programmes including closer attention to childcare and mother care programmes.

ACKNOWLEDGEMENTS

I would like to thank and express my appreciation to several people who helped and guided me to bring this study to completion. I gratefully acknowledge Professor Louis van Tonder who served as my sole supervisor, and patiently and skilfully guided me through the labyrinth of thesis writing.

Very special thanks is due to Professor Janis Grobbelaar, Head of the Department of Sociology, University of Pretoria for her constructive and insightful comments, suggestions, ideas and willingness to assist me at all times. I am also indebted to her for her constant encouragement and generous support throughout my study. She has devoted many long hours to rigorous reviews of my drafts and has provided me with insightful reactions. Above all, her genuine and generous support has been a great source of encouragement and inspiration.

I must acknowledge the generous assistance of the Department of Statistics at the University of Pretoria. I want to specifically thank Ms Jacqui Sommerville for her steadfast commitment, support and help during the difficult data analysis days.

I want to thank my friends Dr Peter Ubomba-Jaswa and Dr Susanna Ubomba-Jaswa for their unwavering support and help, and for the needed push to keep going through the laborious process of thesis writing.

Finally, but not least, I am very grateful to my husband, Bommie, without his support, encouragement and love, I would not have been able to pursue doctoral studies, let alone complete this thesis. I am thankful for his patience. His advice

has helped me to persevere the excruciating task of combining family responsibilities, work commitments and graduate study. My husband and our children Tandile and Viwe have all my love for their patience and support. I am eternally grateful to my mother for being a superior role model throughout my life. Thank you MaDlomo! Special thanks go to Nontando my sister and Cwezile my brother for being there for me all the time, encouraging and offering me support throughout my career life.

DEDICATION

I dedicate this thesis to the late Professor Kobus Oosthuizen for introducing me to the field of Demography without whom I would not developed the love and interest that I have for the subject today.

ABBREVIATIONS AND NON-ENGLISH TERMS

ADB	Asian Development Bank
AED	Academy for Educational Development
ARI	Acute Respiratory Infection
BMI	Body mass Index
CA	Central Asia
CARs	Central Asian Republics
CDC	Centres for Disease Control
CIS	Commonwealth of Independent States
DHS	Demographic and Health Surveys
EUI	European University Institute
FANTA	Food and Nutrition Technical Assistance
FAO	Food and Agriculture Organization
FSU	Former Soviet Union
GDP	Gross Domestic Product
GNP	Gross National Product
GOSKOMSTAT	State Committee on Statistics
HAZ	Height-for-Age Z-score
HDI	Human Development Index
HIV	Human Immunodeficiency Virus
HTA	Height-for-Age
IMF	International Monetary Fund
IMR	Infant Mortality Rate
IUGR	Intra Uterine Growth Retardation
KADHS	Kazakhstan Demographic and Health Survey
KHDHS	Kyrgyzstan Demographic and Health Survey
LDCs	Less Developed Countries
LSMS	Living Standards Measurement Survey
NCHS	National Centre for Health Statistics
ORT	Oral Rehydration Therapy

Oblast	Province
PSU	Primary Sampling Unit
Raion	District
SES	Socio-Economic Status
SOE	State Owned Enterprise
SU	Soviet Union
TFR	Total fertility Rate
UN	United Nations
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNICEF	United Nations Children's Fund
USA	United States of America
USAID	United States Agency for International Development
USSR	Union of Soviet Socialist Republics
UZDHS	Uzbekistan Demographic and Health Survey
WAZ	Weight-for-Age Z-score
WFS	World Food Summit
WHO	World Health organization
WHT	Weight-for-Height
WHZ	Weight-for-Height Z-score
WTA	Weight-for-Age

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El'tsin Resignation Statement

"I want to ask you for forgiveness, because many of our dreams have not been realised, because what we thought would be easy turned out to be painfully difficult. I ask for forgiveness for not fulfilling some hopes of those people who believed that we would be able to jump from the grey, stagnating, totalitarian past into a bright, rich and civilised future in one go. I myself believed in this. It seemed that with one spurt we would overcome everything. It could not be done in one swoop. In some aspects I have been too naïve. Some of the problems were too complex. We struggled on through mistakes and failures. In this complicated time many people experienced shocks" (B.N. El'tsin, Russian President, 1991-1999, resignation statement, 31 December 1999). Ellman M. (2000). The Russian Economy Under El'tsin. Europe-Asia Studies (52):1417-1432.

CHAPTER 1

1. INTRODUCTION: PERSPECTIVES ON CHILD MALNUTRITION

1.1 BACKGROUND AND RESEARCH OBJECTIVES

This study is aimed at providing some answers or, at best helpful clues, as to why wide variations in the levels of malnutrition[1] exist among children under the age of five years in Central Asia (see Appendix 3). This type of investigation becomes even more important if we recall that, just before the breakup of the Former Soviet Union (FSU), child undernutrition levels reported in the Soviet Union were found to be lower than those in many developing countries at the time (United Nations, 1992).

Statistics on the prevalence of protein energy malnutrition in developing countries indicate that, on average, stunting (low height-for-age), underweight (low weight-for-age) and wasting (low weight-for-height) affect about 30, 27 and 8 percent of the child population respectively (UNICEF, 2004:113). These figures provide important evidence of a global nutrition problem that must be vigorously addressed. However, these figures mask the marked variations in the proportions of stunted, underweight and wasted children under the age of five that exist from country to country by province of residence and by rural or urban residence.

For example, a recent comparative analysis of Demographic and Health Survey (DHS) data from 20 countries in the developing world and in provinces within these countries indicate that there are large cross-country and intra-country variations in malnutrition levels. This led to calls for the focus to be shifted to reducing levels of malnutrition at provincial level rather than on targeting the improvement of population averages (Wagstaff & Watanabe, 2002:1). More than 30 percent of malnourished children live in Asia, approximately 40 percent in sub-Saharan Africa, and about 20 percent in Latin

[1] The term 'malnutrition' refers to the consequences of a combination of an inadequate intake of protein energy, micronutrients, undernutrition, overnutrition and frequent infections.

America and the Caribbean. About 6 million of the 12 million under-five child deaths per year in developing countries are linked to malnutrition. Furthermore, about 83 percent of these deaths are linked not to severe malnutrition, but to mild and moderate forms of malnutrition (UNICEF/WHO, 2004:17). Even when malnutrition is not in itself life threatening it may reduce immunity to disease and hinder growth, brain development and the child's capacity to learn, thereby hampering their ability to acquire skills that are crucial for survival.

The nutritional status of children under the age of five is one of the most important indicators of not only the living standard of households, but also of child survival (Som et al., 2006:626). According to the United Nations Children's Fund (UNICEF) adequate nutritional deprivation is one of the seven areas of deprivation that affect children from developing countries – the others being deprivation of safe drinking water, decent sanitation facilities, health, shelter, education and information (UNICEF/WHO, 2004:20). Malnutrition may arise from a number of factors, such as low birth weight; duration of breastfeeding; poor breastfeeding patterns and supplementation; infection; lack of ready access to a safe water supply and proper sanitation; childcare practices (notably problems encountered with caregivers and working mothers); household food security; household cost of living; allocation and distribution of household income, and access to and utilisation of health services.

According to the UNICEF conceptual framework on the determinants of child malnutrition and health, the immediate determinants of a child's nutritional status are the inadequate food intake and high morbidity within the social and economic context of poverty. These factors are, in turn, influenced by three underlying household-level determinants: food security, adequate care for mothers and children, and a proper health environment. Finally, these underlying determinants are influenced by the following basic determinants – the potential resources available to a country or community, and a host of political, cultural and social factors that affect their utilisation (UNICEF/WHO, 1998).

In the year 2005, it was globally estimated that more than 165 million children under the age of 5 were stunted, 138 million underweight, and 51 million wasted. In those economies in transition, including the Central Asian Republics (CARs), the collapse of economic institutions has reduced output over the past few years, thus negatively affecting child nutritional status in these countries (UNICEF/WHO, 2002).

Perceptions of the child malnutrition problem have changed significantly in recent years. From being regarded as a problem resulting from a lack of protein, then of calories, it is now seen to be caused as much by frequent infection and poor feeding practices as by a shortage of food itself. In particular, it is the link between infection and malnutrition that pulls many children into the downward spiral of poor growth and early death (UNICEF/WHO, 1998).

While widespread moderate malnutrition may not be obvious unless children are weighed and measured, certain severely malnourished children develop clinical signs that are easily observable, such as wasting and stunting. Child malnutrition is also synonymous with growth failure. Malnourished children are lighter and shorter than they should be for their age. An understanding of the complex and subtle causes of malnutrition is important in order to appreciate and develop ways and means of dealing with the scale and depth of the problem. Multiple and interrelated determinants are involved in the reasons for malnutrition, and a similarly intricate series of multifaceted and multisectoral approaches are needed to deal with the problem (UNICEF/WHO, 1998).

Worldwide major surveys on malnutrition such as the DHS use indicators that are comparable across countries and through time, for example, birth order, birth interval, education of the mother, place of residence, age of the mother, and so on. Thus, a great deal is known about the effect of these indicators on child nutritional status in most of the developing countries. However, the different situation exists in the CARs. The first DHS in this region was conducted in 1995 in Kazakhstan, followed by one conducted in Uzbekistan in 1996, Kyrgyzstan in 1997 and again in Kazakhstan in 1999. Therefore,

information about the effect of the above-mentioned variables on child nutritional status in these regions is relatively new. This renders it difficult to compare information that could shed more light on the causal factors. What is clear, however, is that child malnutrition is on the increase, although still at a relatively low level compared to many developing countries (UNICEF/WHO, 2004:113). This is in sharp contrast to the situation before independence when poverty was masked by a functioning and heavily subsidised public assistance system. This system ensured a well-nourished population of children under the age of five in these countries.

During Soviet rule, the nutritional status of children in the CARs was of a higher standard than it is at present. There existed a particularly supportive environment for children and women. Children were highly valued. There was also a comprehensive family support system for the provision of pre- and after- school care. The pro-natalist regime of the time encouraged families to have as many children as they desired. Family allowances given to these families masked the poverty faced by many in the poorer Central Asian Republics (Bauer et al., 1998:12; Falkingham, 2000).

The collapse of the Soviet Union brought about drastic changes in the lives of the people in this region. The state-owned support and social protection systems disappeared, causing a depression, which resulted in a sharp rise in the incidence of poverty, unemployment and inflation. Children have withstood the worst of a major share of the cost of transition from a central planning system to market-related economies. The decline and subsequent disappearance of the social assistance system has exacerbated poverty among the already poorer families. The impact of the transition has resulted in worsening health indicators, especially in the case of children, and in a higher incidence of child malnutrition (Bauer et al., 1998:2; Falkingham, 2000).

A number of factors are responsible for the decline in the nutritional status of children in the CARs – for example, poverty, unemployment, decline in family income, and closure of milk kitchens. Ironically, the latter has had a positive spin off because the incidence of breastfeeding has increased (Bauer et al.,

1998:84). Malnutrition levels are twice the levels before independence. In a study conducted by the World Bank in 1996 it was found that there was a 60 percent increase in wasting among preschoolers in Kyrgyzstan compared to the pre-independence figures. In Kazakhstan, similar estimates were made in a study conducted by the Ministry of Health. Acute malnutrition in the 0-1 age group increased from 7.3 percent in 1993 to more than double (16.7%) in 1996. The growing problems of malnutrition, increasing poverty, poor living conditions, difficult economic conditions, and lack of water and heating are directly related to more than half the infant deaths in Kazakhstan (Bauer et al., 1998:86; Falkingham, 2000). Food consumption, especially by women and children, has decreased radically since 1990 (Goskomstat, 1995).

The problem of child malnutrition is especially severe in rural and remote areas. Farm animals are being slaughtered due to the economic distress experienced on farms, the rural transport system is rapidly deteriorating, and government stores are closing or have closed down in the remote areas. As a result of the abovementioned problems, infectious and preventable diseases have reappeared, especially among children, and maternal mortality rates have increased (Bauer et al., 1998:86; Falkingham, 2000).

Iron deficiency anaemia, which is an indicator of nutritional problems, has become prevalent. According to the most recent DHS data from Central Asia anaemia is a common problem across the region. Uzbekistan has the highest incidence (36%) of children under the age of three years suffering from mild to moderate anaemia, followed by Kyrgyzstan with 24 percent and finally Kazakhstan with 17 percent. The high levels of anaemia found in Uzbekistan were found in children living around the Aral Sea region, and are due to severe environmental problems, which include agrochemical pollution, shortage of food (especially fruits, vegetables and meats which contain iron that is needed by the body to prevent anaemia) and water, and many other socio-economic problems. Children from the rural areas of the Central Asian Republics had a higher incidence of anaemia than children from the urban areas (Sharmanov, 1998).

1.2 AIMS AND OBJECTIVES OF THE STUDY

The goal of this research is to help close the gap in knowledge regarding factors that affect child nutritional status in three Central Asian Republics. Appendixes 4, 5 and 6 present the regional maps of these three countries. This study will examine the relationship between malnutrition among children under the age of 36 months and their environment. Only children under three years of age will be included in the study because Uzbekistan and Kyrgyzstan interviewed only mothers whose children were below three years of age. Kazakhstan interviewed mothers whose children were below five years of age. Secondary to this a causal analysis of the current situation will be conducted in order to provide insights into specific factors in Kazakhstan, Kyrgyzstan and Uzbekistan. The main question that this study proposes to engage is the way in which social, economic, health and environmental factors affect child nutritional status in Central Asia. The second question addresses the way in which institutional factors, including government policies, negatively influence child nutritional status. It is expected that the results will contribute to our understanding of the intermediate factors responsible for child malnutrition in Central Asia.

1.3 RESEARCH QUESTIONS

The study is designed to examine variations in childhood malnutrition that exist within countries and communities, and to investigate the ways in which socio-economic status, health and environmental factors affect child nutritional status regardless of the children's individual characteristics. More specifically the motivation is to attempt to answer the following questions:

- What is the variation regarding the prevalence of stunting, underweight and wasting between the three Central Asian countries, and within these three countries?
- Which factors best explain differences in stunting, underweight and wasting among the three nations?
- What role does the economic development of a country play in the modification of the child malnutrition status?
- What role do structural factors play in the child nutritional status?

1.4 RATIONALE FOR THE STUDY

The CARs comprise a relatively new United Nations region – a region which is approximately fifteen years old. Until 1991 the five countries comprising this region were under Soviet rule. Under Soviet rule data collection and dissemination was in accordance with the requirements of the government. Any data collected was disseminated only with government approval. Under these conditions very few large-scale survey studies were conducted without a directive from government, and very few of these studies were published for public consumption. Studies were published either in Russian or one of the other major languages; this meant that non-Russian speaking researchers were unable to read them and could therefore not be in position to understand the population dynamics in the FSU (Olcott, 1996).

With the breakup of the Soviet Union individuals and research institutions began conducting research, and this research has been able to reach the public domain. The literature that became available indicated huge gaps in the type of data that was collected. As a result of the increase in adult mortality that was crippling the former republics and the independent states of the former Soviet Union, a number of researchers concentrated on mortality, especially adult mortality. A number of factors contributed to the increase in especially male adult morality. The increase in unemployment led to high poverty levels which in turn led to high alcohol consumption and high morbidity from alcohol related disease. Suicide levels also increased probably related to high unemployment and resultant despondency, because the men could not fulfil their traditional obligations of looking after their families (Anderson & Romani, 2001:8). Almost no literature written in English on child malnutrition at national level after 1991 in the CARs is available, except for those reports produced through the DHS beginning in 1995 in Kazakhstan.

The few child nutrition related studies that have been published in Central Asia since the break-up of the Soviet Union have shown that there has been a considerable increase in the extent of malnutrition in the form of impaired child growth, anaemia, morbidity and deficiencies of specific micronutrients. None of these studies have attempted to determine the causes, nor has there been

a study conducted to discover why child malnutrition is higher in the CARs when all the former republics of the FSU were governed through a central planning system under Soviet rule. In Uzbekistan in 1996, for instance, 31% of the children under the age of 36 months are stunted (UZDHS. 19996). Such knowledge is critical in the Central Asian context because of, inter alia, the general deterioration of economic and social welfare, increasing inequalities in society generally, the growth of poverty, increasing unemployment, especially among women, and low rates of remuneration (Anderson & Romani, 2001).

It is within these dynamics that the researcher decided to embark on a further analysis of data collected on child nutrition in this region, in order to probe the causes of child malnutrition, and whether there are similarities and differences between developing countries and these republics. Another aspect warranting a comparative study of the three countries chosen is the fact that nearly all studies on child nutrition using anthropometric information have used single country data, mostly from Latin America, the Caribbean Islands, and a few from Asia and Africa. While these individual country studies are undoubtedly of great value they nevertheless raise the question of the universal validity of empirical relationships that are observed within a single country context.

Cultural and racial/ethnic differences between and within countries are unlikely to allow for wild generalisations. This prompts the need to conduct a comparative study on child nutrition, and socio-economic, health and environmental factors using cross-country data. This is the principal motivation for this study. In addition, fresh evidence on new data sets will be provided bringing out similarities and dissimilarities between countries and within countries with respect to the nature of the impact of different variables on child nutrition individually, and on pooled data combining the three data sets. This study will also take into account the extent of malnutrition and the inequality in nutrition among malnourished children of these countries.
The choice of these specific three countries, apart from their regional proximity, was dictated by the following factors:

- Wide coverage and diversity in terms of development and culture, the three countries also contain comparable information on child malnutrition and its determinants.
- Data for the DHS is available for only three of the five countries in this region.

1.5 MEASURING GROWTH ATTAINMENT

The evaluation of growth attainment requires the use of a reference standard which allows for normal variations at any age. It is based on the rationale that, in a well-nourished population, there is a statistically predictable distribution of children of a given age with respect to height and weight. The World Health Organization / National Centre for Health Statistics / Centres for Disease Control (WHO/NCHS/CDC) reference data are widely recommended for this purpose, as well as for the purpose of evaluating the effect of nutritional programmes. The distribution of children in such a well-nourished population may be used as a reference for assessing the nutritional status within other populations (Waterlow et al., 1977).

The WHO/NCHS/CDC data was compiled from two samples of well-nourished American children during the 1970s. In a healthy, well-nourished population of children it is expected that 2.3 percent of the children will have two standard deviations (-2SD) lower than the median of the reference population on these nutritional indices, and this indicates severe undernutrition About 13.6 percent of the children are expected to fall between –1.00 and –1.99 standard deviations, indicating a mild or moderate undernutrition, while 68.2 percent are expected to fall between –0.99 and +0.99 standard deviations, indicating normal nutritional status. On the other side of the cut-off point 2.3 percent of the children are expected to have standard deviations of two and more, indicating severe obesity, and the remaining 13.6 percent to have standard deviations between +1.00 and 1.99, indicating mild to moderate obesity (Waterlow et al., 1977; Pelletier, 1991).

Several questions pertaining to the collection, analysis and use of this data as a tool for measuring child nutritional status have been raised. One of these

questions involves the reference data itself – data which is based on the growth of American children. Should children in diverse populations be expected to show the same patterns of growth as American children? Would children with different genetic make-ups grow to be the same size as American children if they were raised in the same environmental circumstances? Several studies comparing the growth of affluent children belonging to different ethnic groups indicate no major differences in their growth patterns. It is these studies that have justified the use of one set of international reference data for growth comparisons worldwide (Martorell & Habicht, 1986). There are a number of other internationally recognised reference standards, such as the Harvard data, which were collected before the WHO/NCHS/CDC. Certain countries have also developed their own standards.

A detailed account of the historical background of the currently used NCHS/WHO growth charts, together with a discussion on some of the contemporary scientific issues, may be found elsewhere (Onis de & Yip, 1996; WHO, 1986).

1.6 ANTHROPOMETRY

Cross-sectional anthropometry (body dimensions and composition) is often used as a proxy for assessing the eventual extent and severity of child malnutrition, since this cross-sectional anthropometry reflects the combined effects of past and recent diet, morbidity and childcare. Anthropometric indices are used as the main criteria for assessing the adequacy of diet and growth in infancy. The classical indicators in this respect have to do with the growth of children and the body composition of adults. The most commonly used measurements are the body weight, height, age and gender of each individual, and this allows us to calculate weight-for-age (WAZ), weight-for-height (WHZ) and height-for-age (HAZ). Children whose Z-score[2] are –2SDs below the median of the reference population are considered to be stunted,

[2] A Z-score is the number of standard deviation units by which a child's measurement deviates from the median of the reference population for the child's age.

underweight or wasted. A Z-score of between –3SDs and –2SDs indicates moderate levels of undernutrition while a Z-score of below –3SDs indicates severe levels of undernutrition (Radhakrishna & Ravi, 2004). The criterion is different for WAZ, HAZ and WHZ. For example, if the prevalence of malnutrition is less than 20 percent for HAZ, less than 10 percent for WAZ and less than 5 percent for WHZ, the population is considered to have a low prevalence (Som et al., 2006:627).

1.6.1 Weight-for-age (WAZ)

Weight-for-age (WAZ) is influenced by both the height of the child (height-for-age) and the child's weight (weight-for-height). In addition, low weight-for-age or underweight is associated with both chronic and acute malnutrition, or with infection. The composite nature of this measure renders interpretation complex. For example, weight-for-age fails to distinguish between short children of adequate body weight and tall, thin children. However, in the absence of significantly low weight-for-height, similar information may be provided by weight-for-age and height-for-age, as both reflect the long-term health and nutritional experience of the individual or population. In general terms, the worldwide variations and age distribution of low WAZ are similar to those of low height-for-age (UNICEF/WHO, 2002:170). The worldwide variation of the prevalence of low WAZ is considerable – ranging from 6 to 46 percent in poorer countries (WHO, 1986; UNICEF/WHO, 2004:113).

1.6.2 Weight-for-height (WHZ)

Weight-for-height (WHZ), which reflects body weight relative to height, is a more robust indicator, particularly for cross-sectional data, since it allows for low height-for-age. It is important to note that weight-for-height cannot be substituted for height-for-age or weight-for-age since each index reflects a different combination of biological processes. In most cases low WHZ, or wasting, indicates a recent severe weight loss, which is often associated with acute starvation and/or severe disease. However, low weight-for-height may also be the result of a chronic unfavourable condition. Provided there is no severe food shortage, prevalence of low weight-for-height is usually below 10 percent, even in poor countries (UNICEF/WHO, 2004:113). Even so, lack of

evidence of low weight-for-height in a population does not imply the absence of current nutritional problems, as low height-for-age and other deficits may be present (UNICEF/WHO, 2002:165).

1.6.3 Height-for-age (HAZ)

Low height-for-age (HAZ) or stunting generally indicates long-term past malnutrition. Height deficiencies are usually related to intermittent or continuous inadequate nutritional intake and frequent infection, especially during the first two years of life (Graitcer & Gentry, 1981:292). High levels of low height-for-age are usually associated with poor socio-economic conditions and exposure to adverse factors, such as illness and/or inappropriate feeding practices. Similarly, a decrease in the national low height-for-age indicates improvements in the overall socio-economic conditions of a country (UNICEF/WHO, 2002:164). The worldwide variation of the prevalence of low HAZ is considerable – ranging from 16 to 44 percent in poorer countries (UNICEF/WHO, 2004:113).

1.7 ORGANISATION OF THE THESIS

Chapter 2 provides a general background of the three countries and focuses on their socio-historical and socio-political backgrounds, the peoples of Central Asia, and the geography and climatic conditions. Chapter 3 briefly examines the demographic transition for the region. Chapter 4 describes the conceptual and theoretical framework for analysing child nutritional status. Chapter 5 provides a discussion of the conceptual and theoretical tools used in analysing child nutritional status. In Chapter 6 a brief description of the data used in this study is presented. Chapter 7 discusses the effects of the social, economic, health and environmental factors encountered in the empirical analysis. The results of logistic regression analyses are reported using the binary logistic regression form. Finally, in Chapter 8, a summary of the key findings, the conclusion and policy implications will be presented.

CHAPTER 2

2. GENERAL BACKGROUND NOTES: KAZAKHSTAN, KYRGYZSTAN AND UZBEKISTAN

2.1. INTRODUCTION

This study examines three of the five Central Asian Republics. However, a general introduction to the rest of the region covering its socio-historical, political and economic background will be sketched so as to situate and contextualise the research. The geographical and climatic characteristics will also be summarised.

It is important to draw the attention of the reader to the fact that Central Asia does not constitute a homogeneous entity – it is dissimilar and diverse in many ways. Consequently it is not possible to approach the region in a simplistic, integrated way.

Central Asia (CA) consists of five countries, which form part of the Commonwealth of Independent States (CIS).[3] These five countries are Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. Central Asia forms part of this community of independent states, which regard themselves as the successor of the Union of Soviet Socialist Republics (USSR) with respect to certain aspects of international law and international affairs. These countries became independent states for the first time in history after the dissolution of the FSU in December 1991 (Olcott, 1996:3). They are situated east of the Caspian Sea and have common borders with Russia to the north and to the west, China to the east, and Afghanistan, Pakistan and Iran to the south. By 1 January 2005 they had a total population of more than 59.9 million, an increase of 5 million on the 1999 figure (United Nations, 2005a).

[3]The CIS is a loose association of eleven former Soviet Union republics, and includes the five Central Asian Republics.

The FSU consisted of Russia and fourteen national states, and was known as the USSR. These republics represented fifteen separate nationalities – each with unique socio-historical and ethnic characteristics. Together they formed the third most populous country in the world; the first and second most populous at the time were China and India respectively (Haub, 1994:3; Kort, 2004:66).

Although these countries were ill-prepared for independence, when it came all Central Asian leaders accepted independence as something that could be to their benefit. However, none of the leaders understood that the dissolution of the Soviet Union also meant the end of old economic ties. Since 1992 drastic changes have occurred and the political, social and economic situation became anarchic. These changes have had a seriously negative impact on the welfare of the populations of this region. The dissolution of the FSU radically reconstituted the demography of the republics, and this in turn effected economic collapse, and political and social turmoil (Olcott, 1996:5; Islamov, 1999).

For example, the disturbance of the socio-political equilibrium among ethnic groups produced new emigration patterns and, in particular, mass emigration of Russian-speaking populations out of Central Asia. The forced immigration of migrants from neighbouring states due to civil and economic unrest has been, and still is, one of the most urgent concerns for the new states. The collapse of the Soviet Union also brought about an increase in poverty, unemployment, child illness, malnutrition, and mortality in general (the biggest increase has been found to be among middle-aged men) presumably due to increased physical and mental stress, and deteriorating socio-economic, health and environmental circumstances (Olcott, 1996:4; Islamov, 1999; Anderson & Romani, 2001).

2.2 RUSSIAN CONQUEST OF CENTRAL ASIA

To sum up Central Asia's experience of Imperialist Russian and Soviet rule is a complicated task. However, the end of Soviet supremacy has allowed us to conceptualise that experience as pure history and not as an ongoing process.

As Western European countries in centuries past sailed the world conquering territories and establishing colonies, so too did the Russians conquer territories and establish colonies; but rather than sail, they marched. Contact between the people of Russia and the peoples of Central Asia dates back more than a thousand years. The Russian Empire expanded into Asia in three stages. In the first stage, beginning in the 1550s, they crossed the Ural Mountains, conquered certain Muslim principalities, and continued east through Siberia all the way to the Pacific Ocean. Although they traversed immense distances, they encountered only sparse populations of underdeveloped peoples, and reached the Pacific in 1638 without serious opposition (Bacon, 1980; Pipes, 1983; Becker, 1994: 21-26; Ferdinand, 1994:10; Kort, 2004:34).

The second wave took place about 150 years later and lasted from 1711 until 1855. During this period the Russians conquered the Caucasus region between the Black and the Caspian Seas, and also present-day Kazakhstan. Although both these areas had larger and more developed populations than Siberia, they too included few well-developed centres of power. By the end of the 18th century the Russians controlled most of the Kazakh steppe. They maintained that control despite a series of revolts during the first three decades of the 19th century (Bacon, 1980; Pipes, 1983; Becker, 1994: 21-26; Ferdinand, 1994:10; Kort, 2004:34).

The third and final wave progressed more rapidly. Between 1864 and 1884 the Russians took control of the important cities of Central Asia, all of which, surprisingly, fell almost without a struggle. Quite suddenly the Russians found themselves wielding power over some five million subjects of varying origins (Bacon, 1980; Pipes, 1983; Becker, 1994: 21-26; Ferdinand, 1994:10; Kort, 2004:34).

By the end of the 19th century, the Russians were eyeing the southern part of Central Asia. There were profitable trade opportunities with the states in the south and, more importantly, by the middle of this century the Russians wanted land on which they would be able to grow cotton in order to supply the

country's growing textile industry. The American Civil War had cut off vital cotton supplies from the United States of America (USA). The stage had thus been set for a vigorous new campaign to complete the occupation of Central Asia. Russians were also concerned about their fellow compatriots, mainly settlers on the steppe, who had been captured by Turkic tribes and sold into slavery (Bacon, 1980; Ferdinand, 1994:10).

While this situation may have been little more than an excuse for expansion, it nevertheless struck at national pride and inspired public anger. Muslims, who many Russians considered to be 'heathens', were enslaving Russians, who were Orthodox Christians. Arguably, both sides felt the conflict between religions was secondary to the struggle for power and control. The Muslims of Central Asia looked down on the Christians intruding on their land from the west and, at various times, called for a jihad or holy war against Russian 'infidels'. For a millennium they had actively participated in Islamic civilisation, producing many of its great dynasties, scholars, great buildings in the Islamic world, and cultural achievements. Islam not only brought a new belief system, but also a new social order and a new epistemology. Whilst most of the population spoke Turkic, some spoke the Iranian languages, and Iran was a predominant political, cultural and economic force in the region. In important ways Central Asia was virtually a part of Iran. Accordingly, the population was heavily oriented toward the Muslim areas in the south and east, and had had only fleeting and antagonistic contacts with a distant, but expanding, Russia (Bacon, 1980; Pipes, 1983; Ferdinand, 1994:6-7; Kort, 2004: 36).

There were few obstacles in the way of a determined Russian colonising drive. The three states (Kokand, Bukhara and Khiva) that controlled most of southern Central Asia were in poor shape. They were socially, politically, technologically and economically underdeveloped societies. Most of the land was controlled by the state, by powerful property owners, or by Muslim religious institutions, and was farmed by poor peasants. The three states, under their absolute rulers, were constantly engaged in tortuous territorial disputes. The Russian campaign lasted about a decade and, in effect, rendered Central Asia a Russian colony. The Russian Land Empire closely

resembled the contemporary sea empires put together by the British, French, Dutch, Spanish, Portuguese, Italians, Germans, and Belgians (Bacon, 1980; Pipes, 1983; Ferdinand, 1994:9; Kort, 2004:37-38).

Like other colonial masters the Tsarist government believed in the overwhelming superiority of its own culture. Russians insisted on using their own language, despised local customs, especially Islam, and held attitudes characteristic of all European colonial powers in the Third World. The Russian settlement in Central Asia resembled that of the French in Algeria, the British in the former Rhodesia, and the Portuguese in Angola. The only difference was that, unabashedly imperialistic in their expansion, they used far harsher and more brutal methods than any other European colonial power (Bacon, 1980; Pipes, 1983; Ferdinand, 1994:9; Kort, 2004:37-38).

The Russians divided Central Asia into two main parts. The old name, Turkistan,[4] was revived to designate the southern half of the region and included present-day Turkmenistan, Uzbekistan, Kyrgyzstan, Tajikistan and parts of Kazakhstan. The northern half, which constitutes most of present day Kazakhstan, was governed separately. Both regions were divided into several administrative units. The Tsarist government also used its colonies for strategic and economic benefit, much as the other European powers did. Central Asia served the Russians in blocking a British advance from India. The imperialist government built two new railroads connecting Central Asia to Russia, encouraged the planting of cash crops such as cotton, and turned Central Asia into a captive market for Russian industrial products by imposing high tariffs on foreign goods. Russians settled in Central Asia not only in towns but also on farms, especially in order to grow grain on the Kazakh plain. Old irrigation systems were repaired and new ones were built to provide for the expanded cotton fields. As a result, cotton production in the last two decades of the 19th century increased eightfold. Russian settlers in Central Asia profited from the growing cotton trade. In Moscow and other European

[4] Turkistan 'land of the Turks' named after Turkic incursions into the region and the dominance of Turkic languages.

cities Russians made money manufacturing cotton textiles (Bacon, 1980; Pipes, 1983; Kort, 2004:40).

The Central Asians themselves, however, paid dearly. They lost the ability to grow food locally. This, as will be argued in Chapters 4 and 5, would have an adverse effect on the people in these countries long after they had attained their independence. Fields that had once produced grains, fruits and vegetables were converted to growing cotton, thus forcing Central Asians to import much of the food they ate. It has been suggested, however, that there were a few positive aspects to Russian rule in Central Asia. The region apparently enjoyed greater peace and security than before, as the old economic and ethnic conflicts were kept under control (Bacon, 1980; Pipes, 1983; Kort, 2004:40).

2.2.1 Opposition to Russian rule

Between the mid-1880s and the turn of the century there were a number of revolts against Russian rule in various parts of colonised Central Asia. All were put down quickly and brutally. The outbreaks led the Russians to pay very close attention to potentially 'dangerous' ways of thinking, especially those with appeal across ethnic lines. There were two varieties of these dangerous ways of thinking – either from traditional Islamic teachings or from more modern ideologies based on pan-Turkic ideas. The revolt in the Russian territories and homeland in 1905 raised the prospect of democratic reforms among Central Asians, and even the possibility that Russian rule might be overthrown. The defeat of the revolutionary forces dashed these hopes in Central Asia, even though there were important, if limited, political reforms within Russia (Bacon, 1980; Pipes, 1983; Ferdinand, 1994:10; Kort, 2004).

The outbreak of World War I in 1914 brought more hardships to every part of the Russian empire, including Central Asia. Once the war began new taxes that weighed heavily on an overwhelmingly poor population intensified discontent. By mid-1916, Central Asian men who had not initially been drafted to fight in the war were called up by decree. The decree was a disaster. Central Asians were conscripted into a war in which they clearly had no stake.

Furthermore, Russians informed them that they, who took pride in their martial traditions and skills, were not fit to fight, but suited only for digging trenches and performing similar non-military tasks. The decree sparked an uprising in Kazakhstan that quickly spread across Central Asia. Russian troops were called in to suppress the rebellion, which, with great brutality and at the cost of many lives, they did by the end of that year (Bacon, 1980; Pipes, 1983; Kort, 2004:42).

The suppression of the rebellion of 1916 proved to be the last act of oppression Central Asians would suffer at the hands of the Russian Empire. In March 1917, the hardship caused by World War I sparked another upheaval, this one in St. Petersburg (then known as Petrograd), the Russian capital at the time. The Tsarist government collapsed, and a Provisional Government, committed to democracy, came to power. Eight months later the Bolsheviks came to power under Vladimir Lenin's leadership. This seizure of power by a militant minority determined to remake Russia totally ultimately ushered in an era of repression and hardship, noble goals notwithstanding. This was the prelude to a period of fundamental social transformation in this region (Bacon, 1980; Pipes, 1983; Ferdinand, 1994:10; Kort, 2004: 42).

2.3 THE BOLSHEVIKS

The goal of the Bolsheviks was to overhaul Russia completely and to turn it into the world's first socialist society. The Bolshevik coup quickly plunged Russia into a dreadful civil war that lasted until the end of 1920. On coming to power, the Bolsheviks promised a new era and spoke of the cultural, and even political autonomy, of the old colonies. Despite such lofty goals and intentions, these areas still formed part of the authoritarian and fascist Soviet Union more than seventy years later. Once in power the Bolsheviks resisted every effort to break up the empire – indeed, they reconquered a number of non-Russian regions that had set up local rule during the civil war that had destroyed the Imperial Russian regime after the October Revolution of 1917 (Bacon, 1980; Pipes, 1983; Critchlow, 1994:243; Kort, 2004:45).

Finally, in 1924, with the turmoil of the revolution and the subsequent civil war at an end, the new Soviet government began implementing a 'nationalities policy' known as the National Delimitation of Central Asia. The National Delimitation of Central Asia was based on the assumption that ethnic and linguistic affiliates coincided, and that together they formed markers of 'national identity'. During this time the Bolshevik government had to contend with the dilemma of how to govern a country that essentially remained a multinational empire. They wanted to maintain tight central control over the entire country, but they also wanted to give the impression that its many non-Russian subjects were equal members of a new socialist and fraternal union. Their solution was a new political phenomenon – the Union of Soviet Socialist Republics. Officially the new union had a federal structure that was composed of 'union' republics. This setup was primarily for the sake of appearance. In reality, the Soviet Union was a dictatorship, tightly controlled from the centre by the Communist Party (as the Bolshevik Party had been renamed in 1918). The federal structure of the Soviet Union was an administrative ploy to hide the true nature of the dictatorship. Nevertheless the restructuring provided a way to govern the Soviet Union, especially as efforts were made to enlist non-Russians into the Communist Party and, thereby, into the tight knit apparatus that controlled the huge country. Rather than release the non-Russian peoples from Imperial Russian rule, this policy granted them national 'republics' within the USSR (Bacon, 1980; Pipes, 1983; Ferdinand, 1994:11; Kort, 2004: 50).

In Central Asia this meant dividing the region into five republics which, with minor adjustments, survive today: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. The boundaries of these republics had scrupulously followed ethnicity and minor linguistic variations (dialects) in the Turkic language. The republics did not reflect anything more than this, however, for there was no existing political consciousness along linguistic or any other lines in Central Asia. Indeed, the inhabitants had almost no sense of territorial loyalty except for a strong anti-Russian sociopolitical consciousness. Rather, they saw themselves primarily as Muslims. The names given to them under Stalin's rule were derived from their tribal designations and they "were

created primarily as a mechanism of divide and rule". The creation of national republics introduced a new political concept – suddenly, on orders from Moscow, the Central Asians had become five distinct peoples. The boundaries were politically imposed in order to retain central control, a fact which belied true autonomy. This was no less artificial than the division of South Africa by the apartheid regime in the 1970s along the lines of eight major languages and the naming of each of the resulting regions a nationality (Bacon, 1980; Pipes, 1983; Ferdinand, 1994:11).

Sociologists define ethnicity as a concept referring to a shared culture and way of life, especially as reflected in language, folkways, religious and other institutional forms, material culture such as clothing and food, and cultural products such as music, literature, and art. Ethnicity is sociologically important because it is both a major source of cohesion and/or of social conflict. The notion of ethnicity is particularly important when it forms the basis for social discrimination or for independence movements, as happened in the FSU (Marshall 1998; Johnson, 2000). To define ethnicity in the Central Asian context is a daunting task. It is widely acknowledged that ethnic discord has always been a major feature underpinning the Central Asian landscape. When the Soviet rulers came to power, coercive and ideological measures were used to promote ethnic stability. This resulted in a reorganisation of the traditional power structure in the region through the creation of 'nationalities' (Haghayeghi, 1995:186) as has been suggested above.

Arguably the imposition of national republics on the Central Asians served the Soviet government in two important ways. First, it destroyed the unity of the region, and thus reduced the possibility of all Central Asians acting together in concert against the Russians. It obliterated previous forms of self-definition and provided an alternative focus for regional and substate identities (the state identity being Soviet). The borders of the newly formed republics left pockets of one ethnic group within the borders of another ethnic group, thereby creating friction points that prevented the development of any united front against the ruling Communist Party based in Moscow. Furthermore, the borders of the Central Asian Republics helped render all local ethnic groups

dependent on Moscow (Bacon, 1980; Pipes, 1983; Ferdinand, 1994: 11; Kort, 2004). Commenting on this issue Martha Olcott (1992:375) notes:

Stalin drew the map of Soviet Central Asia not with an eye to consolidating natural regions, but rather for the purpose of reducing the prospects for regional unity. Five separate republics were formed, creating national units of ethnic communities that had yet to think of themselves as distinct nationalities. Moreover, the boundaries were set to insure the presence of large irredentist populations in each republic.

Secondly, by providing the Central Asians with their own political structures, if only in form, the Communist Party technically ended the colonial nature of their rule in Central Asia without facilitating a de facto shift in power. This change had profound implications and long-term significance. Through a breathtakingly simple change in ideology, the establishment of national republics justified permanent Bolshevik rule over non-Russians. These republics allowed Soviet leaders to claim that the non-Russian peoples had voluntarily chosen to become part of the Soviet Union, and also that fraternal ties made their relationship mutually beneficial. Unlike imperial regimes, which overtly subsumed the interests of the colonies to those of the ruling peoples, the Bolsheviks could argue that federation with progressive forces in Russia brought benefits to all peoples, and that Moscow's revolutionary government had as much appeal to non-Russians as to Russians. Therefore if joining the Soviet Union was an enlightened act that benefited society as a whole, breaking away would be a counter-revolutionary act – the selfish response of the bourgeoisie (Bacon, 1980; Pipes, 1983; Ferdinand, 1994:11).

The Soviet assertion did have some validity, for, under the Soviet regime, Central Asia was under the regime, in important ways, much better off than under Tsarist Imperial Russia. Central Asians benefited from their own political structures, from dramatic economic gains, and from great advances in education. Most striking is the fact that, under Soviet rule, they fared better than did the Russians themselves. They suffered less terror, dislocation, bureaucracy, religious persecution, and economic mismanagement. However,

the counter-argument still stands, namely that prosperity and education have nothing to do with colonialism in principle – the colonial relationship is defined by power. A colony need not be badly off, but it is still ruled by a foreign power (Bacon, 1980; Pipes, 1983).

The political situation in Central Asia differed from that of a typical colony in several ways. The region's lack of power resulted from centralised Soviet rule, and not from the inequity between Russians and non-Russians. A totalitarian government, such as that of the Soviet Union, required centralisation – Moscow controlled innumerable details in the lives of all Soviet citizens. Thus, the absence of political power in Central Asia may be explained without reference to its predominantly non-Russian population – it would have little self-rule no matter who lived there. Given the nature of the Soviet government, the distance of Central Asia from Moscow had its own benefits, for, to some extent, it slightly removed the people of the region from the heavy hand of the state. Living far from the centre of power, their actions were less subject to the intense scrutiny of the government. It may be argued that the Muslims, legally classified as inorodtsy (aborigines) enjoyed a better quality of life than did the Russians themselves (Bacon, 1980; Pipes, 1983; Malik, 1994:5).

There were also two other aspects in terms of which Central Asians did not fit the status of a colonial people. Firstly, Central Asians were fully fledged citizens of the Soviet Union. They enjoyed complete legal equality with the Russians, and the discrimination they suffered was outside the law. Secondly, the Soviet army conscripted all citizens, without regard for regional or ethnic origin. Central Asians served in the army just as Russians did. Once in the army there was no distinction based on ethnic origin, and all nationalities were mixed freely. This too contravened the Imperial Tsarist Russian pattern. At the same time, however, Central Asia did share vital characteristics with colonies. It had the trappings of power but not the substance. Like the maharajas of India, who retained formal authority while the British ran their affairs, the republics of Central Asia were independent and sovereign. The Russians,

however, allowed the Soviet Third World peoples little more power than did the typical colonial master (Bacon, 1980; Pipes, 1983).

Moscow's power was not limited to foreign policy only, as it also had the final say in internal affairs. There could be no rivalry between Moscow and the republics as the latter had no forces to array against the central power. The instruments of power were all in Soviet hands. The army and the secret police were controlled by Moscow, and vital economic matters were directly supervised from Moscow. It was not necessary to look far for proof of Moscow's power in ruling the republics: Moscow could control the outcome of court cases, set censorship guidelines, discipline party members, and reverse any locally made policy. It retained the power to reverse any decision made at republic level. What little power the republics had was largely for propaganda purposes. Russians dominated every decision-making body. The minorities' token representation gave them almost no say in deliberations that decided their fate. A decision from Moscow was a decision by Russians, and all decisions were ultimately made (or affirmed) in Moscow (Bacon, 1980; Pipes, 1983).

It was not only that Russians dominated – the whole Soviet regime was inextricably bound up with Russian nationalism. Far from representing an internationalist ideology, as it had originally intended, the Soviet government represented Russian interests and in principle and effect was a linear successor to the Imperial Russian Empire. This limited the patriotic feeling of Central Asians towards the regime. They generally viewed it less as their own than as a Russian government. Russian power extended even within the Central Asian republics, where ethnic Russians held many key positions. However, the Soviet regime made a concerted effort to recruit a native elite, a comprador class that would serve its interests in return for privilege and status. This strategy was largely successful. However, nothing was left to chance. Russian officials often occupied key positions in the Communist parties within the republics. Normally, Muslims would hold the top positions and ceremonial posts, while Russians filled key second-level posts in order to keep a close watch on local developments. Russians also doubled up with

Muslims in many positions. They were appointed directly by Moscow, and they maintained tight control over the local political apparatus. The presence of so many Russian settlers in all the Central Asian republics made it possible to keep all political positions in local hands and still include many Russians. While technically leaving power in the hands of residents, Moscow awarded real authority to the Russians among them (Bacon, 1980; Pipes, 1983; Kort, 2004).

This situation closely resembles that of nineteenth century European empires. However, whereas those empires made no efforts to conceal their domination of the vanquished, the Russians used an ideology and elaborate political structures in order to disguise their own domination. Ironically, while the Soviet Union has greatly contributed to the anti-imperialist nature of present society by attacking all forms of colonialism, at the same time it has done the most to refine the colonial relationship by shedding its overt features. A "fraternal tie" may look better, but in real terms it means the same thing – the control of one people by another. Economic and cultural affairs closely reflected this power relationship. However in certain ways Central Asia also defied classic colonial patterns. Although there were barely any industries in Central Asia in 1917, dramatic improvements in productivity and standards of living took place, often greater improvements than those taking place in the Soviet Union as a whole (Bacon, 1980; Pipes, 1983; Kort, 2004).

The foregoing discussion paints an obtrusive picture of structural, physical and socio-psychological violence within an oppression paradigm, violence that existed within the structures of the society of the Soviet Union, especially through hypersurveillance.[5] Hypersurveillance of non-Russians by Russians was common practice under Soviet rule.

The government made substantial efforts to accelerate growth by investing heavily in Central Asia. Apparently, Moscow invested more money in the

[5] Hypersurveillance is a type of structural violence. It occurs when state authorities pay undue attention to one group over others on a consistent basis (Wong 1998). Structural violence will be further analysed in a later section of the thesis.

region than it took out. This defies nearly all colonial precedents, for no metropolitan power ever (intentionally) invested more in a colony than it derived from the colony. Furthermore, much of this investment could have brought better returns through investment elsewhere in the Soviet Union. One may, therefore, conclude that this investment in Central Asia was in order to improve standards of living there although it is difficult to accept this. Martin Spechler, quoted by Pipes, has dubbed this oddity "welfare colonialism" (Pipes, 1983:160).

Thus the Soviet Union did bring economic benefits to Central Asia, lifting the region to a prosperity that the local peoples on their own might not have attained. Comparisons between the Central Asians and their nearest relatives in independent countries – Afghanistan, Iran, and Turkey – confirm this. Regardless which index one considers – per capita income, mortality rates, medical services, or electric power – Soviet Muslims, in all respects, enjoyed higher standards than their independent neighbours. This may also be due in part to the more stable government that prevailed in Central Asia at the time, as not one of its neighbours had had the same government since 1920, and all had witnessed turmoil over the period. Central Asia compared favourably not only with the Middle East countries to the south, but also with other regions of the Soviet Union. Central Asia experienced a smoother development under Soviet rule than most other regions. Aside from the catastrophic collectivisation efforts in the 1930s, to a large extent the Central Asians escaped the economic excesses and reversals that so severely afflicted the rest of the Soviet Union. In contrast to other regions, Central Asia received enough money for agricultural investment, and, as a result, it was the only region in the country with a successful agriculture (Bacon, 1980; Pipes, 1983; Kort, 2004).

2.3.1 Russian policies in Central Asia

Typical colonial relations existed not only between Central Asia and Moscow, but also between the Muslims and Orthodox Russians living in Central Asia itself. The Russians in this region tended to own the better land and have the better posts. The region presented a model case of ethnic stratification,

according to which one group, the Russians, commonly enjoyed socio-economic advantages that few from other groups shared. Even if it were possible to explain this situation in terms of differences in skills, motivation, and education, it still served to remind the Muslims of who was in control. Whatever the advantages Central Asia enjoyed, these were at Moscow's pleasure. Presumably, Moscow had good reasons for treating Central Asia leniently and one may be sure this was not a spontaneous act of generosity. As Michael Rywkin, quoted by Pipes (1983:188), notes, "Soviet Russia seeks political domination, even at the price of economic discomfort for its own citizens".

Without underestimating the socio-economic advantages that Central Asian Muslims enjoyed in comparison with their independent brethren to the south, this mattered very little in the then current age of nationalism. The economic benefits of colonial rule have almost never influenced a people (unless its numbers are very small) in preferring to remain a colony. Given the choice it would appear that independence matters more than socio-economic well-being, and this surely also applied to the Muslims of Central Asia (Pipes, 1983). The fact that the blacks in South Africa were richer than their compatriots everywhere else in Africa did not render them content – they did not compare themselves with poorer blacks in distant countries, but with the richer whites in their midst.

(a) Education

As far as education is concerned Central Asia differed in certain ways from the typical colony. The Tsarist government before 1917 had done nothing to encourage education, with the result that the literacy rate in Central Asia was extremely low. There were tremendous strides in education from 1917 onwards. This change came about as a result of the heavy Soviet emphasis on education, and the willingness of the government to spend on education. These advances in education distinguished Central Asia from the typical colony, where the European power was typically unwilling to spend money on education. Indeed, many colonial powers (including the Tsarist regime) preferred an uneducated colony, rightly expecting that less trouble would

emanate from it (Bacon, 1980; Pipes, 1983; United Nations, 2006c). Educating the Central Asians served two purposes for the Soviet rulers however. Firstly it created a more efficient workforce and secondly it politicised the population and thereby incorporated it into the new system. The educational process was saturated with ideology, with the sole intention of remoulding the intellectual responses of society (Ferdinand, 1994:12). Currently nearly everyone is able to read. All three countries have literacy levels of 99 percent. All children must attend school, numerous technical programmes prepare them for skilled jobs, and there are now several universities in the region (United Nations, 2006c).

(b) Religion

In a strange way the Soviet treatment of religion argues again for Central Asia's relatively privileged status. Soviet authorities discouraged religion in principle, yet overall Islam fared better than Christianity. If mosques were turned into post offices, Russian Orthodox churches were used as barns. The Communist leaders persecuted Christianity with a particular ferocity, while at the same time they seemed to care less about Islam (Bacon, 1980; Pipes, 1983; Ferdinand, 1994).

State atheism had two special consequences in Central Asia. As it originated from men of Christian origin, Muslims perceived these atheistic doctrines as a covert Christian attack on Islam. They observed that Russians had always despised Islam – earlier in the name of Christianity, now in the name of atheism. From the Muslim perspective the two appeared suspiciously similar. In addition, as Islam is tied to every aspect of a Muslim's life, an attack on the religion also denigrates the people's lifestyle. By attacking Islam, the Russians denigrated much more than merely the religion of Central Asia (Bacon, 1980; Pipes, 1983; Blank, 1994:42-43).

(c) Language

Soviet policy toward the Turkic and Iranian languages of Central Asia indicated most clearly the power Russians wielded in cultural matters. The government wrought havoc with the local languages by changing their scripts

and word meanings. The Soviets regulated the Muslims' use of their languages. One technique was to change the system used in writing these languages. Between the 1920s and 1930s, the Soviet government ordered that the Central Asian languages drop the Arabic script, as a way to isolate the Muslims of the Soviet Union from both their Islamic heritage and from writings emanating from Turkey, Iran, and other parts of the Middle East. The Arabic script was replaced by the Latin script. This gave the Soviet authorities much greater control over reading matter. In addition, it placed an obstacle in the way of Soviet Muslims communicating with foreign Turkic and Iranian speakers. This intention to isolate was proved by the Soviet reaction to Atatürk's[6] reforms, when he required that the Turks adopt the Latin alphabet in 1928. In 1940, the Soviets ordered a second change in script, from the Latin script to the Cyrillic alphabet used to write Russian and other Slavic languages. Cyrillic letters remain in use until today (Bacon, 1980; Pipes, 1983; Blank, 1994:47; Kort, 2004).

The change from Latin to Cyrillic letters also involved a further change. Whereas the Latin alphabet had represented each sound of the many Turkic dialects with the same letter, the Cyrillic alphabet for the many dialects assigned different letters to the same sound. The intent behind this needless complication is clear – the different letters rendered communication between nationalities more difficult. Thus the policy with regard to the alphabet reduced the possibility of unified action on the part of Turkic speakers against the Russians. As ever, Russian interests came first. The Russians did even more – they redefined Turkic and Iranian words to suit their own purposes. Disregarding the sentiments of those who spoke these languages the Russians shuffled word meanings around to suit their own purposes. This is perhaps the most blatant instance of Russian cultural imperialism. Russian became the official language of each Central Asian Republic. The goal was to render the Muslim population of Central Asia more Russian – a policy known as Russification. This policy was also aimed at changing social processes and

[6] Atatürk founded the modern Turkish Republic.

relations in order to promote a single socialist consciousness and culture (Bacon, 1980; Pipes, 1983; Blank, 1994:51).

However, the most important, and by far the most difficult changes, that came about in Central Asia during Soviet rule had nothing to do with the tightening of the region's political bonds to Moscow, or with Russification. These changes resulted from the attempt to transform the Soviet Union's economy. Using Marxist principles, the Soviets instigated a programme of rapid industrialisation along centrally planned socialist lines. This programme was implemented under Josef Stalin, the all-powerful dictator, after the death of Lenin in 1929. Stalin's plans called for phenomenal, and, ultimately unrealistic, increases in industrial production.

(d) Collectivisation

Industrialisation depended on the overhauling of agriculture, still the largest sector of the Soviet economy in the late 1920s, through a policy of *collectivisation*. Collectivisation was implemented in the early 1930s. It entailed combining about 20 million small farms into about 200 000 collective farms controlled by the Communist Party. These were large farms on which dozens or hundreds of families worked together. Soviet planners expected that these farms with their large fields and herds of livestock would make use of modern machinery and methods to produce far more food than had been produced under the old system. At the same time, the state would have control over what was produced and would use it to promote industrialisation (Bacon, 1980; Kort, 2004; Ferdinand, 1994:12).

Collectivisation immediately ran into problems when most peasants refused to give up their land. The Soviet regime responded with brutal and overwhelming force. Peasants were driven into the collective farms, sometimes after bloody battles with soldiers armed with machine guns. The wealthier peasants, known as *kulaks,*[7] met an even worse fate. Stalin, like Lenin, had decided that, by definition, the *kulaks* were the enemies of socialism. Kulak families

[7] Kulaks were rich peasants before the formation of the USSR.

were, therefore, driven from the countryside altogether. The turmoil of collectivisation was followed by a famine, which did not abate until 1934. Collectivisation had equally disastrous consequences in Central Asia. Life was totally disrupted. Thousands of nomads fled the steppe and Kazakhstan altogether, with most of them going to Uzbekistan and Turkmenistan. There they joined the local people in a new upsurge of the Basmachi Revolt.[8] Eventually, however, the Soviet government was successful, and, by the end of 1932, 99 percent of the peasants in Uzbekistan had been collectivised. However, as elsewhere, production from the collective farms remained disappointingly low (Bacon, 1980; Kort, 2004).

(e) Reformist policies

World War II was one disaster of which the full force did not hit Central Asia. The Germans swept eastward to the gates of Moscow, Leningrad and Stalingrad. They were met by heroic and often unbelievable resistance and were turned back from the Soviet Union before they could reach Central Asia. Meanwhile industrialisation in the region, which had begun during the 1930s, received an enormous boost during the war. Hundreds of factories were disassembled and moved from the European regions of the Soviet Union to Central Asia. There they were reassembled and enlisted in the desperate war effort. The war also brought temporary relief from certain repressive policies. The campaign of the Soviet regime against Islam in Central Asia underwent a change during the war, when the regime made a peace of sorts with the Russian Orthodox Church. Certain schools and mosques, which had been closed, were allowed to reopen, and a Muslim Board of Central Asia was established as part of an effort to improve the government's relationship with Muslim leaders. These concessions, like others permitted by Stalin during the war, were rescinded after the war ended in 1945 (Ferdinand, 1994; Kort, 2004).

[8] The Basmachi Revolt was a largely Turkic uprising against the Russian Empire and Soviet Rule in Central Asia.

(f) Environmental issues

After Stalin's death in 1953, his successors agreed that the intolerable aspects of life under the dictator had to end. Consequently policy reforms were put in place. These included economic reforms designed to raise the miserably low standard of living. The Soviet people needed more food, especially grain. Party leader Nikita Khrushchev's programme to increase grain production was known as the Virgin Lands campaign. This campaign called for the ploughing up of millions of acres of land on the steppes of Kazakhstan and western Siberia (Bacon, 1980; Kort, 2004).

These areas had not been cultivated before for good reason – despite the fertile soil the rainfall in the area was too low and irregular to sustain agriculture on a long-term basis. The Kazakhs objected to the programme and were promptly replaced because of their opposition. During the next few years, almost 50 million acres of Kazakh steppe were ploughed up and planted with grain. The years that followed saw mixed results, some good harvests, and some very bad. Topsoil was blown away and millions of acres of farmland ruined. Entire towns were covered with silt. This was a major ecological disaster, but did not put an end to the Virgin Lands enterprise. Until the collapse of the Soviet Union in 1991, Kazakhstan produced one-third of the country's wheat. The influx of Russians and Ukrainians under the Virgin Lands programme also threatened to keep the Kazakhs a minority in their own republic This state of affairs led to a very high Kazakh birth rate in order to shift the population balance in their favour (Bacon, 1980; Glantz et al., 1994; Kort, 2004).

Ever since the 19th century, Russia had been promoting cotton cultivation in Central Asia, despite the demands of this thirsty crop on the resources of the region. Production rose dramatically from the 1920s onwards, resulting in the Soviet Union becoming self-sufficient in cotton as well as becoming an exporter by 1937. It was not, however, until the 1960s that the irrigation needs of the cotton fields began noticeably to affect the Aral Sea. The impact on the sea increased substantially when the Garagum and other new canals began drawing water from the Amu Darya and Syr Darya rivers after 1959. By the

late 1970s Central Asia was growing 95 percent of the total cotton production of the Soviet Union. However the toll was frighteningly high. The substantial loss of water became critical. As a result of poor construction and other inefficiencies, half the water that entered the Garagum canal leaked out before reaching the cotton fields. The Aral Sea was no longer fed by most of the water it had been receiving in the 1950s and began to dry up, with disastrous ecological consequences that have even now not been reversed (Bacon, 1980; Glantz et al., 1994; Kort, 2004).

The following statement most aptly describes the FSU's crimes against nature in Central Asia:

Nowhere has the link between the misuse of the land and filthy water been manifested more clearly than in Central Asia. There, a combination of unfiltered drinking water, untreated sewage, and large quantities of pesticides, herbicides, defoliants, and fertilizers has done massive damage to the population's health, not to mention causing severe economic losses (Powell, 1992).

(g) Economic inequality

In 1964, Nikita Khrushchev was replaced with Leonid Brezhnev who had been a Khrushchev protégé and party leader in Kazakhstan during the crucial early days of the Virgin Lands campaign. By 1964, Brezhnev and the rest of the Communist Party elite wanted security and stability above all else. This required raising the country's standard of living and easing tensions with the USA, both of which the Brezhnev regime made serious efforts to bring about. It also meant paradoxically that there could be no reforms that might threaten the good life enjoyed by the party elite. In effect this meant that many of the problems that beset the Soviet Union were left unchecked. One of the most serious of these problems was an overcentralised, increasingly inefficient economy, and widespread corruption.

By the 1980s these problems had reached crisis proportions. One dangerous consequence was the growing economic inequality. The Soviet Union

purported to be a socialist society of which the most important principle was that society wealth was distributed equally. This had never been the case, but under Brezhnev it became increasingly difficult to conceal the true situation. This was especially obvious in Central Asia, where the standard of living for ordinary people was the lowest in the Soviet Union, but where party leaders lived almost as the khans of old. Corruption in Central Asia ran deep (Bacon, 1980; Glantz et al., 1994; Kort, 2004).

(h) Reform, collapse and independence

Leonid Brezhnev died in 1982. His two immediate successors, both sick, elderly men, governed for a total of three years. In March 1985, Mikhail Gorbachev became the Soviet leader. At first his attempts to reform the Soviet system impressed many observers and raised hopes that the situation could be remedied. Instead it soon became clear that the rot was too extensive and too deep, and that efforts to fix the system were in fact causing the collapse of the system. As was the case with the rest of the Soviet Union, Central Asia was about to be swept up in unexpected changes that the Communist leaders, who once had seemed so powerful, were unable to control. The secrecy that pervaded Soviet society meant that not even its leaders knew how serious the situation was. Officials at all levels of government and administration commonly falsified reports. In addition, many officials at every level of the Communist Party hierarchy opposed meaningful reform because it might threaten their positions and privileges (Glantz et al., 1994; Kort, 2004).

Finally, when Gorbachev began his reform programme, which he termed “perestroika” or “restructuring”, he soon found that the limited changes he had in mind were not enough to solve the problem. For example, Gorbachev wanted to relax censorship under a policy he called “glasnost” or “openness”. He hoped that a freer flow of information would help expose corruption and energise a whole range of reform efforts (Goodman, 1994; Kort, 2004).

What in fact happened was that a little glasnost immediately brought demands for a greater relaxation of censorship, in fact, for the abolition of all censorship. Plans to democratise the Communist Party led to runaway

criticism of the party and demands for genuine multiparty democracy. By 1989 the process of change was accelerating and outstripping Gorbachev's desperate attempts to keep it under control. Restructuring had inadvertently become deconstruction. By 1991, chaos had replaced change and the Soviet Union had collapsed, leaving the Russians and the 14 minority nations of the non-Russian former union republics of the Soviet Union on their own as independent nations. Of all those republics those least prepared were arguably the five Muslim republics of Central Asia (Glantz et al., 1994; Kort, 2004).

During 1990 and 1991, Central Asia was forced along the road to independence as the Soviet Union careered toward collapse. Every republic in the region established the new and powerful post of president. While presidential elections were taking place the parliaments of the union throughout the Soviet Union were declaring what they termed sovereignty. In Central Asia, the declarations of sovereignty were clearly more limited in intent than in other parts of the Soviet Union. This was demonstrated in a referendum sponsored by Gorbachev in March 1991. Soviet voters were asked whether they wished the reformed Soviet Union to be preserved. Six republics refused to participate mainly out of a desire to secure independence. Of the nine that did participate, 76.4 percent voted to preserve a reformed union (Ferdinand, 1994; Kort, 2004).

The greatest support for the continued union came from Central Asia. No doubt the local ruling elite had a profound influence on these results, but the results also indicated a widespread conservatism and a reluctance to dismantle the Soviet Union. This outlook was reaffirmed in early August 1991, when Communist Party hardliners in Moscow attempted to overthrow Gorbachev. Their goal was to reverse his reforms and, as far as possible, to restore the Soviet Union to its pre-1985 form. Kyrgyzstan and Kazakhstan opposed the coup, while Tajikistan and Turkmenistan supported it, and Uzbekistan never made any public statement about the matter. In any event, the coup unleashed a chain reaction that ultimately doomed the Soviet Union. Every union republic declared independence, as did the Central Asian

republics, although they were the last to do so. A few days after December 16, the day on which the last of the republics (Kazakhstan) claimed independence, the five Central Asian republics joined with six others in the old Kazakh capital of Almaty to sign a declaration establishing the CIS (Ferdinand, 1994; Kort, 2004).

The declaration that established the CIS also declared the abolition of the Soviet Union. The official end of the Soviet Union came at midnight on 31 December 1991. The five former Soviet republics in Central Asia were now independent states, on their own, and burdened with enormous problems they were ill prepared to solve (Kort, 2004).

2.4 INDEPENDENT CENTRAL ASIA

2.4.1 The Kazakhs

In 1991 Kazakhstan was the only former Soviet republic where the indigenous ethnic group did not constitute the majority of the population. There were Russian and Ukrainian population majorities in eight of the country's eleven provinces. The Kazakh (40%) and Russian (38%) populations were approximately equal. Principally, Kazakhs populated the three southernmost provinces together with other Turkic groups, while there was a German and Russian majority in the former capital city, Almaty. Within a decade this situation had changed dramatically. According to the 1999 census 53.4 percent of the inhabitants were Kazakhs. This situation had come about as a result of the high ethnic Kazakh birth-rate and the emigration of many ethnic Russians and other Europeans. This emigration may well have suited those Kazakh nationalists determined to increase their share of the total population, but it cost the country a significant section of its best-educated and technically skilled workforce. Kazakhstan's ethnic composition was and still is the driving force behind much of the political and cultural life of the country (Olcott, 1996:60-62; Kort, 2004).

In most aspects the republic's two major ethnic groups, the Kazakhs and the "Russian speakers" (Russians, Ukrainians, Germans and Belarussians), might well have lived in separate countries. To the Russians, most of whom live in

northern Kazakhstan within a day's drive of Russia itself, Kazakhstan is an extension of the Siberian frontier and a product of Russian and Soviet development. To most Kazakhs, however, these Russians are usurpers. Of Kazakhstan's current Russian residents 38 percent were born outside the republic, while most of the remainder are second-generation Kazakhstani citizens. In the long term, the role of the Russians in the society of Kazakhstan will also be determined by a demographic factor – the average age of the Russian population is higher than that of the Kazakhs, while its birth rate is much lower than that of the Kazakhs. The Kazakh population is predominantly rural, while the Russian population is mainly urban (Olcott, 1996:60-62; Kort, 2004).

By tradition the Kazakhs are Sunni Muslims and the Russians are Russian Orthodox. Almost 50 percent of Kazakhs are Muslim. As elsewhere in the newly independent Central Asian states, the question of the role of Islam in everyday life, and especially in politics, is a delicate one in Kazakhstan. As part of the Central Asian population and the Turkic world, Kazakhs are conscious of the role Islam plays in their identity, and there is strong public pressure to increase the role that faith plays in society. At the same time the roots of Islam in many segments of Kazakh society are not as deep as in neighbouring countries. Since independence religious activity has increased significantly. The construction of mosques and religious schools accelerated in the 1990s, with financial help coming from Saudi Arabia, Turkey and Egypt. It is important to note, however, that the 1995 constitution of Kazakhstan stipulates that Kazakhstan is a secular state, thus Kazakhstan is the only Central Asian state of which the constitution does not assign a special status to Islam. National Islamic festivals, for example, have not been declared public holidays as is the case elsewhere in Central Asia (Olcott, 1997:60-62; Kort, 2004).

As in the other Central Asian republics, the preservation of indigenous cultural traditions and the local language was problematic during the Soviet era. The years since 1991 have provided greater opportunities for cultural expression, but striking a balance between the Kazakh and Russian languages has posed

a political dilemma for Kazakhstan's policymakers. The two official languages in Kazakhstan are Russian and Kazakh. Although Kazakh is the mother tongue of indigenous Kazakhs, at least 40 percent of the Kazakh population is not fluent in Kazakh. Even those who are fluent find Kazakh a difficult language to work with in science, business, and certain administrative settings because it remained largely a "kitchen" language in Soviet times, and did not develop a modern technical vocabulary. Nor has there been extensive translation of technical or popular literature into Kazakh. Thus, for many ethnic Kazakhs, Russian remains the primary "world language". It also remains the language of instruction in most subjects in schools despite efforts to increase the number of schools where Kazakh is the primary language of instruction. The President of Kazakhstan has proposed that Kazakh be the sole official language on the basis that decades of Russification have endangered the survival of Kazakh as a language (Olcott, 1997:68-69; US Library of Congress Annual On-Line, 2006).

The Kazakhs' nomadic lifestyle and their lack of a written language until the mid-19th century, has meant that their literary tradition relies upon oral histories. The Russian conquest did inestimable damage to Kazakh traditional culture by inhibiting the nomadic pastoralism upon which the culture was based. However, many individual elements survived the loss of the lifestyle as a whole. For the most part pre-independence cultural life in Kazakhstan featured the same plays, films, music, books, museums, paintings and other cultural features common in every other corner of the Soviet empire. The collapse of the Soviet system with which so many of the Kazakh cultural figures were identified left a difficult situation. Even more damaging has been the total collapse of public interest in most forms of higher culture. Thus, cultural norms have been determined predominantly by Kazakhstan's increasing access to global mass culture (Olcott, 1996:70-72; US Library of Congress Annual On-Line, 2006).

The constitution of 1995 specifies that education at secondary school level is mandatory and free between the ages of seven and fifteen, and that citizens have the further right to compete for free education in the republic's

institutions of higher learning. One of the most positive statistics when Kazakhstan became independent was its high literacy rate, a legacy of the Soviet system. According to the 1999 census Kazakhstan's literacy rate was 97.5 percent. Enrolment in both primary and secondary grades is above 90 percent while in the post secondary age group 34 percent of the population only is enrolled. Primary school constitutes a four year period, followed by five years of mandatory general secondary school. Two further years of specialised secondary school are optional. In view of the almost equal distribution of the population between ethnic Kazaks and ethnic Russians the language of instruction is a particularly sensitive and, as yet, unresolved issue. In the early 1990s the primary language of instruction was changed from Russian to Kazakh, although in 2005 many institutions were still instructing in Russian (Ferdinand, 1994:4; US Library of Congress Annual On-Line, 2006).

Serious shortages in funding and resources (due to budget cuts and the emigration of Russian and German scientific experts) have hindered efforts to revamp the education system inherited from the Soviet Union. Many preschools have been converted into offices or stores. Kazakhstani citizens may still enrol in what were once the premier Soviet universities, all of which are now in foreign countries, in particular, Russia and Ukraine. Despite the obstacles, efforts have been made to upgrade the education system, especially at the highest level. Existing universities have been upgraded and new private universities have been established, thus increasing regional access to higher education (Kort, 2004; U.S. Library of Congress Annual On-Line, 2006).

Kazakhstan is the most industrialised republic in the region. Its industrial and agricultural sectors are highly developed. However even this country is also a victim of the specialisation that was peculiar to the economy of FSU. About 33% of the finished goods consumed in the country are imported. By the same token, 75% of its total exports are intermediate goods and raw materials (Ahrari & Beal, 1996; US Library of Congress Annual On-Line, 2006).

2.4.2 The Kyrgyz

When Kyrgyzstan became independent only about 52 percent of the population was ethnic Kyrgyz. Russians, who numbered about 18 percent of the population, constituted the largest minority group, followed by the Uzbeks. However, by the 1999 census, ethnic Kyrgyz accounted for almost 65 percent of the population. Uzbeks, at 13.8 percent, had become the largest minority. In 2005 Kyrgyzstan's population was estimated to be 5 million with about 65 percent of the inhabitants being Kyrgyz. Substantial numbers of Tajik refugees entered the country in the 1990s, while in the early 2000s considerable numbers of Russians left the country annually. As with the other Central Asian republics, language was and still is a sensitive issue in Kyrgyzstan. One serious problem posed by the geography of Kyrgyzstan is that mountains isolate parts of the country. Over generations this mighty natural barrier has helped bring about noticeable cultural differences between the two regions. Today, northern Kyrgyzstan is highly Russified and secular, while in the south both Uzbek and Islamic influences are strong (Ferdinand, 1994:4-5; Kort, 2004: 6-10; US Library of Congress Annual On-Line, 2007a).

During Kyrgyzstan's first decade of independence several attempts were made by the government to prevent Russians from emigrating. One of these measures involved declaring Russian an official language in areas where Russian speakers predominated. In 2001 the legislature designated Russian as the country's second official language after Kyrgyz. Russian is the primary language of commerce and higher education. About 80 percent of Kyrgyzstan's population is Muslim, and 16 percent Christian. The Kyrgyz practise a version of Islam that is influenced by earlier beliefs and practices, and by the nomadic nature of earlier Kyrgyz society. This version is most prevalent in the north; while the Islam practised in the south-western population centres (where the Uzbek minority is concentrated) resembles more closely that form of Islam which is practised elsewhere in Asia. The majority of the Russian population are Russian Orthodox (Ferdinand, 1994:4-5; Kort, 2004: 6-10; US Library of Congress Annual On-Line, 2007a).

A number of factors distinguish daily life in Kyrgyzstan from daily life elsewhere in Central Asia. The most notable involves women. Women enjoy a far greater degree of freedom than women in neighbouring countries, with the possible exception of Kazakhstan. This is the result of two factors. Firstly, the nomadic Kyrgyz tribesmen who, historically, adopted a moderate approach to Islam did not permit this moderate approach to interfere with many pre-Islamic customs and traditions. The status of women in Kyrgyz was further improved by the secular government policies of the Soviet era. Furthermore, Kyrgyz women participate more actively in business, education, and other professions than do women in the other Central Asian republics which practise Islam. At the same time, however, old traditions that subordinate women to men do still persist (Ferdinand, 1994:4-5; Kort, 2004: 6-10; US Library of Congress Annual On-Line, 2007a).

In 2004 the literacy rate in Kyrgyzstan was 98.7 percent. Education is compulsory between the ages of seven and fifteen. The educational system offers two years of upper secondary school, specialised secondary school, or vocational/technical school. In primary and secondary schools the language of instruction is Kyrgyz, but in the higher institutions it is Russian. In 2001 enrolment in primary grades was approximately 90 percent. However this figure has since diminished.

The Kyrgyzstan economy is primarily agricultural. However, there is one uniquely important characteristic – a sizeable private sector. The economy is also largely dependent on imports, especially from the republics of the FSU (Ferdinand, 1994:4-5; Kort, 2004: 6-10; US Library of Congress Annual On-Line, 2007a).

2.4.3 The Uzbeks

Uzbekistan is by far the most densely populated of the five Central Asian republics, and has a population density of 63 people per square kilometre. Uzbeks make up 80 percent of the population, while Russians, who constitute 5.5 percent of the population, form the largest minority. Uzbeks also have a strong presence throughout the region of Central Asia, and they account for a

quarter of the population in Tajikistan. In the early 2000s the greatest population growth occurred in the rural areas, while in the urban areas emigration was taking place. About 62 percent of the people live in rural areas. The population is growing at a rate of more than 2 percent per year. The rate of population growth is dangerously high in terms of the burden it places on the country's limited resources, and on the government's efforts to promote socio-economic development and reduce poverty (Ferdinand, 1994:4-5; Kort, 2004: 6-10; US Library of Congress Annual On-Line, 2007c).

Before the Soviet era, Uzbeks identified themselves by clan and by khanate[9] rather than by nationality. According to the 1998 census 76 percent of the population was Uzbek. However, a substantial portion of the officially Uzbek population is of Tajik ancestry. Substantial numbers of Germans and Ukrainians left in mass emigrations during the 1990s. Approximately 74.3 percent of the population speaks Uzbek, 14.2 percent Russian, and 4.4 percent Tajik. About 88 percent of the population is Muslim and 9 percent Russian Orthodox. Most Uzbek Muslims practise the type of mystic Sufism[10] that is introspective and distinctly nonpolitical. Old cultural traditions still influence daily life in Uzbekistan. Older people enjoy a high status, especially older men (Ferdinand, 1994:4-5; Kort, 2004: 6-10; US Library of Congress Annual On-Line, 2007c).

Eleven years of primary and secondary education are mandatory with the school commencement age being seven. These eleven years of schooling include four years of primary school and two cycles of secondary school, lasting five and two years respectively. The rate of attendance in these grades is high, although the figure is significantly lower in rural areas than in urban areas. The official literacy rate is 99 percent. However, in the post-Soviet era educational standards have dropped. Funding and training have not been sufficient to educate the expanding younger generation of the population

[9] A Khanate is a region under the rule of a Khan/ruler.
[10] Sufism is a mystic tradition within Islam and encompasses a diverse range of beliefs and practices dedicated to divine love and the cultivation of the heart. (http://www.nimatullahi.org/us/WIS/WIS1.html)

effectively. The three largest universities are all state-funded. Private schools have been outlawed since the establishment of Islamic fundamentalist schools in the early 1990s.

Agriculture, oil and mineral deposits dominate economic activities in Uzbekistan. Cotton accounts for 40 percent of the entire agricultural production (Ferdinand, 1994:4-5; Kort, 2004: 6-10; US Library of Congress Annual On-Line, 2007c).

2.5 GEOGRAPHY AND CLIMATE

2.5.1 Kazakhstan

Kazakhstan, located in the centre of the Asian continent, is by far the largest of the Central Asian Republics of the former Soviet Union. It is also the world's ninth-largest nation in terms of geographic area (see Appendix 4). With an area of about 2 717 300 square kilometres and about 14.8 million people, it is more than twice the combined size of the other four Central Asian states. It is, moreover, by far the largest landlocked country in the world. The country borders Turkmenistan, Uzbekistan and Kyrgyzstan to the south, while Russia forms its entire northern border – one of the longest borders in the world. Its only coastline is the landlocked Caspian Sea to the west, with China's Xinjiang Uygur Autonomous Region to the east. The population density of Kazakhstan is one of the lowest in the world, partly because of the large areas of inhospitable terrain. The proximity of unstable countries such as Afghanistan, Tajikistan and Azerbaijan to the west and south further isolates Kazakhstan (Ferdinand 1994:4-5; Kort, 2004).

There is considerable topographical variation within Kazakhstan. Only 12 percent of Kazakhstan is mountainous with most of the mountains located in the Altay and Tian Shan ranges of the east and northeast. Many of the peaks of the Altay and Tian Shan ranges are snow capped throughout the year and their run-off is the source of most of Kazakhstan rivers and streams, almost all of which form part of landlocked systems. The rivers and streams either flow into isolated bodies of water such as the Caspian Sea, or simply disappear into the steppes and deserts of central and southern Kazakhstan. Many rivers,

streams and lakes are seasonal, evaporating in summer. The three largest stretches of water are the landlocked Lake Balqash, a partially fresh, partially saline lake in the east and the largest lake in Kazakhstan (situated near Almaty – former capital city until 1997), and the Caspian and Aral Seas, both of which are partially situated within Kazakhstan. Lake Balqash is fed by three main rivers, the largest of which flowing westward out of China is the Ili River. Aside from the Ili, Kazakhstan's two main rivers are the Syr Darya and the Irtysh. The Irtysh is very important to Kazakhstan. It is the main source of water for several cities in the north and for more than 4 million people, – about a quarter of the country's population. About 9.4 percent of Kazakhstan's land is either mixed prairie and forest or treeless prairie, found primarily in the north or in the basin of the Ural River in the west. More than three-quarters of the country, including the entire western region and most of the south, is either semi-desert (33%) or desert (44%). The terrain in these regions is bare, eroded, broken uplands with sand dunes and desert. Most of the country lies between 200 and 300 metres above sea level (Ferdinand 1994:4-5; Kort, 2004).

As a result of the fact that Kazakhstan is situated so far from the ocean the climate is harshly continental with hot and very dry summers and cold winters. Rainfall in the mountains of the east averages as much as 600 millimetres per year, mostly in the form of snow, but most of the republic receives only 100 to 200 millimetres of rain per year. The shortage of rainfall makes Kazakhstan a predominantly sunny country in which temperatures vary widely due to a lack of moderating amounts of water. Average winter temperatures are -3^0 C in the north and 18^0C in the south. There are extreme differences within areas and temperatures may change very suddenly. The winter air temperature may fall to -50^0C, while in summer the ground temperature may reach as high as 70^0C (Ferdinand 1994:4-5; Kort, 2004).

2.5.2 Kyrgyzstan

The second smallest (the smallest is Tajikistan) of the five Central Asian states, Kyrgyzstan (see Appendix 5) has an area of 198 500 square kilometres of which 7 100 square kilometres is water. Kyrgyzstan is located

along the eastern border of the Central Asian region, south east of Kazakhstan, west of China, east of Uzbekistan, and north of Tajikistan. The population (5.2 million) is concentrated in small areas in the north and southwest in the valleys. About two-thirds of the population live in rural areas, but this figure is rising as the predominantly urban Russian population decreases (Ferdinand, 1994:4-5; Kort, 2004:6-10; U.S. Library of Congress Annual On-Line, 2007a).

Sharp mountain ranges, constituting about 95 percent of the country, and valleys dominate the topography of Kyrgyzstan, and glaciers cover considerable areas. The only relatively flat regions are the valleys. The major climatic influences are the mountains and the location of the country at the centre of the Eurasian landmass – far from any body of water. As a result Kyrgyzstan experiences a very harsh continental climate with very cold winters and hot summers. Rainfall in the mountains to the west averages as much as 2 000 millimetres per year. The country's only port is Balykchy, which is a fishing port on Lake Issyk-Köl. The Chu River arises in the mountains of northern Kyrgyzstan and flows northwest into Kazakhstan. The Naryn River arises in the Tien Shan Mountains of eastern Kyrgyzstan and crosses central Kyrgyzstan before meeting the Kara Darya River to form the Syr Darya River in the Uzbek part of the Fergana Valley. None of these rivers is navigable and there are no canals (Ferdinand, 1994:4-5; Kort 2004:6-10; US Library of Congress Annual On-Line, 2007a).

2.5.3 Uzbekistan

Uzbekistan (see Appendix 6) is located in Central Asia east of the Caspian Sea, directly south of Kazakhstan, north of Turkmenistan, and on the western borders of Tajikistan and Kyrgyzstan. With an area of 447 440 square kilometres it is the third largest (second largest is Turkmenistan) of the five Central Asian Republics. The topography of Uzbekistan is diverse. Almost 80 percent of the country is desert or arid steppe, and there are no significant forested areas. In the northeast the fertile Fergana valley, which is the centre of the country's population, agriculture and industry, is surrounded by mountain ranges, and is intersected by the Syr Darya River. All of the rivers of

Uzbekistan flow from other countries across a small stretch of Uzbekistan (Ferdinand, 1994:4-5; Kort, 2004:6-10; US Library of Congress Annual On-Line, 2007c).

The climate of landlocked Uzbekistan is continental, with hot summers and cool winters. Summers are long and hot with temperatures reaching 40^0C. Winters, while short, are often very cold with temperatures dropping as low as -38^0C. Rain falls mainly during the winter and spring. The average rainfall varies between 100 millimetres per year in the northwest and 800 millimetres per year in the Tashkent region. As has been suggested, the Aral Sea, half of which is in Uzbekistan, has been severely desiccated by the overuse of its tributary rivers, a situation acknowledged as one of the world's worst environmental disasters (p.34). Enormous overdrafts on these rivers are caused by the extremely low efficiency of irrigation systems in Turkmenistan and Uzbekistan. Vozrozhdeniye Island in the Aral Sea, now connected to the shore as a result of the shrinkage of the sea, contains the lethal remains of a Soviet anthrax weapons testing laboratory, most of which lies in Uzbekistani territory (Ferdinand, 1994:4-5; Kort, 2004:6-10; US Library of Congress Annual On-Line, 2007c).

2.6 SUMMARY

This chapter briefly sketches the socio-historical and socio-political context of the Central Asian Republics under Imperialist Russia and the Soviet Union. Thereafter, a short account of the post-independence state of the three Central Asian Republics focused upon in this study is outlined including their respective geographies and climates. With this as background, chapter 3 is concerned to unpack the relatively recent demographic changes that have taken place in Central Asia.

CHAPTER 3

3. DEMOGRAPHIC TRANSITION IN CENTRAL ASIA

3.1 INTRODUCTION

A discussion of the demographic characteristics of the peoples of the CARs is essential in a study of this nature. Demographic trends and characteristics represent important elements of the setting in which societal changes take place. While the populations of the CARs are, in respect of several indicators, heterogeneous, the population trends of the republics will be discussed as an entity. The proximity of the CARs and their rich and intertwined political history warrant an inclusive approach to the discussion on population trends.

Prior to dissolution, the USSR had one of the fastest growing populations of any developed country. The former Soviet Republics in Europe had completed their demographic transition long before the breakup of the USSR. Central Asia, however, still retains many of the demographic characteristics of a developing country. The high fertility and young age structure of the population of Central Asia present a significant long-term potential for population growth (Haub, 1994:6; UNECE, 2005:17).

The CARs emerged from the Second World War with an estimated population of 17.2 million in 1950 and an annual growth rate of 3.2 percent. During the next twenty years (1950-1970) the population almost doubled to 32.8 million while the annual growth rate declined to 2.1 percent. The expansion of the population continued unabated, reaching 53.7 million in 1994, although a further decline in the annual growth rate was noted (1.2%). In 2005 the region had a total population of approximately 60 million inhabitants Chapter 2, p14). This increase attributable to in-migration from the other republics and high fertility rates in some of the republics. In 1994, Kyrgyzstan and Kazakhstan had negative annual population growth rates of –0.9 and –0.3 percent respectively, while Uzbekistan, Turkmenistan and Tajikistan had annual growth rates of 2.2, 2.5 and 2.3 percent respectively. The growth rates have

been declining annually since 1950 (Haub, 1994:7; United Nations, 2005b:514-515).

3.2 POPULATION GROWTH

There have been profound demographic responses to the collapse of the communist regimes at the beginning of the 1990s. In addition, the social and economic disruption caused by the breakup of the USSR appears to have accelerated the pace of in- and out-migration, and high mortality, and therefore the course of demographic transition in these countries. The large-scale emigration, especially of Russians, Ukrainians and Germans, from the CARs and the return of indigenous inhabitants led to increases in the population, but also led to fears of a brain drain as the population groups leaving the countries had been the intelligentsia in the region throughout Soviet rule (Kort, 2004:154).

Labour in-migration, mainly Russian, and high fertility among the Kazakh population in the 1950s led to increases in the population in this republic. Dwindling labour migration in the 1970s and low fertility among the Russians slowed growth. In spite of the decline in fertility in the early 1990s the region has retained a high population growth rate. By January 2005 the United Nations estimated 1.22 percent and –0.30 percent annual population growth rates for Kyrgyzstan and Kazakhstan respectively. The population growth rate for Kyrgyzstan is indicative of a less developed country status. Less developed countries have an intermediate position with a growth rate of 1.27 percent, whilst the growth rate of the more developed countries stands at 0.30 percent per annum, and that of the least developed at 2.40 percent per annum. A noticeable decline has been observed in the annual growth rates of Uzbekistan (1.46%), Turkmenistan (1.42%) and Tajikistan (1.10%). This could be indicative of the influence of declining fertility rates and low out-migration (Haub, 1994; 37; United Nations, 2005b:514-515).

The population density in Kyrgyzstan, Uzbekistan and Tajikistan is 26, 59 and 45 inhabitants per square kilometre respectively, compared with a ratio of 14 and 5 inhabitants per square kilometre in neighbouring Turkmenistan and

Kazakhstan respectively. The majority of the population (67%) of Kazakhstan lives in urban areas, while the populations of the other countries live mainly in rural areas. The CARs are the most rural of the FSU. The high proportion of the population residing in rural areas in Central Asia reflects the regional investment policies of the FSU. Strong extended kinship network preferences and low incentives for urban in-migration reinforced these preferences, thus generating the lowest rural out-migration rates in Central Asia. Over the past few years this has begun to change. The economic crisis has brought unemployment and poverty to rural areas, and forced members of the younger generation to move to the cities in search of work (Ferdinand, 1994:28; Buckley, 1998; United Nations, 2006a:266-455).

Population trends seem to have stabilised slightly after the rapid population changes (intensive migration, a fall in the birth rate and an increase in mortality) that took place between 1991 and 1994 following the collapse of the Soviet Union. Despite the recent decline, the birth rate remains high in some republics compared to that of other countries in the European former republics. In many of these countries (European former republics) life expectancies have fallen, especially amongst males. However, high adult mortality is not expected to contribute to long-term population decline, given the above-noted replacement fertility levels still being experienced in some of these countries (Haub, 1994:37-44; United Nations, 2005b:586-587).

3.3 POPULATION STRUCTURE

Historically these countries have experienced higher fertility rates and this has contributed to the younger age structures of the past and the present. The young age structures virtually ensure population growth for the foreseeable future. Population pyramids (age and gender structure) of the former Soviet Republics until the early 1990s suggest a disturbing demographic past (see Figures 3.1-3.5). Population pyramids, the key to the life of a social group, are used to assess past history and also provide an indication of future trends. The gender and age composition of the pyramids indicates the effects of the low birth rates during the Second World War on the 45-49 age group. This

picture has not changed much, except for an upward shift in the age group intervals.

Figure 3.1: Age and gender structure of Kyrgyzstan 1993

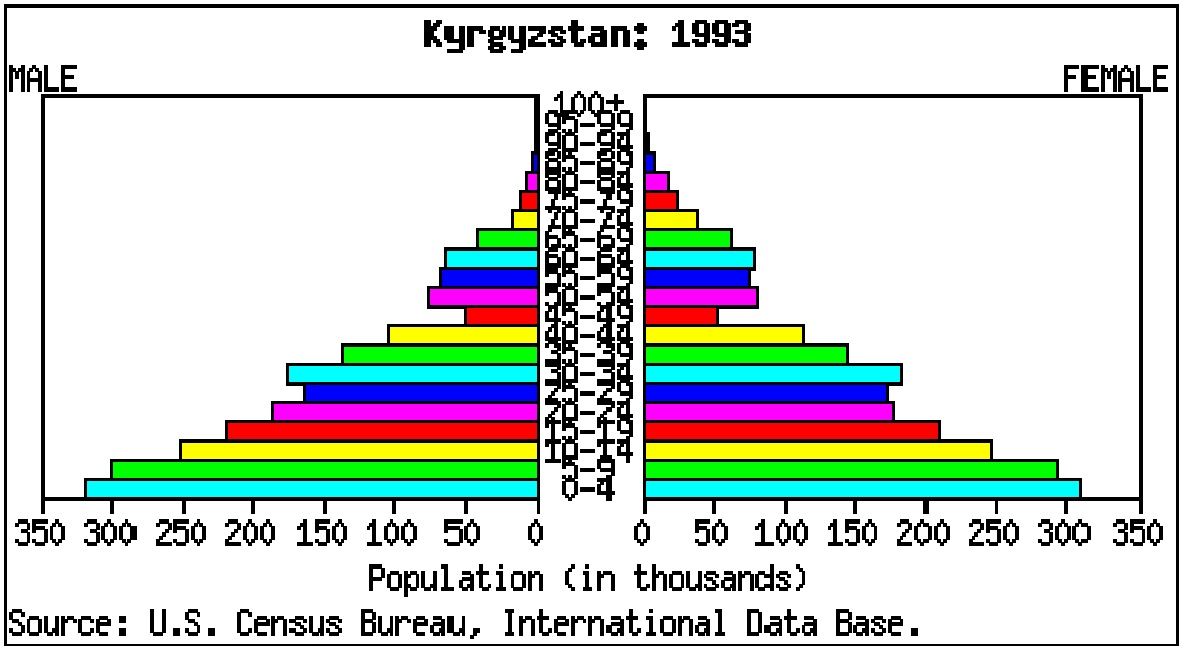


Figure 3.2: Age and gender structure of Kazakhstan 1993

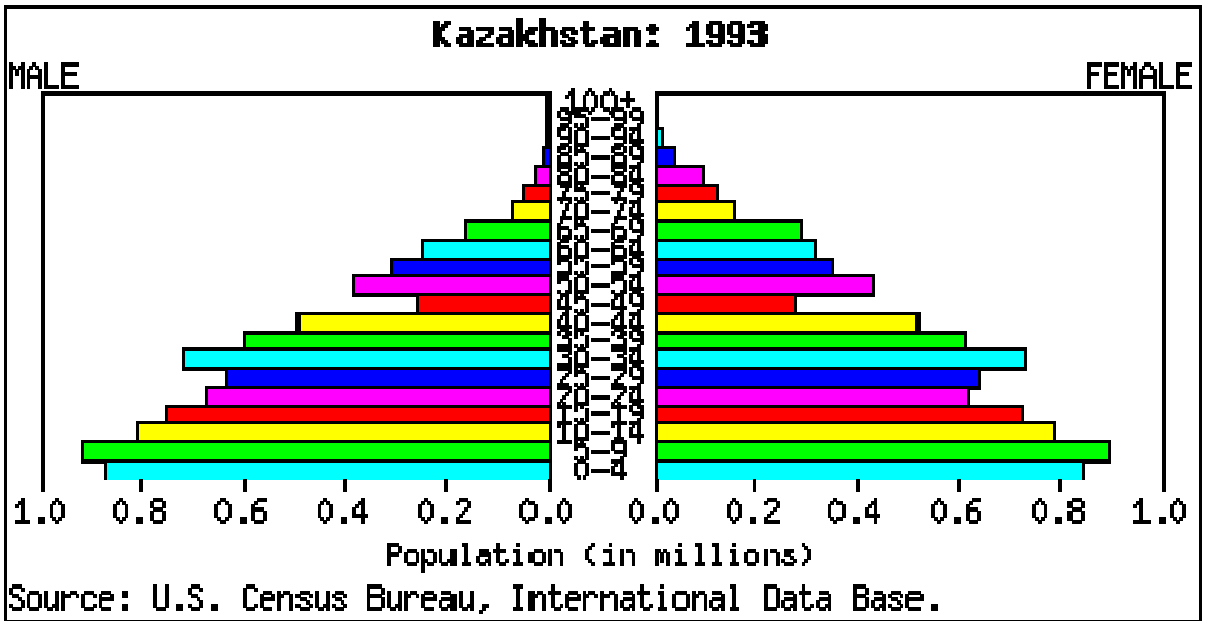


Figure 3.3: Age and gender structure of Tajikistan 1993

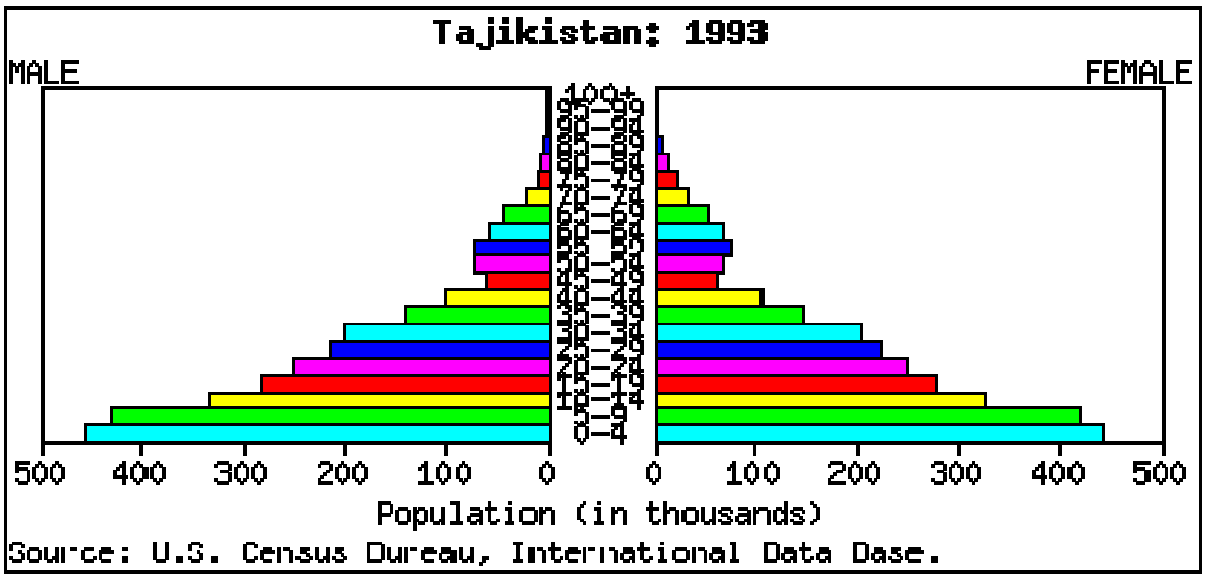


Figure 3.4: Age and gender structure of Turkmenistan 1993

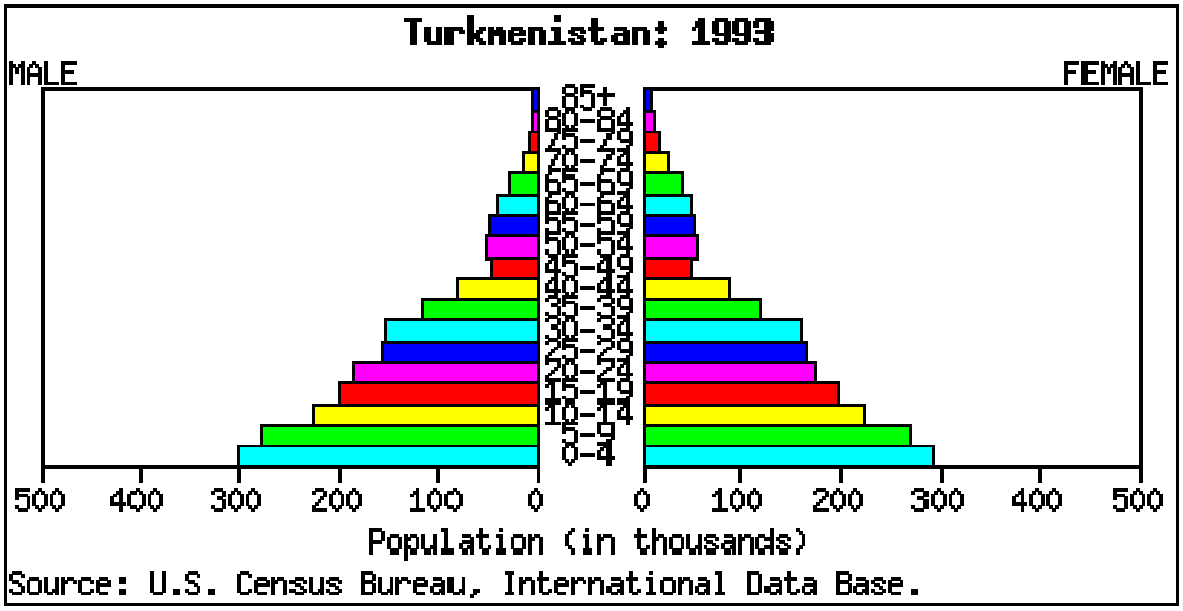
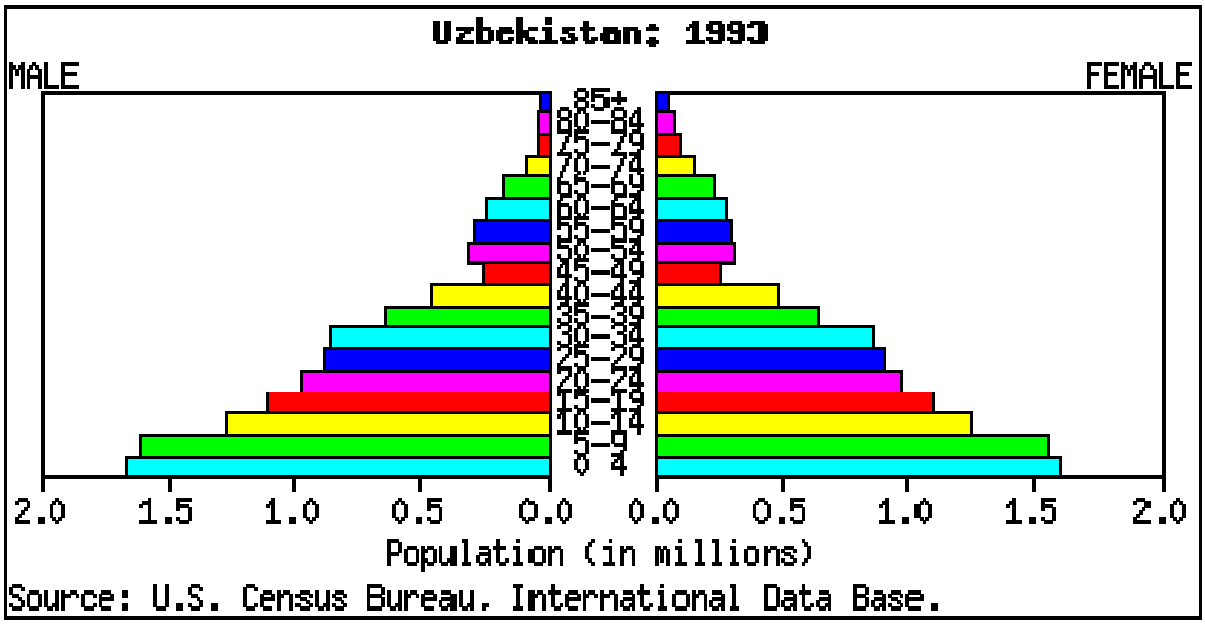


Figure 3.5: Age and gender structure of Uzbekistan 1993



The high mortality rates are particularly evident in the paucity of men above the age of sixty-five (see Figures 3.6-3.10). For instance, except for Kazakhstan, the population pyramids of the other four Central Asian Republics have a relatively smaller male and female population in the age interval 50-59, although these populations are definitely much larger than those in the 45-49 age group. There is also a paucity noted in the percentage of males in the 65+ years in the early 1990s in all five countries. However, an increase in the number of people in the 65+ age group has been noted in all CARs, especially in the female population (Haub, 1994:7-12, United Nations, 2005a:516-890).

Although there are clear commonalities in the population pyramids there are also distinct differences. The extremely broad-based pyramids of Central Asia are reminiscent of the historically high fertility rates experienced in this region. This high fertility rate produced a distinctive pattern in the age and gender structure of the early 1990s. Each age cohort was higher than the one above, except in the 45-49 age group. The impact of this pattern may be seen in the 2006 age and gender structures, as the number of childbearing women has increased, leading to an increase in the number of births each year.

Kazakhstan is the only country of the five CARs that presents a different pattern.

Figure 3.6: Age and gender structure of Kyrgyzstan 2006

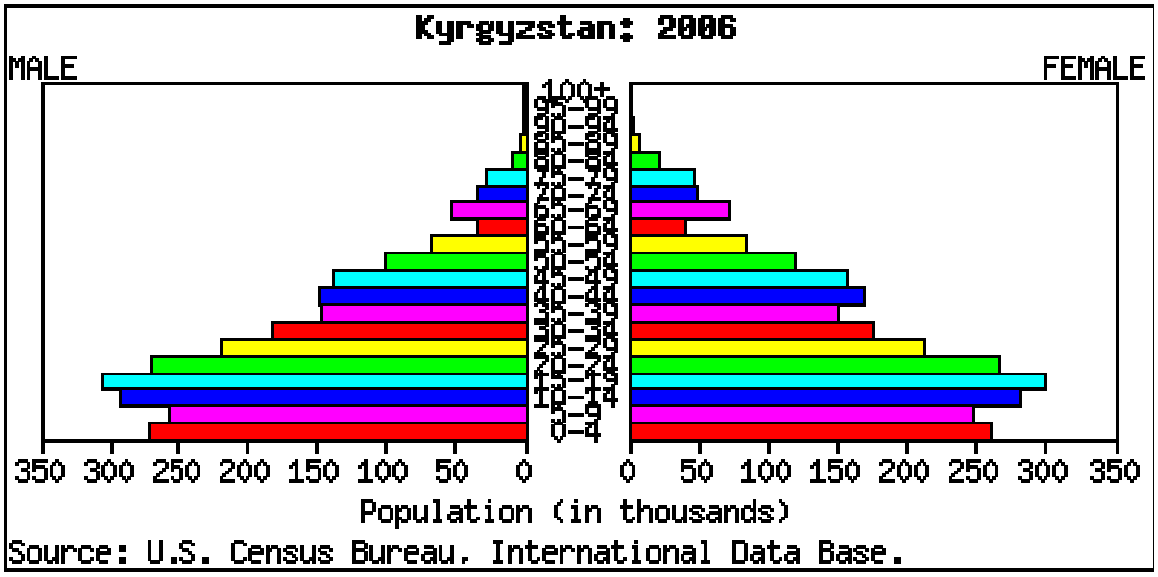


Figure 3.7: Age and gender structure of Kazakhstan 2006

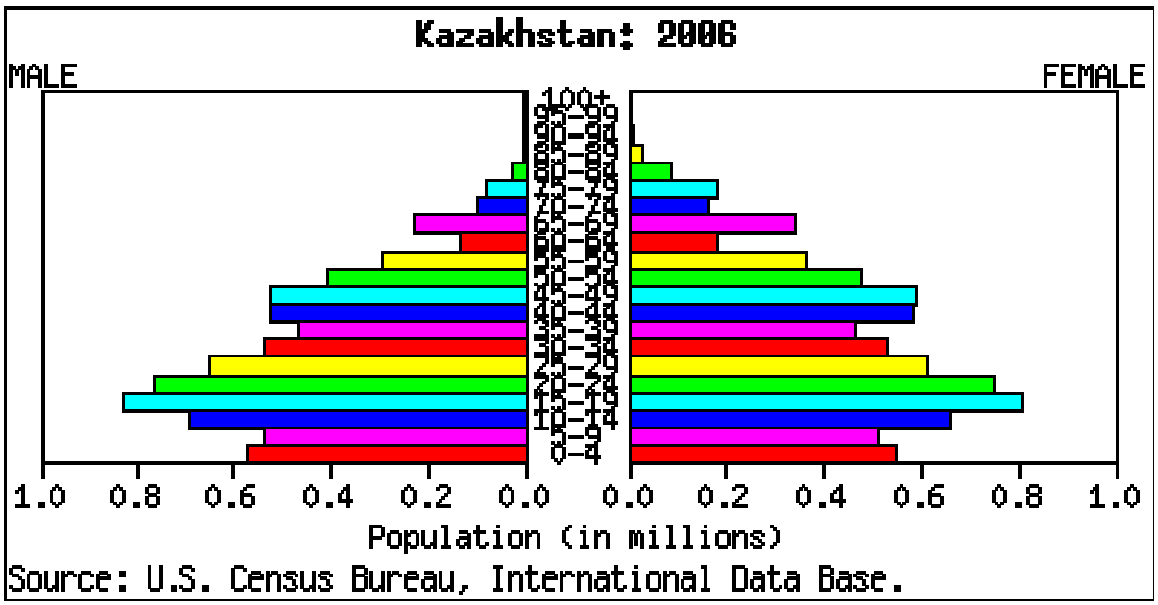


Figure 3.8: Age and gender structure of Tajikistan 2006

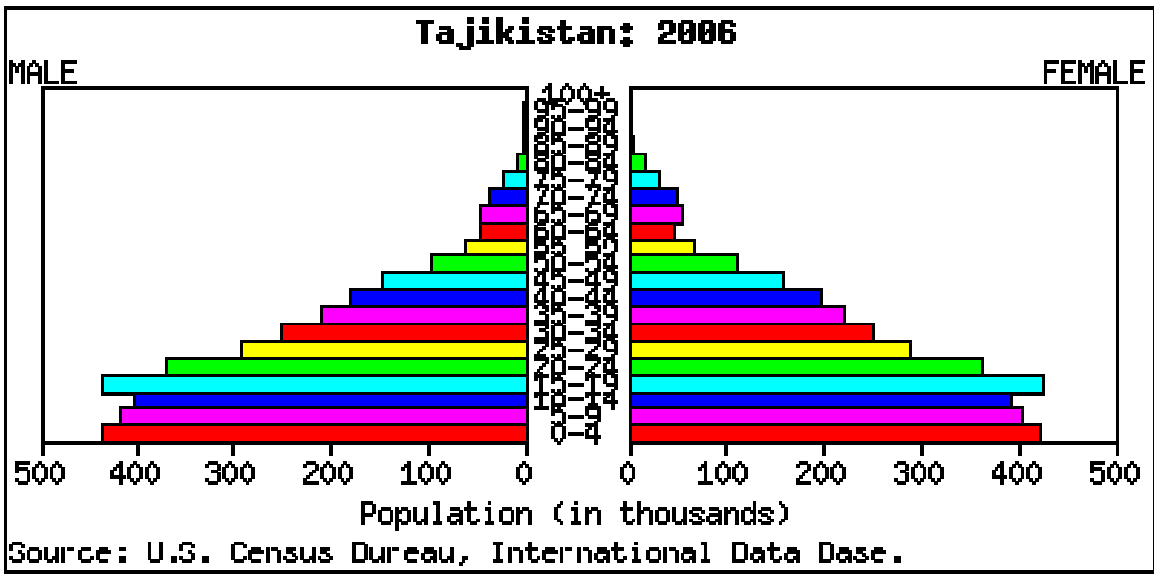


Figure 3.9: Age and gender structure of Turkmenistan 2006

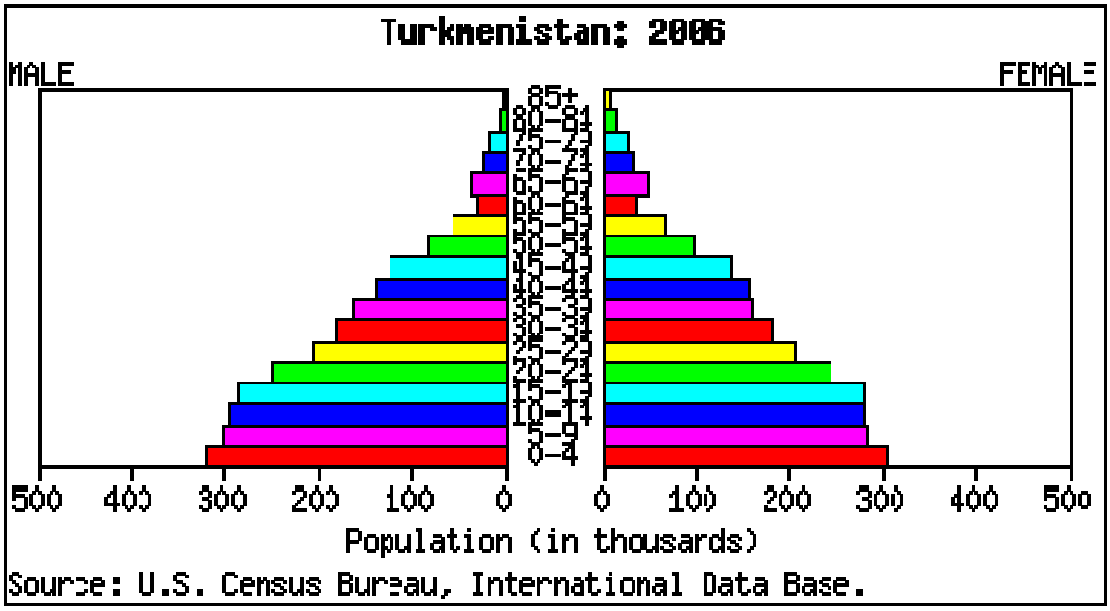
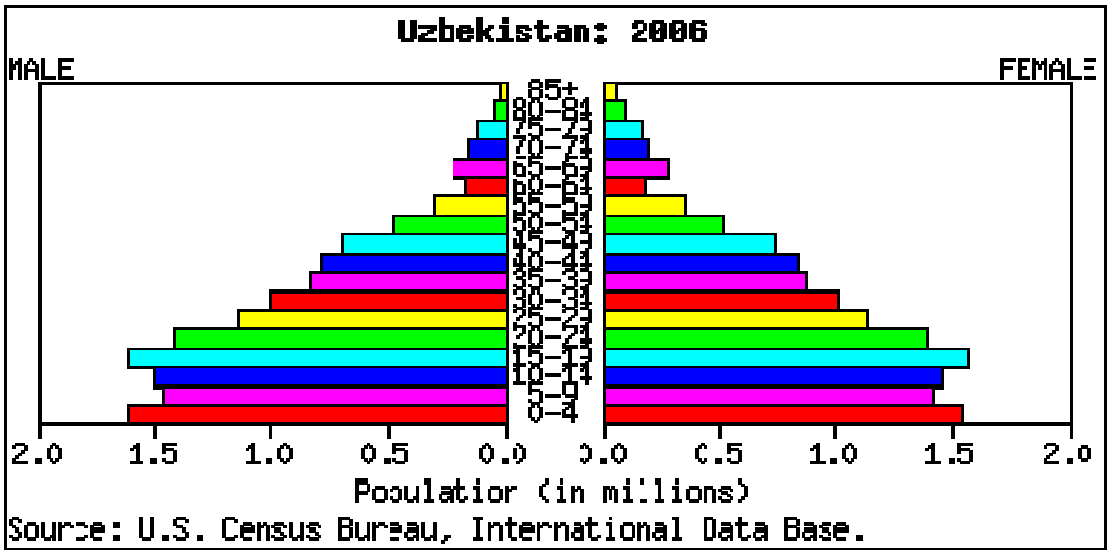


Figure 3.10: Age and gender structure of Uzbekistan 2006



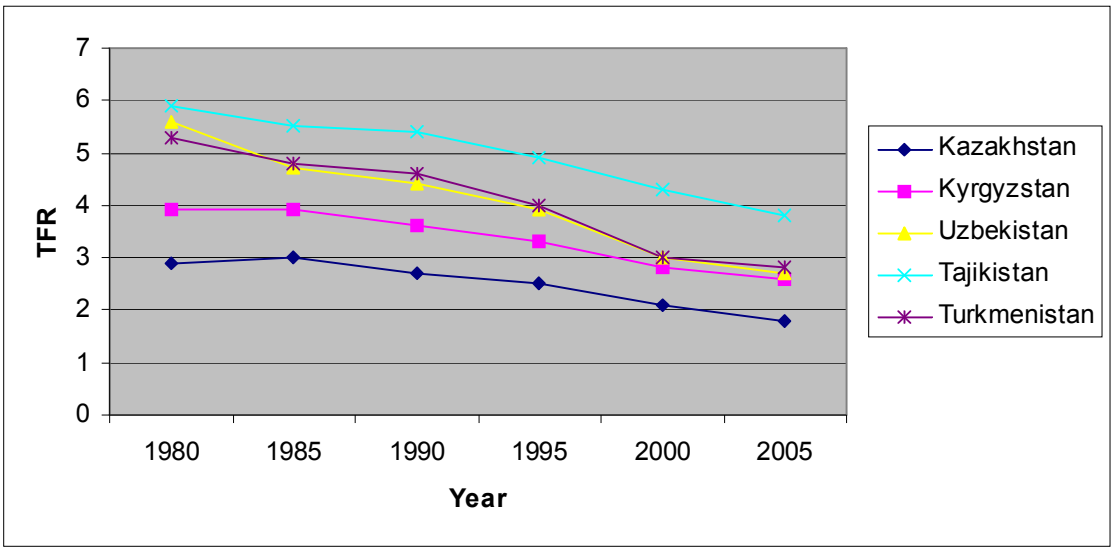
This difference was clearly influenced by the lower birth rates experienced in this country over a longer period of time than in the other republics, possibly due to the influence of the lower birth rates of the Russian population (Haub, 1994:13-14; Uzbekistan Demographic and Health Survey (UDHS), 1996:14; Kyrgyzstan Demographic and Health Survey (KRDHS), 1997:12; Kazakhstan Demographic and Health Survey (KDHS), 1999:12; US Census Bureau, 2006).

3.4 FERTILITY

Throughout Soviet rule, especially during the 1960s, population was perceived as a resource. The country maintained a pro-natalist policy to support families with several children, thus encouraging high fertility. Families were rewarded for having large numbers of children and abortions were restricted. Social programmes guaranteed maternity leave, and provided small grants and state pensions for mothers. During this time all the countries in this region had total fertility rates (TFRs) above 3.0 although these were below average for all developing countries except China. Uzbekistan led with a TFR of 6.8, followed by Turkmenistan, Tajikistan, and Kyrgyzstan with 6.7, 6.3 and 5.4 respectively, and finally Kazakhstan with 4.4 (Haub, 1994:13; Buckley, 1998; United Nations, 2005b:586).

In the early 1990s the highest TFRs in the FSU were to be found in Central Asia, with the exception of Kazakhstan, which had a TFR of 2.3. According to the UNDP 2006 figures (see Figure 3.11) these countries, again with the exception of Kazakhstan (1.9), still have TFRs above 2.1, although a decline has been noted in the total fertility rates within these countries, Kyrgyzstan: 2.6; Tajikistan: 3.9; Turkmenistan: 2.9; and Uzbekistan: 2.7 (UNDP, 2006).

Figure 3.11: Total fertility rates (TFR) Central Asia 1980-2005



Source: UNDP 2006

After the dissolution of the FSU increased contraceptive usage gained governmental support in the republics. However it is not possible to attribute the recent reductions in fertility to increased contraceptive use only. Low fertility rates in poor or developing countries are often associated with poor nutrition due to maternal depletion or stretched inelastic resources. The collapse of the economy played the most significant role in fertility reductions, together with changes in marriage patterns, and a high dependence on abortion (although the abortion rates have fallen in recent times). Although the abortion law was liberalised in 1956 the abortion rates were, however, much lower in the heavily Muslim-oriented republics such as Tajikistan and Turkmenistan (Popov, 1993:281; Haub, 1994:13; UNICEF/WHO, 2002).

In the former Soviet Union marriage was universal, with a very small proportion of women (between 3 and 13 percent) remaining single. Since the

collapse of the FSU the percentage age of women in Central Asia in the 20-24 age interval, who are not married, has risen to 20 percent in Kyrgyzstan, 23 percent in Uzbekistan, 40 percent in Kazakhstan, and 53 percent in Turkmenistan (Haub, 1994:15; 1996:79; KRDHS, 1997:73; KDHS, 1999:88; UDHS).

While the number of women in the 20-24 year age interval who remain unmarried is increasing, the rise in the number of births outside marriage has also increased. This rise in nonmarital births may be attributed to the growing socioeconomic independence of women in the former Soviet Republics (Haub, 1994; 16).

3.5 MORTALITY

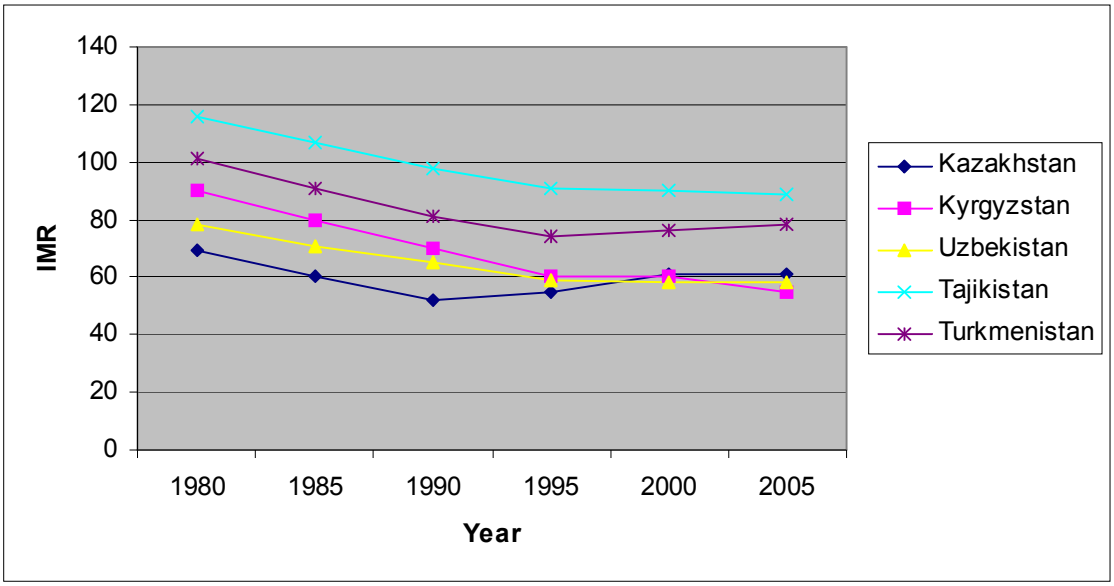
The former Soviet Union, classified as an industrialised and developed country before its collapse, had higher mortality levels than other industrialised countries. Within this empire the CARs experienced the highest mortality rates. In the 1930s life expectancy at birth was less than fifty years. Recurring famines and the two world wars led to a continued decline in life expectancy. However, the introduction and availability of medical and public health technologies led to an improvement in living standards and therefore to better health. Life expectancy thus improved, yet it never stabilised due to inadequate health care systems, alcoholism, severe environmental pollution in certain regions, and suicide (Haub, 1994:17).

During the late 1980s further improvements in life expectancy and mortality were noted. However, gains made in the period immediately prior to the collapse of the FSU were lost when a sharp increase in mortality was noted in ten out of the fifteen republics, with the exception of the five CARs. Interestingly during the early 1990s the CARs enjoyed improvements in life expectancy, ranging from 59 to 69 years for males and 70 to 73 years for females (United Nations, 2006a:228-416). Although life expectancy has been gradually dropping in this region since 1993, it has seemingly begun to stabilise. According to the United Nations 2005 figures the overall life

expectancy for both males and females ranges between 63 and 68 years (United Nations, 2006a:228-416).

A well-documented sign of deteriorating health conditions in any country is the apparent rise in infant mortality. Infant mortality rates in the CARs have increased drastically from the 1960 figures of 35 to 135 infant deaths per 1 000 live births to between 55 and 80 infant deaths per 1 000 live births (see Figure 3.12). In the former Soviet Union the Central Asian Republics had the highest reported infant mortality rate (United Nations, 2005b:107-109).

Figure 3.12: Infant mortality rates Central Asia 1980-2005

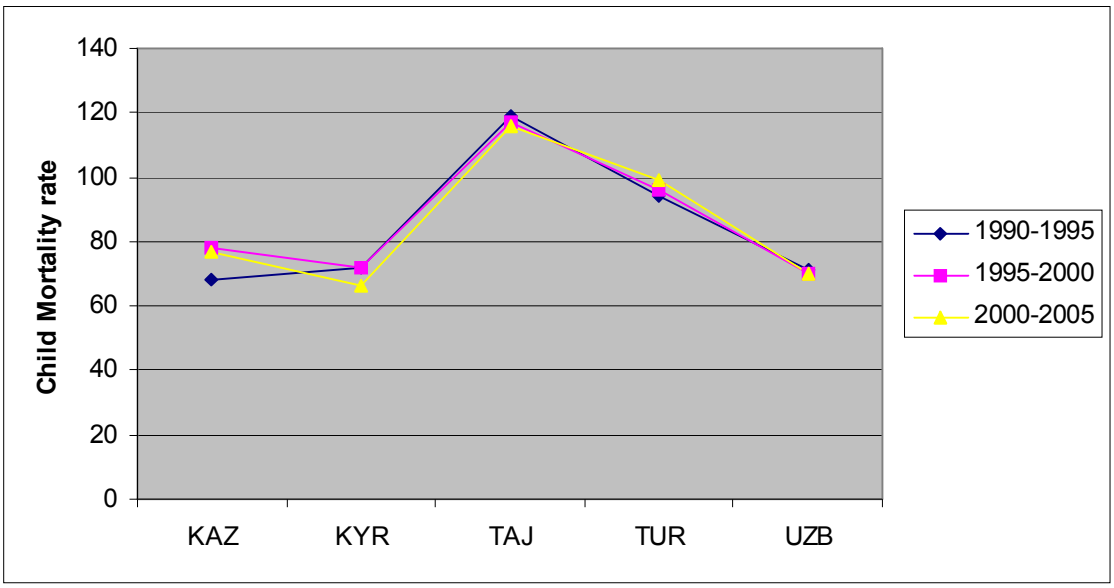


Source: UNDP 2006

Infant mortality rates vary significantly by province, especially in the least economically developed provinces, and in certain rural areas. Some rural areas have lower infant mortality rates than their urban counterparts. There are a number of possible reasons for this, for example, under-enumeration of infant deaths. It is possible that rural children who die soon after birth are simply not registered either as a birth or as a death, especially if born outside of a hospital. Some of these deaths could be related to either the malnourished mother giving birth to a malnourished child, or to an infant who becomes malnourished after birth (Andreev et al., 2003).

Data for child mortality rates (CMR) for the 1-4 age group before 1990 are not available. However, based on data from 1990 that is currently available (see Figure 3:13) we may assume that the levels were high. The CMR increased in Kazakhstan and Turkmenistan between 1990 and 2005, while it has gradually decreased in Kyrgyzstan, and remained almost the same in Uzbekistan and Tajikistan (United Nations 2005b:107-109; United Nations 2006a & b).

Figure 3.13: Child mortality rates Central Asia 1990-2005



Source: UN 2006a; UN 2006b

3.6 AGING

A comparison of the 1993 and 2006 population pyramids (Figures 3.1-3.10) indicates that the number of the elderly is growing. Currently, the percent of the population past retirement age is highest in Kazakhstan. The other republics have relatively lower percentages of populations past retirement age although there are more 65-69 year olds than there are 60-65 year olds in all the countries. The high fertility rates in the republics have kept the percentage of the population past retirement age low. As fertility begins to decline the proportion of the population past retirement age will increase. Increased numbers of pensionable age individuals also represent a challenge to the emerging states in the region given the resource constraints that the respective governments are experiencing. The demands for health care and

material provision, especially for pregnant mothers and children under the age of five, increase in competition with the increased number of pensioners.

3.7 SUMMARY

Fertility and mortality differentials between the countries stem from the difference in context between the states in the CARs. Relatively poor infrastructure and a lack of economic diversification between the states underpin the demographic gap that exists between the countries. Regional variations in fertility, mortality, migration and aging exist across the states of this region. Greater attention to the context in which these differentials emerge and their influence on child health and nutrition is required in order to make an accurate assessment of the current demographic trends and to plan for future health and social policy demands.

CHAPTER 4

4. LITERATURE REVIEW AND CONCEPTUAL CONSTRUCTIONS UNDERLYING THE STUDY

The purpose of this chapter is to present the conceptual framework, including a review of the relevant literature, used to explain the socioeconomic, health and environmental determinants of children's nutrition. The chapter briefly explores the links between socio-historical, socio-political (structural), environmental, socio-economic and health factors, and child nutritional status. Chapter 5 fully explores the link between the socio-historical and socio-political context, which is the invisible central predictor variable that has a bearing on child malnutrition and child nutritional status in Central Asia, drawing on *structural violence theory* as conceptualized by Johan Galtung.

4.1 CONCEPTUAL FRAMEWORK FOR THE ANALYSIS OF CHILD UNDERNUTRITION

More than ten years after the 1996 Rome World Food Summit (WFS) the number of undernourished people in the world remains consistently high. In 2001-2003 FAO estimated that there were 854 million undernourished people worldwide: 820 million in the developing countries, 25 million in the transition countries (including the Central Asian Republics), and only 9 million in the industrialised countries. In the developing world, up to one out of three people die prematurely from malnutrition or preventable hunger-related diseases every year. Most countries have sufficient food to meet their people's requirements. Malnutrition, however, persists in almost all countries. This begs the question – why? (FAO, 1996 & 2005:1-4; UNICEF/WHO, 2006:1).

The most common form of malnutrition in developing countries is undernutrition, in terms of which food intake is inadequate to meet the energy requirements of the body. In developing countries, inadequate food intake is the usual cause of specific nutrition-related diseases, and is a major force behind increased rates of infection, infant mortality, reduced productivity, and

shortened life spans. Malnutrition, however, is not just a problem for the world's poor countries – it exists everywhere, thus signifying that it is not simply a question of access to food. The populations of developed countries, on the other hand, suffer primarily from overnutrition caused by eating too many calories derived from fat and refined sugar. Overnutrition is associated with a high prevalence of obesity and chronic diseases such as coronary heart disease, hypertension and diabetes (World Bank, 2006a:10, 49).

In most developing countries, the available food supplies at the national level doe not ensure that adequate food is available at the regional, household or individual level. Factors that may influence the ability of individuals to acquire and utilise nutrients include local food and water availability, food prices, the capacity of the country concerned to import food, incomes and purchasing power, political decisions, the workload and education level of women, local customs and food taboos, sanitary conditions, and health status. Thus, because social; environmental; political and economic factors contribute to malnutrition, solutions require more than simply the provision of food and nutrients (United Nations, 2006a:24).

4.1.1 Introduction

Human nutrition as a science was initially developed in order to advance the knowledge of biochemical metabolism and its clinical and physiological implications. It was during the early 1950s that the problem of malnutrition in the developing countries came to the attention of Western countries. Human nutritionists saw this as their problem to solve. In the 1970's scholars and observers began to acknowledge that human nutritionists alone could not solve the problem of malnutrition. It became a societal problem, requiring the attention and efforts of economists, political scientists, anthropologists, sociologists, and other social scientists (Jonsson, 1994).

A number of efforts have been made to develop conceptual frameworks addressing the causes of malnutrition in society. In the late 1980s, UNICEF developed and promoted a comprehensive conceptual framework in terms of which nutritional status was identified as an outcome of immediate, underlying

and basic causes (UNICEF/WHO, 1998:24). This framework has been widely used in the quest to understand the causes of child malnutrition in many developing countries. Sustainable and stable access to food, adequate maternal and childcare practices, access to basic health services, and a healthy environment were identified as the three most important conditions necessary for adequate dietary intake and the absence of disease. Access to resources is determined by political, cultural, religious, economic and social systems (Jonsson, 1995).

Notwithstanding, in the years following the view that malnutrition was caused by a lack of food dominated thinking about nutrition interventions. In the early 1970s, it was acknowledged that there were serious flaws in the food-based approach. Lack of food has been identified as a common cause of adult malnutrition. However, in young children it is seldom the only cause of undernutrition. In principle, addressing the immediate problems will only solve a nutritional problem in its immediate sense. However, sustainability is most unlikely if the underlying and basic structural causes are not addressed at the same time (FAO, 2005:1-4).

The causes of child undernutrition are complex, multidimensional and interrelated, ranging from factors as fundamental as political instability and slow economic growth to those as specific in their manifestations as respiratory infection and diarrhoeal disease. Poor nutrition often starts *in utero* and extends, particularly in the case of girls and women, well into adolescence and adult life. Undernutrition that occurs during childhood, adolescence and pregnancy has an added negative impact on the birth weight of infants.

Low birth weight (LBW) infants who have suffered intrauterine growth retardation (IUGR) as foetuses are born undernourished, and are at a far higher risk of dying in the neonatal period or later infancy. For example, each year about 11 million babies in South Asia and 3.6 million in sub-Saharan Africa are born with LBW (UNICEF/WHO, 2002:61). If they survive, they are unlikely to catch up significantly on this lost growth later, but are more likely to

experience a variety of developmental deficits than those children not exposed to poor nutrition. An LBW infant is thus more likely to be underweight or stunted in early life. The consequences of being born undernourished extend into adulthood, leading to a host of other debilitating factors later in life (UNICEF/WHO, 2002:61-62).

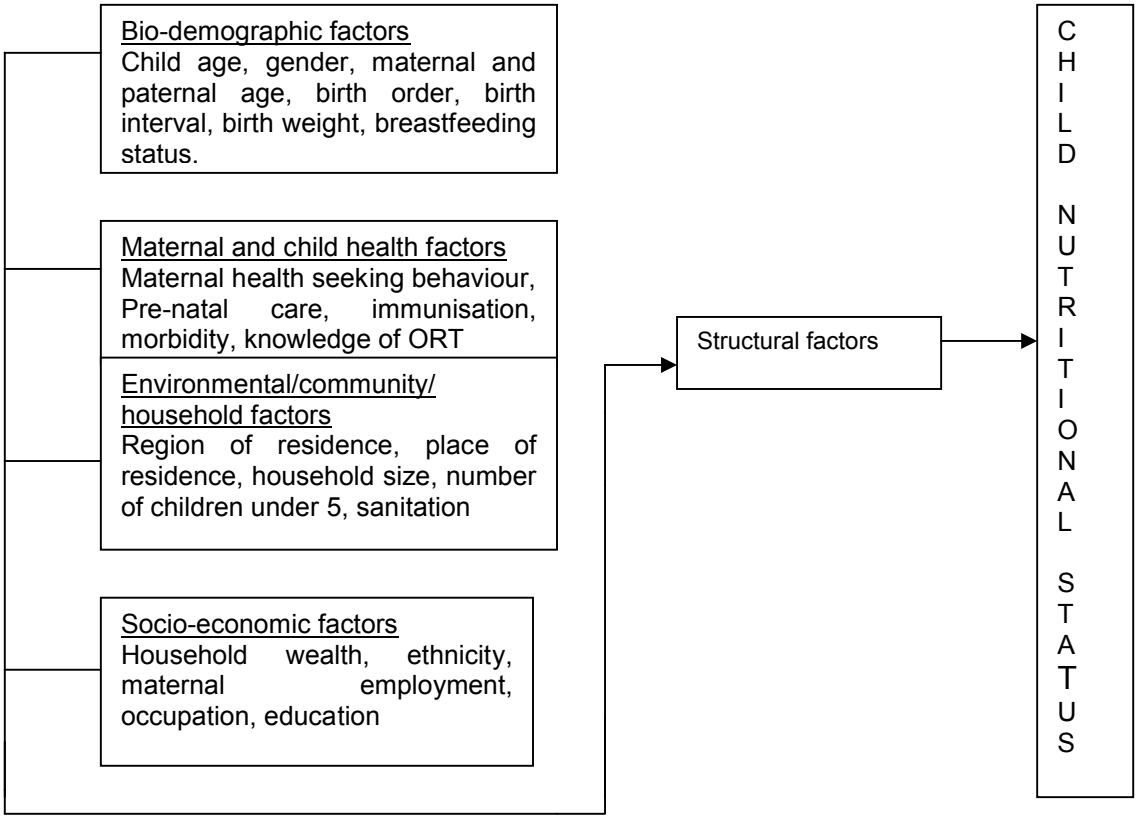
During infancy and early childhood, frequent or prolonged infections and inadequate intakes of nutrients, particularly energy, protein, Vitamin A, zinc and iron, exacerbate the effects of foetal growth retardation. Most growth faltering, which results in underweight and stunting, occurs within a relatively short period from before birth until about two to three years of age (UNICEF, 2002:79).

About 149 million children in developing countries are undernourished. More than half live in South Asia, whilst the absolute number (22 million) of undernourished children has increased in sub-Saharan Africa (UNICEF/WHO, 2002:1). A range of misconceptions persists in the study of undernutrition, for example, the perception that mild to moderate undernutrition does not increase the risk of death. Another misconception about the contribution of undernutrition to mortality is the common tendency to equate undernutrition with inadequate food intake. A third problem is that the method used to classify deaths, where the focus is usually on the proximate cause of death, for example, infectious disease, conceals the contribution of undernutrition to mortality. In order to ensure a better understanding of what causes such problems, it is necessary to consider systematically the operation of various determinants of undernutrition at different levels in society (UNICEF, 2002:16).

In this study, a conceptual framework, which would help shed light on Central Asia's child health characteristics, was sought. This framework was needed to facilitate the understanding of the context of child nutrition in Central Asia at a structural level, by taking into account the sociological as well as environmental variables that are relevant. The conceptual hypothesis derived from the model presented in Figure 4.1 is that socio-economic, socio-

environmental and health factors act through a range of proximate and non-proximate determinants to influence child nutrition. These factors may be grouped into five broad categories. The proximate determinants include bio-demographic, socio-environmental, socio-economic, and health factors, while the non-proximate are the socio-historical and socio-political or structural factors. This framework differs from some other frameworks in the degree of importance attributed to the *socio-historical and socio-political context.* This deliberately broad term refers to the spectrum of structural factors in society that are not possible to measure directly at the individual level.

Figure 4.1: Conceptual framework



'Context' therefore encompasses a broad set of socio-historical and socio-political aspects of a state system of which the impact on individuals tends to elude easy or simple quantification, but which exerts powerful, determinate and formative influences on the health opportunities of children and hence life chances. The most relevant contextual factors, that is, those factors that play the greatest role in generating social inequalities, may differ considerably from one country to another. Equally, certain interventions or policies are likely to be effective for a certain socio-historical and socio-political contexts and not for another. It is on these grounds that the role of socio-historical and socio-political factors in child undernutrition is being explored in this study.

The following subsection describes the relationship of proximate characteristics within the framework. The next subsection discusses the socio-historical and socio-political, structural or non-proximate factors.

4.1.2 Description of relationship of characteristics within the framework

Broadly speaking, the main argument underpinning this study is that children living under different socio-historical and socio-political conditions respond to and are affected differently by socio-economic, environmental, and health factors and that this produces a variety of outcomes in child malnutrition rates and problems.

4.1.2.1 Bio-demographical factors

Demographic indicators are very useful to promote a better understanding of certain aspects of malnutrition.

(a) Age of child

It has been observed in many developing countries that the nutritional status of children deteriorates rapidly during the first year of life (especially after the age of six months) and, in certain instances, increases significantly with age, but that this age group (below six months) also has lower rates of underweight children in general, probably because the children might be breastfed until they at least six months old. Age also reflects the typical deterioration of linear growth in children that is believed to occur between the ages of one and three

(Ndiaye, 2002). Underweight (weight-for-age) rates begin to increase substantially at the age at which children are no longer exclusively breastfed. Weaning (usually between 18-23 months old) increases exposure to infectious agents and increases the likelihood of diarrhoea that will detract from a child's weight gain (FANTA, 2003; Waters et al., 2004). Children at this age have already begun consuming other foods and may therefore be ingesting contaminated food or liquids. They are also becoming more mobile and may therefore be exposed to potential hazards in their surroundings. The weaning period is also a period during which immunity decreases, hence the importance of immunisation in order to boost the immunity levels of children under the age of three years.

(b) Gender of child

The interrelated issue of gender bias and gender differentials in child health and intra-household resource allocations has been reported in several studies (Stini, 1975; Stinson, 1985; Dettwyler, 1991; Leonard, 1991; Basu, 1993; Ray, 1997). Arguably gender indicates the importance which a household assigns to children when apportioning resources (Sahn & Stiffel, 2002), or may show linear growth between boys and girls (Agnihotri, 1999). This study examines the possible differences between boys and girls, and between children of different age groups with regard to their nutritional status.

Nearly half the nutrition studies have found that male children are less well nourished than females. This is true of almost all of the studies carried out in East and Southern Africa (Garrett & Ruel, 1999; Stiffel et al., 1999). Of the 35 papers covering countries in Africa, Latin America and Asia selected for inclusion in a meta-analysis to study the determinants of health and nutrition (Chamarbagwala et al., 2004) only one paper reported that being male was associated with better nutrition. In Indonesia, for example, boys were associated with a higher risk of malnutrition as compared to girls (Waters et al., 2004). Similar results were found in South India in children aged 5-7 years (Jeyaseelan & Lakshman, 1997), and in rural Nepal where boys consistently showed lower weight-for-age and height-for-age scores after controlling for other socioeconomic factors (Hotchkiss et al.,2002). These results are in

contrast to the popular belief that, in societies where males are the main decision makers in the household, or where parents have a strong preference for male offspring, male children are better nurtured than female children. In many of these societies, bearing a son ensures an increased status for the mother, and it is therefore impossible to believe that mothers would not be more biased toward their male offspring (Bhuiya et al., 1986).

Conversely, an analysis of data sets for Pakistan, Russia, Peru, Jamaica and South Africa revealed that no significant differences existed between the health and nutritional status of boys and girls in Russia, in contrast to the other countries in the study. Similarly, Fedorov and Sahn (2005) did not find any significant differences in the growth patterns of boys and girls in Russia. This contrasts with Pakistan and South Africa where boys do better than girls in short-term nutritional status, although this advantage disappears in the long run (Ray, 1998; Bomela, 1999).

Data from India indicates discrimination against girls in terms of infant feeding, healthcare and nutrition, and correlates malnutrition status with gender (Rao & Kanade, 1992; Kishor, 1993; Saito et al., 1997). Leonard et al., (2002) found that the declines in linear growth were more pronounced among girls of Evenki (ethnic group) origin in Siberia. This raises the question as to whether there may be differential treatment of boys and girls in certain parts of Russia given the stressful social and economic conditions in Russia. The greater impact on the girls may reflect gender bias in parental attention and/or resource allocation, as has been documented in parts of South Asia (e.g. Chen, 1980). Mishra and Retherford (2000) found that, despite widespread evidence of discrimination against girls in India, the proportions of stunted and underweight were identical for boys and girls. This is confirmed by several other studies conducted in developing countries where there is widespread gender discrimination that have also failed to detect a gender differential in child malnutrition. The reason for this unexpected result is unclear. Clearly careful further examination of gender bias in developing countries with regard to nutrition is required.

(c) Maternal and paternal age

Few studies have examined the effect of maternal age on child nutritional status. A comparative study using DHS data from 39 developing countries did not find a consistent pattern between stunting and maternal age. However, a study conducted in Bolivia found that the likelihood of stunting decreases with maternal age (Forste, 1998). The age of the mother has been found to be a strong predictor of child health. Higher levels of infant mortality are associated with both childbearing among adolescents and women over 35 years of age (Martin et al., 1983; Gubhaju, 1986; Tagoe-Darko, 1995).

The mother's age typically serves as proxy for experience in child caring. A lack of experience in childcare is often associated with very young mothers. Moreover, their physiology is likely to cause them to experience a higher level of malnutrition and mortality in terms of their children as compared to older mothers. While age may reflect biological factors, it also reflects socioeconomic considerations, including status in the household hierarchy. Household decision-making could influence the resources that the mother may receive for herself as well as for her child, with inadequate resources possibly leading to adverse nutritional consequences. This is more likely when the mother is very young (Smith & Haddad 2000). Wessel et al., (1996) found that if the mother were less than 20 years old this was likely to be a risk factor for low birth weight. In Russia, the mother's age did not have an effect on the growth patterns of children of less than six years of age. None of the literature reviewed for this section of the study indicated any evidence in support of the father's age having an effect on child nutritional status (Martin et al., 1983; Gubhaju, 1986; Tagoe-Darko, 1995; Wessel et al., 1996; Smith & Haddad, 2000).

(d) Birth order

Horton (1986) conducted a study in the Philippines on birth order and child nutritional status. In this study, he found that the birth order of a child has a significant impact on the nutritional status of the child. The health of a mother and her consequent ability to provide nutritional care for her child deteriorates with each addition to the family. Furthermore, recent research findings show

that stunting increases as birth order increases (Sommerfelt & Stewart, 1994; Forste, 1998; Aturupane, 2006). Child overcrowding in a household competing for inelastic resources might, for example, lead to maternal depletion syndrome. Exhaustion and other factors related to pregnancy and delivery might make it difficult for the mother to give undivided attention to each of her children. In a study conducted in India, Mishra and Retherford (2000) found that children with three or more older siblings are more likely to suffer chronic malnutrition than are children from smaller families. This is most probably because competition for food increases with family size.

(e) Birth interval

Birth intervals of less than two years are associated with increased childhood mortality rates (Gubhaju, 1986; Sullivan et al., 1994; Tagoe-Darko, 1995; Curtis & Steele 1996). Children spaced two or more years apart have a greater chance of being well cared for, of being breastfed for longer, and of being taller and heavier (Gubhaju, 1986; Bastien, 1992). Comparatively speaking, stunting is greater amongst children with a prior birth interval of less than 24 months than among children following longer birth intervals (Boerma et al., 1990; Sommerfelt & Stewart, 1994; Forste, 1998).

(f) Birth weight

The relationship between maternal health and nutrition, and low birth weight has been well documented. It has also been shown that low maternal socio-economic status (SES) is associated with an elevated risk of low birth weight in the baby compared to a high SES (Sanghvi et al., 2001: Radhakrishna & Ravi, 2004).

Women with low status (*women's power relative to men)* tend to have less control over household resources, less access to information and health services, poorer mental health, and lower self-esteem. These factors are thought to be closely linked to the women's own nutritional status and the quality of care they receive, and, thus in turn, to the children's growth weights and the quality of care they receive (Smith et al., 2004). Nutritional problems continue throughout the lifecycle. A baby faces a higher risk of disease and

premature death if the mother is malnourished, sick, or received inadequate prenatal and delivery care (Tinker & Ransom, 2002). The nutritional status of girls and women significantly affects first and foremost the development of the foetus, which depends on the mother for nourishment (Ramakrishnan et al., 1999). Maternal malnutrition leads to childhood malnutrition as underweight and/or anaemic mothers are more likely to give birth to low-birth weight infants (Adair, 1987; Scholl & Hediger, 1994). When malnourished female adolescents enter their adult years and fall pregnant they often fail to gain enough weight, which puts their babies at risk of low birth weight. Thus the cycle of malnutrition continues. Pongou et al., (2004) report that in Cameroon the size of the child at birth definitely affected the child's nutritional status. Children of low birth weight tended to have lower weight-for-age z-scores as compared to those of average or larger birth weight.

(g) Breast feeding

In many developing countries, prolonged breastfeeding without adequate supplementation of food after the age of 6 months, as well as poor weaning practices predisposing to many types of infections, may explain the lower nutritional status that very often occurs as the child grows. However, other studies conducted in developing countries report that 1-5 months of breastfeeding is a factor favouring the attainment of optimal nutritional status (Magnani et al., 1993; Pongou et al., 2004; Fotso, 2004).

A lengthy period of breastfeeding was found to have a spurious relationship with stunting and wasting during infancy. The positive effect on stunting may reflect the fact that the nutrients in breast milk are only sufficient for a child's growth for a certain number of months, after which other food supplements will be needed. Women who breastfeed for longer may be doing so because they may, as a result of poverty or inadequate nutritional knowledge, lack the resources to provide their children with adequate nutrition (Ukwuani & Suchindran, 2003; Sasisaka et al., 2006). Therefore, poverty rather than prolonged breastfeeding may be the cause of malnutrition. Alternatively, mothers of weaker children may wait longer to wean them, or the quality of complementary feeding may be lower for children who are still breastfeeding

(Madise et al., 1999). In Nicaragua, breastfeeding for more than 12 months was identified as a risk factor for underweight (Sasisaka et al., 2006). On the other hand, other reports emphasise that breastfeeding decreases infant mortality (WHO, 2000; UNICEF/WHO, 2004; Akmatov et al., 2006).

4.1.2.2 Maternal and child health factors

The promotion of child survival and child health has long been an important aim of the wide range of policies worldwide aimed at improving the overall health status of a population. Important advances have been made in making accessible the means to combat the most common diseases of childhood, and an increasing number of children are routinely immunised against diseases that are potential killers, such as measles. Major inroads have been made into reducing suffering and death from diarrhoeal diseases and acute respiratory infections. Furthermore, there is growing literature on health-seeking behaviours and the determinants of health services utilisation, especially in the context of developing countries.

(a) Mothers' health-seeking behaviour

The behaviour of the mother in seeking healthcare services, for either preventive or curative purposes, is an important factor in determining child survivorship through the child's health and nutritional status, as well as through her own health status (UNICEF/WHO, 1998; WHO, 1999).

The factors determining health behaviours may be seen in various contexts: physical, socio-economic, cultural and socio-political. Therefore, the utilisation of a healthcare system – public or private, formal or non-formal – depends on sociodemographic factors, social structures, levels of education, cultural beliefs and practices, gender discrimination, status of women, the nature of economic and political systems, environmental conditions, and the disease pattern and healthcare system itself.

The beneficial impact of the mother's education on child nutritional status is partially mediated by her positive behaviour in relation to modern healthcare. In many developing countries, however, even within the same educational

group, the attitude of the mother regarding modern health facilities and their adequate use may vary depending on other mediating factors. On the other hand, education may facilitate the use of available health facilities, where educated mothers benefit more from the available health services (Barrera, 1990). In this case, the relationship between maternal education and the use of health services and/or health-seeking behaviour may be complementary. Conversely, uneducated mothers living in a community of educated mothers may be positively influenced to increase their use of healthcare facilities, because educated mothers are more prone to endorse health-promoting behaviour (Fotso, 2004). The implication is that the presence of a high proportion of educated mothers in a community encourages uneducated mothers to increase visits to healthcare facilities for themselves and for their children (Desai & Alva, 1998). However, conversely, a lack of healthcare facilities may limit a mother's ability to seek care for herself and her child before, at and after delivery.

Assessing the socioeconomic and environmental factors for child nutritional status in Cameroon, Pongou et al. (2004) found that maternal health-seeking behaviour (MHSB), specifically prenatal attendance, was positively associated with child nutritional status. The universal indicator variables for MHSB are prenatal visits, a tetanus injection, medical assistance at delivery, knowledge of ORT, and possession of a health card for the child. This result, however, implies that prenatal attendance only, which is one component of MHSB, has a positive impact on child health in Cameroon.

Thind and Cruz (2003) studied the determinants of children's health services utilisation in the Philippines. Their results indicate that maternal education and the number of illnesses a child experiences determine the decision to seek care. Once the decision to seek care has been made, the choice between a public or private provider is affected by the family's economic status and the size of the household. Goldman and Heuveline (2000) in their study on health-seeking behaviour for child illness in Guatemala found that modern medical care plays a major role in the treatment of infectious illnesses among children in rural Guatemala, with visits to pharmacists, doctors and the staff at

government health facilities occurring much more frequently than visits to curers and other traditional practitioners. In general, families are much more likely to seek a health provider when a child experiences fever and gastrointestinal symptoms, as compared with respiratory and other symptoms, and when a mother perceives the illness to be serious. The estimates also indicate that infants, low parity children, and children assessed as having generally been in good health are more likely to visit providers than other children. However, the particular associations often vary according to the type of provider.

Sasisaka et al. (2006) found that in Nicaragua, living considerable distances from the nearest health facility did not deter the mothers from seeking healthcare. In Pakistan, it was found that living four kilometres from a health facility militated against the use of a medical service (NoorAli et al., 1999). In addition, a survey in Zambia noted that nearly 50 percent of people living less than five kilometres from a health provider chose to seek healthcare, while only 17 percent of those who lived at a distance of more than 40 kilometres received medical care.

Balabanova et al., (2004) conducted a study in the FSU to examine patterns and determinants of healthcare utilisation. They found that unaffordability, probably due to an impoverished status and environment, rather than lack of health knowledge was a common factor in five of the eight countries they studied. A decrease in the provision of health services and a decline in the ability or willingness of mothers to bring their children to health centres were found to be factors in the deterioration in young African children (4-23 months) in two districts of Congo (Martin-Prével et al., 2000). Regional differences with respect to access to healthcare services were observed in a study conducted in rural Nepal. Utilisation of healthcare services differed significantly (Hotchkiss et al., 2002) depending on the ecological zone (mountains, hills) where the mother lived and whether there was a road.

Using data from Senegal, Linnemayr and Alderman (2006) found that the presence of a health facility had a positive and statistically significant impact

on child nutritional status. The use of a traditional healer or an unqualified doctor was found to be significantly associated with child mortality in a study conducted in Karachi between 1993-1994 (D'Souza, 2003).

(b) Prenatal care

Several types of preventive and curative services are most likely to influence child growth. With respect to preventive services, prenatal care may influence maternal nutrition and weight gain in pregnancy as well as parenting skills. Better parenting skills may lead both to improved dietary intake as well as to a decreased incidence, severity and duration of illness (Hotchkiss et al., 2002). Access and provider characteristics of healthcare services in developing countries have been found to have an effect on their utilisation, especially by pregnant women, women in labour and mothers with young children (Alderman & Lavy, 1996; Acharya & Cleland, 2000).

Chamarbagwala et al., (2004) found that infants and children of mothers who had received antenatal care, either by a medical doctor or a nurse, and who had received professional assistance during delivery, had a higher likelihood of survival. Good health of the mother during pregnancy had a positive significant effect on the nutritional status of children in India (Devi & Geervani, 2004).

(c) Immunisation

During the 1980s, considerable efforts were made by countries and international organisations to improve the coverage of immunisation. In almost all countries, an improvement of immunisation coverage continued during the 1990s. As a result, in many countries, including developing countries, immunisation is almost universal (Minujin & Delamonica, 2004). In India, Devi and Geervani (1994) found that, although the immunisation given to a child was not significantly associated with chronic nutrition, it emerged as a significant factor for current nutritional status. Gebreselassie (2005), in a study conducted in Ethiopia, found that the education of the mother was strongly correlated with an increased chance of immunisation and a reduced chance of child illness.

(d) Knowledge of oral rehydration therapy (ORT)

Studies linking health knowledge and child health outcomes are limited and the empirical relationship between knowledge and health behaviour is inconclusive. Some research has shown that higher levels of education are associated with specific types of health knowledge, including proper use of oral rehydration therapy to treat diarrhoea and an understanding of infections as a cause of disease (Bhuiya et al., 1990; Boerma et al., 1990). Rates of ORT (increased fluids plus continued feeding) for children with diarrhoea tend to be somewhat lower in poorer countries (UNICEF/WHO, 2001:24). Although the effectiveness of oral rehydration therapy has been proved, only about 20 percent of children with diarrhoeal episodes worldwide currently receive it appropriately.

Furthermore, knowledge and use of appropriate home treatments to manage diarrhoea successfully may be declining. Adherence to recommendations for children is poor because oral rehydration therapy does not reduce the duration of diarrhoea, and this often leads to the use of antibiotics and other treatments of no proven value (Jones et al., 2003).

(e) Morbidity status of child

The prevalence and severity of disease may be influenced by a wide range of underlying social and economic factors (Mosley & Chen, 1984). One factor likely to be important in influencing disease, and as a result nutritional status, is the health status of the mother and the child. Adequate and accessible maternal and child healthcare services, paternal education, paternal occupation, and nutrition and health information may be significant factors in preventing child malnutrition (Behrman, 1995).

Malnutrition and infectious diseases among preschool children feature prominently among the major public health concerns in developing countries (UNICEF/WHO, 1998:30; WHO, 1999:55; Kuate-Defo, 2001). Nutrition and health are closely related. For example, waterborne diseases, such as diarrhoea, affect the assimilation of food and lead to malnutrition, which in turn lowers resistance to disease, particularly infectious disease. The relationship

between morbidity and malnutrition may weaken the child's immune system, making the child more susceptible to infection. The implication is that child illness should be considered endogenous. The causes of malnutrition and morbidity are diverse, multisectoral, and interrelated, and entail biological, social, cultural, political and economic factors. Their influences operate at various levels, such as child, family, household, community and nation.

Empirically, a large body of research has documented an inverse relationship between socioeconomic status (SES) and a variety of health outcomes. Unfortunately, the literature on these topics is built mainly on evidence from industrialised countries (Alvarez-Dardet, 2000). In developing countries research on these issues has focused mainly on mortality, (Sanghvi et al., 2001; Fedorov & Sahn, 2005; Akmatov et al., 2006) and there has been comparatively very little research regarding the relationship between morbidity and malnutrition (Martin-Prével et al., 2000; D'Souza, 2003; Caulfield et al., 2006).

Fotso and Kuate-Defo (2005) found that variations in child health among communities may be clearly accounted for by contextual factors over and above likely compositional effects, even though differences between communities in the risks of childhood malnutrition and morbidity are found to originate mainly from differences in familial characteristics. The health status of children is usually assessed according to the incidence of infectious diseases, levels of child mortality, immunisation status and the nutritional status of the children aged below 5 years at the time of the survey.

The highest rates of diarrhoea occur among malnourished children (Black et al., 2003). Dehydration is the most direct effect of diarrhoea, accounting for the majority of deaths. The advent and widespread adoption of oral rehydration therapy has greatly reduced the mortality related to diarrhoea (UNICEF/WHO, 2004:23). Children who suffer from repeated episodes of diarrhoea or acute respiratory infection (ARI) are more likely to suffer from malnutrition. This is partly because of reduced appetite, and less fluids and foods being offered during episodes of diarrhoea and other illness. Diarrhoea

and ARI have been found to have an effect on malnutrition in a number of studies (Mull & Mull, 1988; Hudelson, 1993; D'Souza, 2003; Sahn, 1994). For example, Sah (2004) found in Nepal that diarrhoea had an impact on the nutritional status of the children. This finding showed an increased risk of children who had suffered from diarrhoea in the prior year being underweight or stunted than those who had not suffered from diarrhoea. Some micronutrient deficiencies, including anaemia, have been found to be closely linked to child undernutrition. Lack of iron in the diet is the main cause of anaemia. In children, it is more pronounced in undernourished children. Between 1990 and 1993 the consumption of fruits, vegetables and meats decreased significantly in many parts of Central Asia, thereby reducing iron intake (Scrimshaw, 2001:7).

Three illnesses that are of major concern in this region are diseases from which mothers suffered during pregnancy e.g. anaemia; and ARI. Both are directly related to deteriorating sanitary and housing conditions, decreased maternal nutrition, and the worsening provision of public health services. These illnesses are also of major importance for infant and child mortality in Central Asia (Bauer et al., 1998). The morbidity status measured in terms of malnutrition and infections is closely related to poor living conditions, including lack of water, heating and the growing problems of malnutrition.

4.1.2.3 Environmental/community/household factors

Environmental hygiene is a major determinant of health. The role played by the community environment and domestic hygiene in child malnutrition and child mortality has been well documented world-wide, especially in developing countries. However, based on the assumption that factors in the child's immediate environment are likely to have the greatest impact on growth most studies on the nutritional status of children have tended to focus mainly on child-specific and household level determinants. Yet, community environmental hygiene which is, for instance, determined by the main type of sanitation to be found in a particular area, may, independently of individual or household characteristics, have an impact on child nutritional status. Poor environmental conditions, including limited access to clean water and

sanitation, are very often characterised by bacterial and microbial proliferation causing infectious diseases, which, in turn, negatively affect child nutritional status. A child living in a wealthy household located in a poor neighbourhood with households with unsafe hygienic conditions is at greater risk of malnutrition than a child with similar characteristics but who lives in a quality environment. Conversely, a child living in a poor household within a high quality environment may benefit from the healthy conditions of his environment (Magnani et al., 1993; Fotso & Kuate-Defo 2005; Pongou et al., 2004).

Likewise, in areas with, for instance, no access to potable water rich and poor people experience the same degree of exposure to unclean water and the resultant consequences to health. Such poor environmental circumstances expose children to diseases such as diarrhoea or respiratory infections, both of which increase the likelihood of malnutrition (Pongou et al., 2004). Household level variables include a variety of goods and services, which affect child nutrition through the proximate determinants. These include water supply, good sanitation, household size, number of children under the age of five, province and place of residence.

(a) Province of residence

The inefficient use and pollution of water resources (see Chapter 2, p33) through industrial and agricultural runoffs, and, in certain places, radioactivity through nuclear testing, air pollution, release of toxic chemicals together with land degradation and improper agricultural practises are directly responsible for many childhood diseases in the Central Asian region, especially in Kazakhstan (Falkingham et al., 1997).

For example, the areas around the Aral Sea experience unfavourable climatic conditions (see Chapter 2, p28) and therefore there is either low or no production of food and cash crops. Strong regional disparities in respect of child nutritional status have been found in studies conducted in developing countries, including countries in Asia, Africa and Latin America. Larrea and Freire (2002) found higher stunting levels in children living in the highlands

(hilly high altitude locations) in Peru, Bolivia and Ecuador. Serious declines in nutrition have been found in children living near the Aral Sea, therefore the area of residence and nutritional status of children will be examined (Bauer et al., 1998; Falkingham et al., 2000). In India, Som et al., (2006) found that regional differences in child malnutrition were not the same. The effect of various socioeconomic, demographic and cultural factors on malnutrition has been observed with some minor variations depending on the specific circumstances in the various regions. Similar results were found in South Africa (Bomela, 1999).

(b) Place of Residence

Geographic location variables provide an interesting insight into the pattern of child health in Central Asia. In a study conducted in Russia on socioeconomic determinants of child health, Fedorov and Sahn (2005) found the following interesting results. Contrary to what has been commonly found in many developing countries children in rural areas do not appear to be less healthy than urban children. A mitigating circumstance would be that rural children are more physically active, eat more home-grown food, have cleaner air and a generally less stressful environment. In addition, children living in regions with harsh climatic conditions (Western and Eastern Siberia and the Far East) are not less healthy than children living in the European part of Russia. On the contrary, children living in the politically unstable Northern Caucasus regions are shorter than their peers living in other regions of Russia. This may be explained by their proximity to the war-ravaged Chechnya region. This is a clear example of structural violence affecting children through war, which leads to poverty and hunger and subsequently to high mortality, especially child mortality.

Many studies on child nutrition have found higher malnutrition rates in rural rather than in urban areas (United Nations, 1998; Som et al., 2006; Sasisaka et al., 2006). The urban-rural differentials in child health in developing countries may stem from the sociocultural, economic and environmental disparities existing between the areas. Low income households, uneducated mothers and poor environmental conditions are concentrated in rural areas,

predisposing children living in those areas to greater exposure to multiple risk factors for developing infectious diseases and malnutrition. In terms of health infrastructures, urban areas are also more equipped, providing urban mothers with easier access to medical care for their children. A shortage of food is also more likely in rural settings, and may help to explain urban-rural inequalities. Although in Central Asia most people in rural areas work in agriculture they use antiquated techniques and practise subsistence farming. As production is seasonal people are very often exposed to periodic food shortages and, consequently, to an imbalanced diet. These urban-rural differences are likely to create certain inequalities in child nutritional status in most socio-cultural and economic categories. In addition, given the national differences in respect of economic development in the Central Asian states, the income differences unquestionably vary across and within the states (Falkingham et al., 1997).

(c) Household size

Household composition may affect the way in which household resources are distributed among household members. Household size, gender of the head of the household and the number of children under the age of five years are important in measuring intra-household resource allocation. The issue of the impact of household size and household composition on a child's health and nutrition has not received the attention it merits. Very few studies have focused on the influence of these variables on child nutritional status. Although a number of studies have not found significant relationships between gender of the head of the household and child nutritional status it has been found that in Ethiopia children living in a female headed household were more likely to be malnourished, whereas household size did not have any significant effect (Silva, 2005).

(d) Number of children under the age of five

The household conditions in which infants are born and reared are very important for their health and survival. Aggregation of a relatively large number of children, especially when they are below six years of age, creates conditions necessary for the propagation and transmission of micro organisms, which lead indirectly to malnutrition. The number of children under

five years of age in a household in Ethiopia increased the probability of a child being stunted by 2.5 percent (Silva, 2005). Similarly, in the Congo, the mean weight-for height index decreased when there was more than one child aged below six years in the household (Delpeuch et al., 2000).

(e) Sanitation and water supply

Lack of good sanitation and access to clean drinking water has been found to be associated with a greater incidence of disease and higher levels of malnutrition. Several studies conducted in certain developing countries found good water and sanitation to be associated with improved nutritional status in children (Bomela, 1999; Christiaensen & Alderman, 2004; Silva, 2005; Sasisaka et al., 2006). Using data from Ghana, Lavy et al., (1996) suggest that an improvement in the water and sanitation infrastructure in rural areas would probably lead to substantial gains in child health.

The lack of ready access to a safe water supply and proper sanitation, the unhygienic handling of food together with unhygienic conditions in and around homes that cause most childhood diseases have significant implications for the spread of infectious diseases. Furthermore, when food is handled in unhygienic conditions in an unhealthy environment children are prone to infection, which in turn leads to poor growth and malnutrition. A study conducted by Boerma, et al. (1990) found that the prevalence of diarrhoea was lower in regions where there was piped drinking water and access to toilet facilities.

In studies conducted in various developing countries Merchant et al., (2003), Daniels et al., (1991), Huttly (1990), Ricci and Becker (1996) and Magnani et al. (1993), found a strong correlation between good water and sanitation and improved nutritional status. Using data from Cameroon, Pongou et al. (2004) found that the household sources of drinking water, sanitation, and cooking fuel were significantly associated with child nutritional status. Children whose households had access to piped water revealed better nutritional status compared to those whose households used public tap or surface water. Furthermore, they found that cleaner fuels were associated with better

anthropometric indicators. This was consistent with results from South India by Jeyaseelan and Lakshman (1997).

4.1.2.4 Socio-economic factors

The socio-economic variables considered in this framework include the employment status, occupation, education, religion, and ethnicity of both parents as well as the economic level of the household measured through ownership of various assets. Basically these individual variables measure individual productivity. In this study household ownership of various assets e.g. radio, bicycle, motorcycle, television, refrigerator, car, floor material, telephone and land will approximate income and assets.

(a) Household wealth

No income or expenditure data has been collected in the DHS surveys. Filmer and Pritchett (1989) suggested the use of a wealth index to serve as a proxy for the household's long-run wealth or economic status. The wealth index is typically constructed from information regarding housing characteristics and the possession of household durable goods. Silva (2005) found that in Ethiopia household wealth was an important determinant of a child's nutritional status. In India children from households with better economic conditions have better nutritional status in the West Bengal state, which is more highly developed economically than the east Bengal state (Som et al., 2006). In Senegal, Linnemayr and Alderman (2006) found that the wealth index has a statistically significant impact on child nutrition when controlling for household size, which had a negative and significant impact. This result is in line with the findings of Haddad and Ahmed (2003) on the relationship between household expenditures and nutritional status.

In a study of five African countries, Fotso (2004) reported household wealth to be the most powerful predictor of child malnutrition. In Cameroon economic status had a positive effect on child nutritional status. Economic status is associated with improved child nutritional status because high economic status mothers are able to afford supplementary foods (Pongou et al., 2004).

(b) Ethnicity

In Central Asia and in some countries in Africa and South America, ethnicity has been found to be a predictor variable for child nutrition. Children of ethnic Kazakhs, Uzbeks and Kyrgyz have been found to have higher levels of malnutrition than children from other ethnic groups (UZDHS, 1996; KRDHS, 1997; KDHS, 1999). Ethnic affiliation affects child nutrition through its influence on a household's economic conditions, the cultural status of the mother, the geographical setting, and the extent to which health care services are utilised. The effect of stunting reached 58 percent among indigenous children in Ecuador compared to 24 percent for non-indigenous children (Larrea & Kawachi, 2005). In Nepal, Sah (2004) found a higher proportion of underweight and stunted children for Dalit than non-Dalit children under the age of three. Conversely, Hotchkiss et al., (2002) and Strickland and Tuffrey (1997) found that Mongoloid children had higher weight and height measurements than non-Mongoloid children. In Russia, Fedorov and Sahn (2005) did not find any significant difference in the nutrition status of Evenki and non-Evenki children.

(c) Maternal employment

Although considerable research has been done on the relationship between maternal employment and breastfeeding, only a small number of studies have explored the effects of maternal employment on other child nutrition outcomes, although research concerning the implications of women's work for child nutritional status has gained popularity during the last five decades (Leslie, 1989).

Research focusing on maternal employment has increased partly due to the changing economies in developing countries – from family-oriented to modern technology types of businesses. This transition, which also includes an increase in the number of educated women, has created better opportunities for employment outside the home for women, resulting in greater participation in the labour force (Schultz, 1990). A literature review conducted by Johnson et al., in 1993 concluded that although the study in this field is limited maternal

employment does not have negative consequences for preschool children's dietary intakes.

The employment status of mothers has potential implications for virtually all aspects of children's growth and development, and nutrition outcomes are no exception. The quality of children's diets and their subsequent physical health may depend to a significant degree on whether and to what extent their mothers work outside the home. On the one hand, employed mothers may have less time available to supervise their children's activities and to prepare their meals, including breastfeeding. On the other hand, the additional income they bring into the household may help to ensure a stable supply of high quality food, as well as the treatment of childhood diseases (Leslie, 1989).

A point, not always made explicit, is that if women take on a productive role, particularly one outside the home, the welfare of the children may suffer, especially during infancy. The effect of women's work may also depend on the age of the child. Childcare and breastfeeding are advocated during the first 4-6 months of infant life. After this period solids are introduced and formulated milks replace breast milk. It is during this period that mothers either go back to work or begin to look for work, because there is a greater need for income. Therefore, the negative effect of employment may be greater during infancy, while the positive effect of increased income may be greater during childhood (Ukwuani & Suchindran, 2003).

The relation between women's work and child welfare has been investigated from two different points of view. One view is concerned primarily with women's productive roles. This view tends to either downplay women's childcare responsibilities or to assume that adequate substitute childcare is available. Proponents of this view are also likely to assume that children will benefit from the women's increased earnings and from the greater control by women over the use of resources that women's work may bring. The second view is typical of policymakers and researchers concerned with child health, nutrition and development, and they assume that women should primarily devote themselves to their reproductive and childcare roles (Leslie 1989).

There is mixed evidence regarding the association between the mother's employment status and child nutritional status. The literature on the effects of women's employment on child nutritional status and health outcomes reveals that there is not a simple correlation between the two (e.g. Leslie, 1989). A few recent studies have found significant negative associations of work for earnings and child nutritional status. In an evaluation of almost 2,000 rural mothers in India, Abbi et al., (1991) found that children of mothers who worked in agricultural labour on their own farms for 5 to 6 hours per day were significantly more malnourished than those whose mothers went out to work and left their children under someone else's care, regardless of whom the alternate caregiver was. Work carried out in Iran by Rabiee and Geissler (1992) on the impact of maternal workload on child nutrition indicated that the extent of the mother's fieldwork did not seem to have any profound or conclusive effect on the children's nutritional status. Lamontagne et al., (1998) examined the relationships among women's employment, childcare strategies, and the nutritional status of children of 12-18 months of age in Nicaragua.

The findings indicate that children of employed mothers fared better in weight/height than those whose mothers were not employed, with and without controlling for socioeconomic status and maternal education, paternal financial support, child care adequacy, and gender and age of the child. Children with inadequate alternate childcare (care by a preteen or care at the workplace) had lower height for age, even when controlling for the same variables. Toyama et al., (2001) examined the association between mother's employment and child nutritional status in Indonesia. The findings indicate that the children of nonworking mothers had significantly higher height-for-age Z-scores than those of working mothers.

When mother's work was divided into 'formal' and 'informal' the height-for-age and weight-for-age Z-scores of children of the 'informal' worker group were significantly lower than those of the nonworking mother and the formal worker group. Data from Kuwait (Ezzat & Fawzia, 1996) show that the mother's employment did not have an effect on the prevalence of stunting, which was comparable in the children of employed mothers or housewives. On the other

hand, the prevalence of wasting was low among children of employed mothers compared to those of unemployed mothers.

(d) Occupation

A mother's occupational status is expected to have an effect on the health status of her children. It is assumed that those mothers in professional or technical skilled employment are likely to earn better salaries/wages and have more access to material resources. Moreover, a salaried mother might be in a position to devote her income to her own needs and those of her children (Delpeuch et al., 2000). Yet, mothers who work outside the home are likely to spend long hours away from their children, and this could result in neglect, exposing the children to frequent infections.

In 1985 the United Nations reported that the negative relationship between maternal employment and child survival was maintained even after controlling for possible confounding factors, such as maternal education, urban-rural residence, marital status and parental occupation. However, the report warns that the findings should be viewed cautiously as the line of causation is far from clear. Encouraging labour force participation on the part of women without addressing the issue of low earnings of women in the labour market is not likely to result in improvement in child health (United Nations, 1999:39).

In many societies the father's unemployment is likely to be involuntary, usually due to fragile overall economic conditions. Therefore, the father's employment is an endogenous explanatory variable to the health and welfare of children in a household. The mother's employment is in a number of traditional societies is exogenous to the health and welfare of the children. A mother may stay at home taking care of the children until such time that they begin school. The father's employment status had an effect on the height of children in Russia. It was found that children of employed fathers were taller than children of unemployed fathers (Fedorov & Sahn, 2005).

The availability of the mother's time for childcare is very important in child nutrition. In traditional societies such as some Central Asian societies,

childcare time often competes with time needed for income generating work. In poor families a mother's outside work may result in child neglect or care by a sibling or hired caretaker.

(e) Education

Parental characteristics are important determinants of anthropometric status. The value of parental education in respect of child health and child nutrition is well documented. This is particularly true in the case of the mother's education as was confirmed in studies conducted in several developing countries, including the Philippines, Pakistan, Ghana and Jamaica (Barrera, 1990; Alderman & Garcia, 1994; Lavy et al., 1996; Handa, 1999).

According to Glewwe (1999) the role of parental education in determining children's health and nutritional status is two-fold. Firstly, better education should translate into higher incomes, depending on the state of the economy, the state of power relations within a country, or the extent of social inequality in the society. In studies where income is not included as a separate variable, this effect should exert a positive effect on the coefficients of parental education variables. Even when income is included in the estimated equation, more parental schooling could be beneficial for child health and nutrition. Better educated parents are likely to be able to make better use of available information on child nutrition and health, partly because education may increase the parents' preference for child quality over quantity (a decision which, according to Becker (1960), may also reflect increased opportunity cost of the mother's time). It is most likely that the successful completion of primary schooling or functional literacy is sufficient in this context, and postprimary school education might only add limited benefits, although this depends on the quality of schooling (Glewwe, 1995 & 1999).

Glewwe (1999) informs us that the mother's education is often found to be positively correlated with child health and nutrition in developing countries, yet the causal mechanisms are poorly understood. Three possible mechanisms are:

"(1) formal education directly teaches health knowledge to future mothers;

(2) literacy and numeracy skills acquired in school assist future mothers to diagnose and treat child health problems; and
(3) exposure to modern society through formal schooling makes women more receptive to modern medical treatments."

Of particular interest in the analysis of education is the differential impact maternal and paternal schooling might have. Since it is mainly mothers who care for children, while men are presumably working outside of the household, the mother's ability to access information and make use of existing healthcare facilities is likely to be of greater importance. Female education should thus be directly relevant, whereas paternal education should affect child health and nutritional status mainly through its income generating properties (Glewwe, 1999).

Caldwell (1979), in his explanation of education as a factor in mortality decline, indicated that the mother's education was a stronger determinant of child survivorship than other characteristics more closely related to household economics, especially in developing countries. Evidence exists that a number of studies have supported this finding, showing that the magnitude and significance of the effect of maternal education exceeds the income effect (Behrman & Wolfe, 1987a&b; Barrera, 1990; Thomas et al., 1987; Cleland & Van Ginneken, 1988). A positive relation between maternal education and child nutrition has been also demonstrated in many studies, including those of Webb and Block (2004), Alderman and Garcia (1994) and Frongillo et al., (1997).

In a study conducted in India it was found that stunting decreased with increasing levels of the mother's education (Mishra & Retherford, 2000). Similarly, the majority of studies conducted elsewhere in Asia indicate a positive relation between maternal education and child nutrition. Education is also assumed to provide the mother with the capacity to break with traditional practices and taboos regarding breastfeeding and weaning practices, as well as dietary intake. Education is therefore expected to impact on child health and, consequently, child nutritional health by enhancing the mother's

understanding and perception of disease, and by allowing her to take advantage of healthcare facilities in the treatment process (Ware, 1984), as well as by helping her to break with traditional health (Azevedo et al., 1991) and food practices common to uneducated women.

A decrease in the proportion of severely malnourished children with an increase in the mother's education was observed both before and after monsoon flooding in a study conducted in rural Bangladesh (Choudhury & Bhuiya, 1993). Linnemayr and Alderman (2006), in a study conducted in Senegal, found a positive impact of female primary level education on nutrition. Research conducted in some Eastern European countries also indicates that women's education contributes to the reduction of child malnutrition. Indeed, in Albania, children of mothers with less than a secondary school education are more likely to be underweight and underdeveloped than children of mothers with secondary school or higher educational levels (UNICEF/WHO, 2005). Fedorov and Sahn (2005) found that, in Russia, the education of the mother has a very strong impact on the child's health. They found that an additional year of secondary education for the mother on average increases a child's height by 1.1 centimetres.

Reed et al., (1996) found that child nutritional status showed a general improvement when mothers had three to four years of education, but declined when mothers had received higher education. This decline could be attributed to the fact that children of most educated mothers are usually cared for by other people because their mothers tend to be in employment. Moreover, a number of the caregivers are either semi-literate or illiterate. Therefore, even if the mother's nutritional knowledge is of an acceptable or high standard the caregiver might not be able to follow instructions as given. Additional evidence from other countries also suggests that the association between the mother's education and child health and/or nutritional status of children is far from conclusive.

Using DHS data for 22 countries, Desai and Alva (1998), examined the effect of maternal education on three indicators of child health, namely, infant

mortality, child height-for-age and immunisation status. Their findings indicate that the effect of maternal education on child nutritional status is weakened after controlling for household socio-economic variables (such as husband's education and access to piped water) and area of residence. After incorporating the above variables the effect remains statistically significant in only a few countries. Desai and Alva argue that education acts as a proxy for the socioeconomic status and geographic area of residence of the family. Most notably, if the proportion of educated mothers is high within the community, uneducated mothers may increase visits to health facilities at the community level for their children, as well as for themselves, through the spillover effect from educated mothers.

Chamarbagwala et al. (2004) put forward the fact that it is learning outcomes that matter rather than simply attending school. If schooling is of a poor quality then it may have no beneficial effects. In many developing countries the quality of education is very poor due to either inadequate or non-existent educational resources. Using data from Morocco, Glewwe (1999), conversely argued that it is the mother's health knowledge that matters – controlling for that removes the effect of maternal education. He contended that little health knowledge is taught in Moroccan schools. This applies to a number of schools in developing countries, where health knowledge is acquired outside of the classroom. If education does not provide such knowledge it will not be significant. Alternatively, if this information is provided outside the education system and understood by the less educated then the effect of education will be removed.

Bairagi (1980) and Solon (1985) found that, while education had a positive effect within the richer segments of their study populations, it had no effect on the poorer segments. Doan (1988) showed that it is only the status of children in the middle-income group that improved with maternal education; no benefit was apparent in the poorest and wealthiest quartiles. Reed et al. (1996) found that the association between maternal education and child weight differed significantly across socio-economic environments. It is not surprising that studies have uncovered interactive effects between socio-economic

conditions and maternal education, neither is the apparent lack of consistency contradictory. If insufficient resources are available to a woman it is unlikely that education would make much difference.

Micklewright and Ismail (2001), using European University Institute (EUI) EUI/Essex Survey data from Uzbekistan, found no evidence of a lower weight for age or weight for height when mothers did not complete lower secondary education. Evidence from Brazil indicates that a significant interaction between maternal education and community health services exists. The result shows that education and community health services are substitutes for nutritional status in Brazil (Thomas et al., 1990). On the other hand, Behrman and Wolfe (1987), using data from Nicaragua, report that maternal education was not a statistically significant determinant of child height after controlling for unobserved family background and genetic endowment.

Haddad and Ahmed (2003) using household survey data from 12 countries, including Kyrgyzstan, found that parental education had positive and significant determinants of anthropometric status in just over a third of all cases, although this varied by country. This lack of significance is surprising given the conventional knowledge that parental education plays a significant role in child nutrition. On the other hand, this mirrors the findings of Sahn et al. (1999) for DHS for nine African countries. The variation in the significance of parental education and child nutritional status could be due to the different levels of economic and social development in the countries studied. Increasingly, focus on studying the synergy between maternal education and child health/nutritional status has shifted to the influence of other socio-economic characteristics, including household headships, environmental and domestic hygiene, food security care, ethnic/racial differences, and geographic differences, to name but a few.

In Central Asia, where education is universal (98% of all citizens in the three republics had completed secondary school by the time the surveys took place) (see Chapter 2), maternal education is likely to play a key role in child growth by providing the mother or childminder with knowledge about adequate food

composition, and by good use of modern healthcare, both of which are favourable to adequate child development. The rapid eradication of illiteracy through vast investments in primary and secondary education was one of the more remarkable achievements of the former Soviet system. This is clearly indicated in the high educational attainment levels found in women from the three countries which were the subject of this study. The proportion of female students in certain levels of education, such as higher education, has been above that of male students. This situation may be changing. Until very recently there were no indications that female education was given less priority than education for males in Central Asia. The economic crisis and the growing influence of conservative religious movements may be inhibiting the education of females (Falkingham et al., 2000).

4.2 THE THEORY OF STATE VIOLENCE AGAINST CHILDREN

The previous section contained a review of the literature on the nature of socio-economic, health and environmental inequalities that promote child malnutrition status in many developing countries, including those of Central Asia. This study proposes that these inequalities underlie the child malnutrition differences found in the Central Asian region. Furthermore, these inequalities lead us to the proposition that there are entirely different processes through which a variable, for example, a province of residence within a country, will influence the nutritional status of children and therefore have different degrees of impact. The emphasis is on the impact that the geography/province/country of residence has on child nutritional status through socio-political, socio-economic, health and environmental phenomena that are essentially structural in nature.

From the evidence of the socio-economic differentials and inequalities within this region which this study has advanced it may be postulated that children living in different provinces of a country respond to and are affected differently by the geographical, socio-political and socio-economic contexts in which they live. This in turn produces different patterns of child malnutrition. Consequently this study further proposes that the province within a country in

which children are born and reared defines their quality of life and, ultimately, their life chances.

On the basis of this broad generalisation one major theory that strongly influences nutrition outcomes will be used to explain existing gaps and differentials in child malnutrition in Central Asia, especially in Kazakhstan, Uzbekistan and Kyrgyzstan. This theory examines the effects that massive social, political and economic transformations have on the health and welfare of people – especially on those of young children. These transformations are embedded in the institutional organisation and construction of our social world. They are, by definition, exogenous social forces that are beyond the control of ordinary people, and are both structural as well as violent in nature. This broad theory is referred to as structural violence theory. The theory is not exhaustive, but serves to constitute the facts that form the foundation upon which the theory guiding this study is built. Structural violence is presented within a transactional relationship of sociopolitical, socioeconomic, socio-environmental and health factors. The proposed model is constructed with a view to the relationship between these factors and child health, specifically child malnutrition. Moreover, it is argued that the effects of structural violence on these factors are magnified when taking into account child nutritional status.

4.2.1 Theories of structural violence

Sociologists and social scientists in general have always been interested in the nature and logic of war and peace. The notion of structural violence is pervasive and powerful in society (Creighton & Shaw, 1987) and features in courses such as the Sociology of Peace and of Violence, of Poverty etc.

The term structural violence as coined by Johan Galtung and by liberation theologians during the 1960s forms the basis of this argument. The term describes social structures – economic, political, legal, religious and cultural – that prevent individuals, groups, and societies from reaching their full potential. In referring to structural violence, Galtung is referring to a type of violence separate from personal or direct individual violence where there “is

an actor that commits the violence". It is also static, and Galtung has argued that it may actually show a certain stability in contrast to the upheaval and visibility of personal violence (Galtung, 1969).

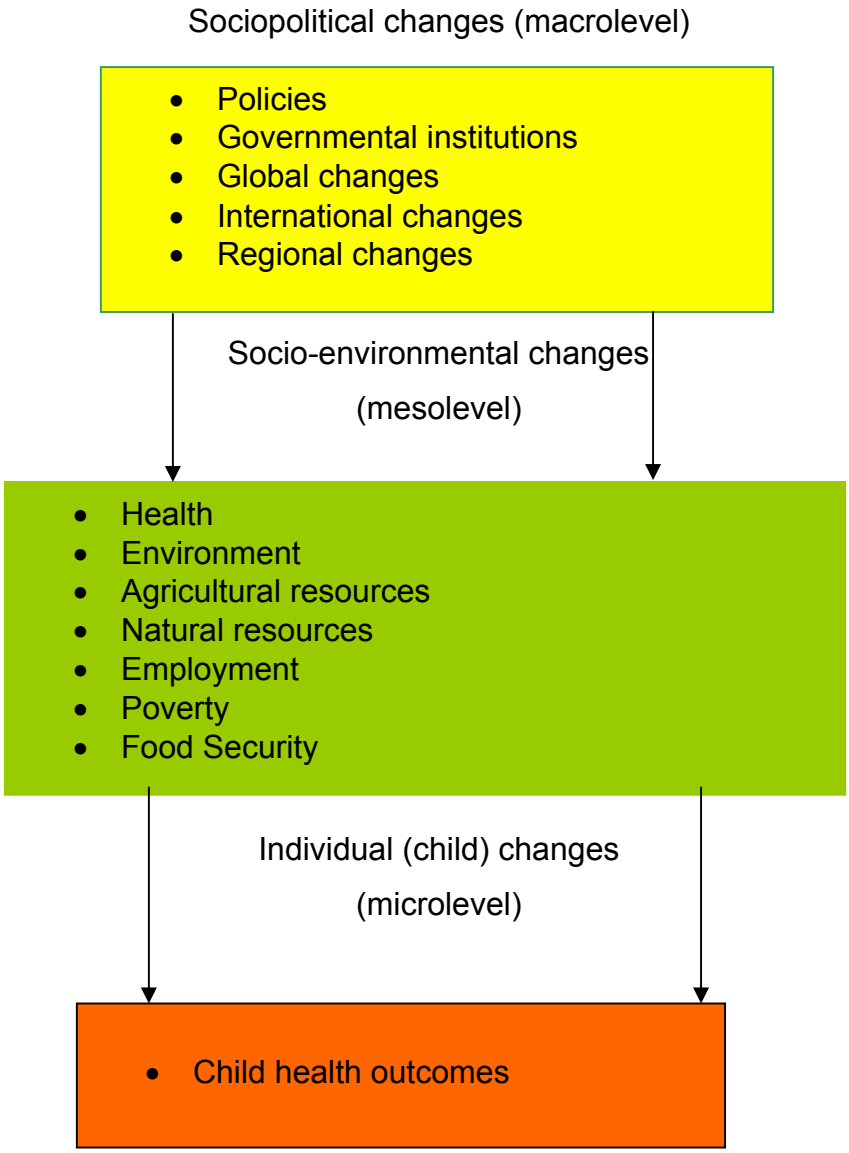
Structural violence is often embedded in longstanding "ubiquitous social structures, normalised by stable institutions and regular experience" (Gilligan 1997). The concept of structural violence is linked very closely to social injustice and the social machinery of oppression (Farmer, 2004). The mechanisms by which structural violence operates are found in the state and its bureaucratic institutions, as well as in the capitalist private sector.

Structural violence may also be defined as the 'frozen direct violence' of past conquest and /or repression, such as colonialism, slavery or economic exploitation (Farmer, 2004). By using a natural paradigm that adapts Bronfenbrenner's (Bronfenbrenner,1977) model structural violence is conceptualised as rooted within the structure of society (see Figure 4.2) and consisting of three hierarchical interconnected levels, 1) the socio-political (macro-system) level, hypothesised to be the most comprehensive level, refers to state institutions and policies that organise society, together with the influence of international, regional and global changes; 2) the socio-environmental (meso-system) which is the intermediate level refers to those 'social institutions', such as health, education, environment, employment, agriculture, natural resources, food security and poverty, which endorse the ideology of the macro system and; 3) the psychological (micro-system) level which refers to the relevant individuals who have contact with the actor. In the model used here the individual is the child under the age of five years who, through his or her parents (the actors), is exposed to those violent messages which foster oppression and culminate in undernourishment.

In order to indicate the convoluted effect of structural violence in Post-Soviet Central Asia on child health the study will expand on Bronfenbrenner's model in the section below. Reference to the changes that take place at each of the levels - structural, social and individual (see Fig 4.2) – is unpacked. Christie (1998) expanded on Bronfenbrenner's three level model when he postulated

that structural violence generates its penalties through the state, its social institutions, and through the collective psyche. Furthermore, structural violence and its effects impact disproportionately on marginalised populations (Christie, 1998) and is typically manifested in differential rates of mortality, morbidity, malnutrition, poverty and incarceration rates among such groups (Dohrenwend et al., 1989). This study argues that the current health crises in the former Soviet Union's Central Asian states provide an opportunity to explicate this form of violence and its effects.

Figure 4.2: Tripartite model of structural violence



Adapted from Bronfenbrenner's Model (1977)

Kent (2000) describes violence as an action which indirectly harms others through the social system, in the pursuit of the perpetrator's own interests. He states that violence may take different forms and may be categorised in different ways. For example, acts of violence may be distinguished according to the types of perpetrators and victims. People are able to hurt others by using many different kinds of capacities (means, powers, forces, instruments etc.) It may be argued that there are four basic kinds of violence – physical, economic, political and cultural. Physical violence comprises direct violence, while economic, political, and cultural violence are forms of structural or indirect violence.

Keshavjee (2000) defines structural violence as "increased morbidity and mortality resulting from forms of social organisation that frequently lead to groups of individuals being marginalised along social axes, often those of economic, racial and gender inequality". In respect of direct violence there is a specific event, an identifiable victim, and an identifiable perpetrator. In contrast, structural violence is not visible in specific events. Its effects are most clearly visible at the societal and individual level, as systematic shortfalls in the quality of life of certain groups of people, especially children.

The approach depicted in Figure 4.2 above to understanding violence suggests that hierarchical relations within and between societies benefit those at on top while oppressing, exploiting and dominating those who occupy the lower layers of society. As in the case of direct violence structural violence also kills people, but does so slowly by depriving them of basic necessities and adequate institutional arrangements. In physical violence there is physical damage to the human body which occurs in a distinct time-bound event, and individual victims and perpetrators may be identified. In the case of structural violence, however, people suffer harm indirectly, often through a slow and steady process, with no clearly identifiable perpetrators. It is not possible to photograph structural violence – it may be known only through its complex effects. Most victims of homelessness or chronic malnutrition, for example, are victims of structural violence (Kent, 2000).

The common thread in all forms of violence is the meeting of one party's needs at the expense of the needs of others. Violence entails the use of ***power***. The associations may be direct and immediate, for example, when a thug hijacks a car, or the associations may be structural, for example, when government leaders decide to purchase weapons instead of vaccines. Max Weber famously defines power as the 'probability of persons or groups of persons carrying out their will even when opposed by others' (Gerth & Mills, 1958:180; Kalberg, 2005). It is clear from the above definition that Weber believed that those in a position of authority are able to exert their power over those who are powerless, irrespective of their will. In such circumstances the powerless are forced to sacrifice their interests (Marshall, 1998:519). Foucault argues further that, in structural violence, "power relations are ubiquitous and are exercised from infinite points "(James et al., 2003).

This project shows that it is not possible to understand the excessive malnutrition of children in individual and clinical terms only – it must also be understood in socio-political and socio-economic terms. The sociopolitical system is most influential in creating, maintaining and sanctioning structural violence. According to James et al., (2003), structural violence at this level is epitomised by the state's direct and indirect exercise of power. The central planning system of the state that characterised the FSU and led to the abysmal conditions in which the former nation states find themselves today is an example of the consequences of political choices. The widespread malnutrition of children in this region results from far reaching deliberate policies, without due consideration of the long-term impact of these policies. Briefly, the policies that were introduced and implemented by the FSU did not adversely impact only on the lives of the people of the FSU at that time, but the legacy of these policies lives on more that ten years after the dissolution of the FSU (Bauer et al., 1998; Falkingham, 2000).

It is particularly children, women and young people who bear the brunt of the economic and political transition that these nation states are currently experiencing, and this is evidenced by the poor health and nutrition status of mothers and their children (Falkingham, 2000).

4.3 SUMMARY

This chapter reviewed studies dealing with developing countries, especially Asian countries, as well as from the FSU republics, to develop a conceptual framework (Figure 4.1) for examining child nutritional status. The paucity of data from the FSU makes it difficult to provide a complete picture of the nutritional status of children under the age of five in these countries. The framework contains proximate and non-proximate factors. The proximate factors that were discussed include socioeconomic, environmental, and health factors, and their influence on child nutritional status. The influence of the non-proximate factors, which are the structural factors that act through the proximate factors, were also discussed. A review of literature on structural violence was also conducted. A simple theoretical model (Figure 4.2) was constructed using Bronfenbrenner's Model of structural violence.

CHAPTER 5

5. POST-SOVIET REALITIES IN CENTRAL ASIA

5.1 INTRODUCTION

Chapter 2 provides an account of the pre-transition policies and their effect on Central Asia during Soviet rule. In this chapter information from chapter two will be highlighted to underscore the impact of these policies on the health of children under the age of five in the three Central Asian Republics which are the focus of this study. The three broad systems depicted in Figure 4.2 bring to light the role of these systems in the rising malnutrition and deterioration in health which characterises children under the age of five in Central Asia.

5.2 SOCIO-POLITICAL CHANGES

The leaders of the Central Asian Republics were among the most conservative elements of the Soviet leadership cadres. From the beginning they questioned the value of the reforms and, until the very end, supported the continuation of the Soviet Union. They were not happy when the Soviet Union did finally disintegrate. Indeed, it would not be far-fetched to say that independence was thrust upon the Central Asian leaders, if not upon the peoples, almost against their will (Pomfret, 1999).

5.2.1 Policies, governmental institutions and regional changes

Since becoming independent the Central Asian countries have faced a host of problems and challenges related to the process of nation and state building. These challenges range from the need to find an alternative value system that would replace communism to the need to reinvigorate and reform their economies, as well as to forge new relations among themselves, with their immediate neighbours, and with the rest of the world (Pomfret, 1999).

Even under the most favourable circumstances it would be very difficult for any country to meet such challenges successfully and promptly. However additional factors have handicapped the Central Asian countries - aside from factors common to all transitional economies their diverse ethnic and cultural

makeup, geopolitical configuration, resource endowment, lack of any sustained previous experience with nationhood and statehood, long periods of isolation from the rest of the world and its philosophical and political trends, the imprint of Russian colonialism, and the peculiarities of regional and international politics have all constituted stumbling blocks. Political instability in the region has also adversely affected economic growth (Olcott, 1996; Kort, 2004)

The process of disintegration of the Soviet Union has made the task of post-independence nation building daunting for the Central Asian countries. The geopolitical situation of these states has complicated their task of developing new relations with the outside world. Their cultural and religious traits and their natural resources have attracted the attention of principal powers and regional actors, drawing them into major regional and international political and ideological currents. This has made them vulnerable to outside forces competing for influence over the direction and character of their internal development and external relations. As a result of the fact that the states vary in size, ethnic composition, historical and cultural characteristics, resources, and geographical location they have developed quite differently since independence as was suggested in chapters 2 and 3. It may be suggested that, during the last few years however, certain common patterns have emerged – both in their political and economic development and in their external behaviour (Kort, 2004; Dowling & Wignaraja, 2006).

Firstly, post-independence political and economic developments in Central Asia have thus far not been promising. The political trend has been toward authoritarianism, a cult of personality, and a perpetuation in power of the old nomenclature, extending even beyond the inherent tenacity of bureaucracies. Nor have there been sustained efforts to build social and political institutions that could transcend regional, ethnic, and tribal proclivities, and thereby enhance national cohesion. Moves are afoot to revive the CIS, but certain of its members are wary of Russia's dominance over the other states. The CIS was disbanded months after its formation due to the 'big brother' role that

Russia began to assume – a role reminiscent of the Soviet period (Olcott, 1996:43-47).

In the case of Tajikistan, the political situation has become worse than it was under the Soviet system. The Uzbek-dominated communist leadership, with military assistance from Uzbekistan and Russia, has brutally suppressed the national aspirations of the indigenous Tajiks, thus turning Tajikistan into a virtual Russo-Uzbek colony and a battleground for competing regional and international actors (Olcott, 1996; Kort, 2004).

The Central Asian region's unsettled political conditions, plus its inadequate legal and bureaucratic infrastructure, have delayed and limited the influx of foreign capital and technology. Foreign relations are still evolving. Thus far, their shape and character have been chiefly determined by their internal political and economic conditions, the dynamics of regional and international political systems (most notably those related to great power priorities and policies), and the state of great power relations-especially the character of ties between Russia and the West (Olcott, 1996; Kort, 2004)

The process of economic reform and reinvigoration has also been slow and largely unsuccessful. The failure and the disruption of the Soviet-era economic system have seriously impaired economic conditions and lowered standards of living. During Soviet rule the CARs, as part of the integrated production system, were required to supply raw materials and other economic inputs to Russia. Russia, in turn, supplied them with finished manufactured goods. Matters were further complicated by the fact that the state owned enterprises (SOEs) in the CAR's had been under Russian management, international trade was controlled by Moscow, and private manufacturing was prohibited. The long-term result of these policies was experienced during and, especially, after transition. Russian management of SOEs meant that there was no opportunity for the locals to receive training which would have enabled them to take over during the transition and after most of the Russians had left. Under Soviet rule there were no opportunities to develop marketing relations

with foreign investors, or even with their own neighbours (Dowling & Wignaraja, 2006).

Despite early fears of a regional struggle in Central Asia, especially between Iran and Turkey, which could have led to domination by one of them, most Central Asian countries have managed to establish reasonable ties with neighbouring states, and have avoided coming under the influence of any of these states. In fact, most of the regional countries, except for Tajikistan, have skilfully manipulated the competition for influence in the region to their own advantage. Although they have expanded the scope of their external ties their relations with Russia have remained the most important. Russian influence is still paramount in this region, but Russia's internal problems, as well as the activist U.S. policies in the region, have somewhat weakened Russia's hold. Efforts have been made to bring about eventual economic integration, and greater security and political cooperation among the Central Asian countries. However these efforts have thus far been as inconclusive as the efforts made to reintegrate the CAS (Olcott, 1996; Kort, 2004).

Rivalries and competition for influence have emerged among the Central Asian states and their leaders. So far, Uzbekistan, the main contender for regional supremacy, has already succeeded in subduing Tajikistan. Potentially, Kyrgyzstan and Turkmenistan could become the targets of Uzbek expansionism. By mid-1995, the West had also appeared to favour Uzbekistan's assuming the role of regional great power and fortification against Russian hegemony and Islamic extremism. However, Uzbekistan's bid for supremacy is likely to be resisted by other countries, notably Russia. Regional and international competition to determine the political map of the region will continue, and the present balance of power will almost inevitably be subject to change during the coming years. These external influences will probably affect the internal developments of the Central Asian countries. The most important of these developments include Russia's domestic evolution, its approach toward the CIS countries, the response of the West to Russian behaviour, changes in neighbouring countries as well as in the broader Middle

East region, and in the nature and character of the relations of the West with the Muslim world (Olcott, 1996; Kort, 2004).

In short, despite the superficial political, institutional, and even cultural homogeneity achieved during the Soviet era, other deep-rooted influences predating Russian and Soviet rule persist in Central Asia and affect the way the various republics receive and react to external influences. These forces and their impact must be adequately assessed in any analysis of the current social and political scene of Central Asia, its future evolution, and its regional and international relations.

5.2.2 Global and international changes

The transition to a market economy imposes new kinds of relations between the state and its citizens, and affects the welfare of the ordinary population. State institutions in Central Asia still claim to take the necessary measures to protect minimal living standards. However, the scale of these measures is not as broad and comprehensive as it was under the FSU. During Soviet rule a comprehensive network of systems providing social services, social protection/safety, and social assistance had been established (Bauer et al., 1998; Falkingham, 2000).

These systems were costly, especially because under Soviet rule there was little focus on the efficiency of resource use. More than fifty percent of the budget was devoted to the social sphere with scant attention paid to the environment. This was made possible only by large transfers from the Central Government of the FSU. The break up of the FSU resulted in independence for the Central Asian Republics in 1991, and was accompanied by the withdrawal by the Soviet government of subsidies, especially to industries. This resulted in a severe economic depression across the region and affected individual lives and relations within states, local communities and families (Bauer et al., 1998; Falkingham 2000). This made the maintenance of social safety nets more difficult as budgets were stretched and thus poverty increased rapidly (Dowling & Wignaraja, 2006).

The CARs emerged from the FSU with a number of difficult legacies. Buiter (2004) asserts that they were all faced with what he calls a 'triple transition challenge'. They were forced to move from central planning to a market economy, from totalitarian communism to pluralistic, open and democratic forms of government, and from colonial subjugation to independent nationhood. More than thirteen years later none of the countries included in his study, including four others (Armenia, Azerbaijan, Georgia and Tajikistan), have fully achieved any of the above transitions (World Bank, 2005a).

Clearly, as indicated earlier in Chapter two, the problems that the republics currently face are a legacy of the Soviet Union. In Uzbekistan for instance, institutional and organisational changes after 1991 that were meant to be enabling factors for land reform, including privatisation, local water management and agricultural production, floundered from inception. Collective farm managers and the hydro-technicians of the collective farms controlled land allocation, and dominated the newly established farmers after independence. The majority of Uzbekistanis experience personally the impact of the economic challenges to which Uzbekistan is exposed. There has been a decline in cotton and wheat production. This not only affects unemployment, but also means a decline in food production, which translates into a decline in food distribution per household. However, the system of basic services provision, left over from the period of the Soviet Union domination, enables the state to continue to provide for the people's basic needs (Wegerich, 2003; Dadabaev, 2004).

In the early 1990s Kyrgyzstan's democratic credentials were regarded as relatively strong. This reputation was subsequently lost as corruption and nepotism took hold. Parliamentary and presidential elections were flawed; opposition figures faced harassment and imprisonment while opposition newspapers were closed. While Kyrgyzstan does possess oil and gas resources it nevertheless imports the vast bulk of what it needs. The economic situation is dire, particularly in the south, where the rate of unemployment is very high and poverty is widespread (Babu & Reidhead, 2000).

Poverty is widespread in Kazakhstan and the country continues to face major economic challenges, particularly in respect of unemployment and inflation. At the same time, since independence an elite group of people have grown very wealthy through privatisation and business deals which opposition figures allege have been corrupt (Dowling & Wignaraja, 2006).

The transition involves huge social and economic costs, and, as always, these costs are being borne by the most vulnerable members of society. In particular, it is the children who are bearing the brunt of the cost of transition. They face the closure of health and education facilities. For poor families the difficult task of feeding children is exacerbated by declining social welfare assistance allowances, and by increased unemployment. Deteriorating health indicators, including a greater incidence of malnutrition, clearly demonstrate the impact of transition (Bauer et al., 1998; Falkingham, 2000).

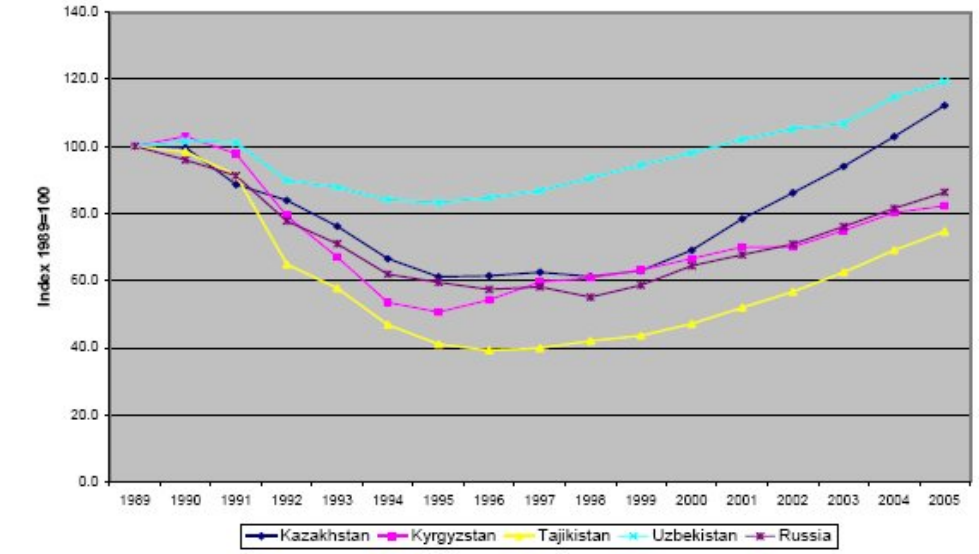
5.3 SOCIO-ENVIRONMENTAL CHANGES

In this section seven major categories of social level factors of importance to child malnutrition are identified: poverty, unemployment, food security, natural resources, agriculture and health. These social forces directly and indirectly affect the nutrition of children. A complex relationship exists between poverty, employment, income, expenditure and access to land. A discussion on one of these issues inevitably leads to a discussion on the others.

5.3.1 Poverty

Although it is a relatively poor region during Soviet rule poverty in Central Asia was masked or cushioned by extensive social protection and social assistance systems which provided help on an entitlement basis to many beneficiaries, particularly children and their families. All of the CAR's suffered severe reductions in real output following the collapse of the Soviet Union, as is illustrated in Figures 5.1, & 5.2 (Falkingham, 2000; UNICEF/WHO, 2005; World Bank, 2005b; Asian Development Bank (ADB), 2006).

Figure 5.1: Changes in real GDP Index, 1989-2005 (1989=100)



Source: World Bank/UNICEF

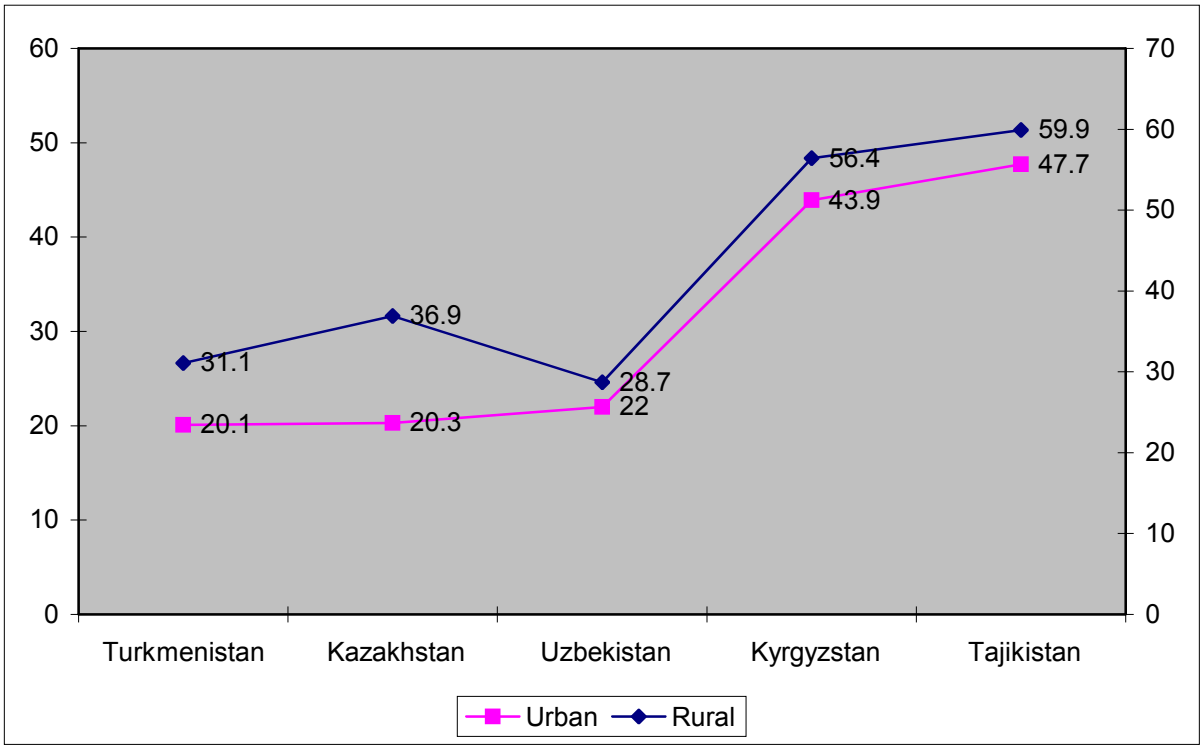
Figure 5.2 illustrates the extent of rural and urban poverty in Central Asia fifteen years after independence. The countries all suffer from serious poverty problems. After the collapse of the USSR the CARs descended into a deep economic crisis. A measure of recovery was noted in 1995/96, although this was dramatically interrupted by the Russian crisis of 1998. The economy has recovered since 2000, but Kyrgyzstan and Tajikistan are still suffering from the lasting impact of the earlier economic shock (Linn, 2002).

Rural poverty remains a major problem in certain of the CARs (see Figure 5.2). Many urban unemployed have moved to the rural areas looking for work and seeking new opportunities on state farms. Income disparities and poverty are more pronounced in certain subregions (Dowling & Wignaraja, 2006). At below 7 percent Uzbekistan has the lowest rural-urban poverty disparity. The other CARs display rural-urban poverty disparities ranging between 11 and 16 percent.

Although there is a lack of household level data for poverty analysis in Central Asia, nationally representative surveys of diet and nutritional status were undertaken in Central Asia two years after the dissolution of the USSR as part of the LSMS series conducted in collaboration with the World Bank. The

series conducted between 1993 and 1997 indicate that not all members of society share equally in the burden of poverty. Between 1995 and 1997 the DHS was conducted in the three republics under review in this study. These surveys revealed similar results to the LSMS in respect of diet and nutritional status, especially in children under the age of five. The incidence of poverty increased with children in large families, female-headed households, and those children with special needs facing desperate circumstances. This is partly due to reduced food entitlements and increasing unemployment among this group (Bauer et al., 1998). Household poverty has been exacerbated by the decline in social and infrastructure services that had previously cushioned the impact of relatively low incomes in the Soviet Union (Babu & Reidhead, 2000).

Figure 5.2: Urban-Rural poverty indicators in Central Asia (2006)



Source: Asian Development Bank (ADB) On-Line

Table 5.1 gives an overview of the trends in poverty rates per capita GNP[11] and per the Gini coefficient[12] in five Central Asian countries from the breakup of the Soviet Union to several years after independence. During this period the level of poverty increased by 15 percent from 36 percent to 51 percent. With the exception of Tajikistan the level of poverty in these countries was below 50 percent before independence, but increased to more than 70 percent in certain of the countries after independence. Similar estimates of the scope and trend of poverty, particularly for Kyrgyzstan, have been documented elsewhere (Green & Bauer et al., 1998; Pomfret, 1998; Howell, 1996). According to Kazakhstan government figures, between 2000 and 2002, the percentage of the population falling below the poverty line declined from 35 percent to 24 percent, as average monthly earnings increased by 32 percent. In 2004 it was estimated that 19 percent of the population fell below the poverty line (United Nations, 2005a).

Table 5.1: Poverty and inequality in Central Asia pre and post-transition

	Initial conditions			Recent data		
	Per capita GNP (1990)*	Gini coefficient (1989)	Poverty, per cent of population (1989)**	Per capita GNP (2003)*	Gini coefficient (2003)	Poverty, per cent of population (2003)***
Kazakhstan	$2600	0.289	16 percent	$1780	0.32	21 percent
Kyrgyzstan	$1570	0.287	33 percent	$340	0.28	70 percent
Tajikistan	$1130	0.308	51 percent	$210	0.33	74 percent
Turkmenistan	$1690	0.307	35 percent	$1120	--	44 percent
Uzbekistan	$1340	0.304	44 percent	$420	0.35	47 percent

* GNP per capita (Atlas method) Current US Dollars
** Individuals in households with gross per capita monthly income of less than 75 roubles
*** Percent of population with expenditures below $ 2.15 (PPP) per day
Sources: Pomfret (1999), Anderson (2001), World Bank (2005a and 2005b)

It should be noted that, prior to the breakup of the Soviet Union, poverty rates in all the Central Asian republics were higher than in the rest of the Soviet

[11] **Gross National Product (GNP)**: Total monetary value of goods and services produced in a year by the nationals, or residents, of a country. It includes income that nationals earn abroad, but does not include income earned within a country by foreigners.

[12] The Gini coefficient is a summary measure of inequality. 0.00 implies perfect equality where every observation has the same income; 1.00 perfect equality where the last observation has all the income while everyone else has zero income.

Union. Over the past six years World Bank (2005b) and ADB (2004 & 2006) estimates place the poverty incidence at between 28 percent and 30 percent in Kazakhstan, Turkmenistan and Uzbekistan. In Kyrgyzstan and Tajikistan estimates of poverty incidence were nearly twice as high, ranging between 48 percent and 57 percent. Currently, the poverty incidence for the five states that make up the Central Asia region averages 38 percent. In general, the rural regions show considerably more poverty and less social development than the urban areas, although certain urban areas have suffered considerably (Bauer et al., 1998).

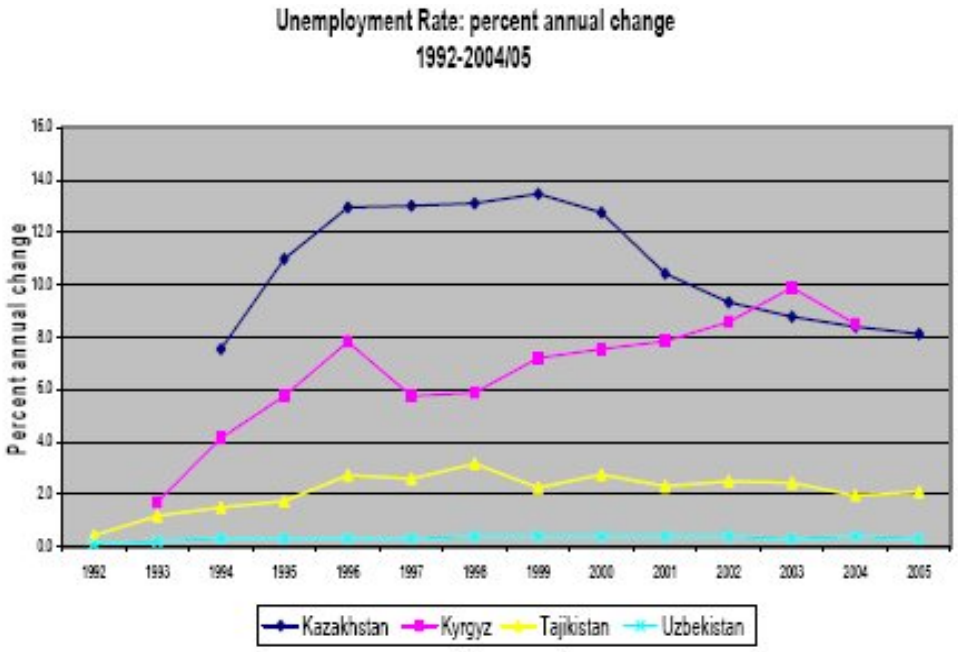
The primary reason for the increase in poverty in the Central Asian Republics following independence has been the deterioration of the macroeconomic environment, which is structural in nature, and has been characterised by decreases in national output and high inflation. The lack of subsidised inputs and guaranteed markets for their products has meant that many businesses have reduced their output or stopped production altogether. These businesses have had to lay off large numbers of workers, and this has resulted in high levels of unemployment among the poorer people. These increased levels of poverty in Central Asia have reduced living standards, which, in turn, have led to high levels of food insecurity and malnutrition.

5.3.2 Unemployment

Falling output levels have been accompanied by a reduction in employment opportunities and the emergence of unemployment across the region. The labour market has performed differently for each country, as may be seen in Figures 5.3 and 5.4 below. A distinction may be drawn between the economy of Kazakhstan and the other economies. In 2004 the total labour force in Kazakhstan was estimated at 7.95 million, slightly more than half the total population, although substantial numbers of illegal Uzbek migrants have joined the workforce in recent years. About 36 percent of the labour force was self-employed. Even here there are differences as are shown by the employment and unemployment data, with Uzbekistan, in contrast to Kyrgyzstan and Tajikistan, showing low unemployment and stable employment growth (see Figure 5.3). In 2000 the labour force in Kyrgyzstan

was estimated at 2.7 million, slightly more than half the total population. About 55 percent of workers were employed in agriculture, 30 percent in services, and 15 percent in industry. In rural villages, long-term unemployment exceeds 70 percent, especially in respect of the younger generations (US Library of Congress On-Line, 2006, 2007a and c).

Figure 5.3: Unemployment Rate: percent annual change 1992-2004/05



Source: Asian Development Bank

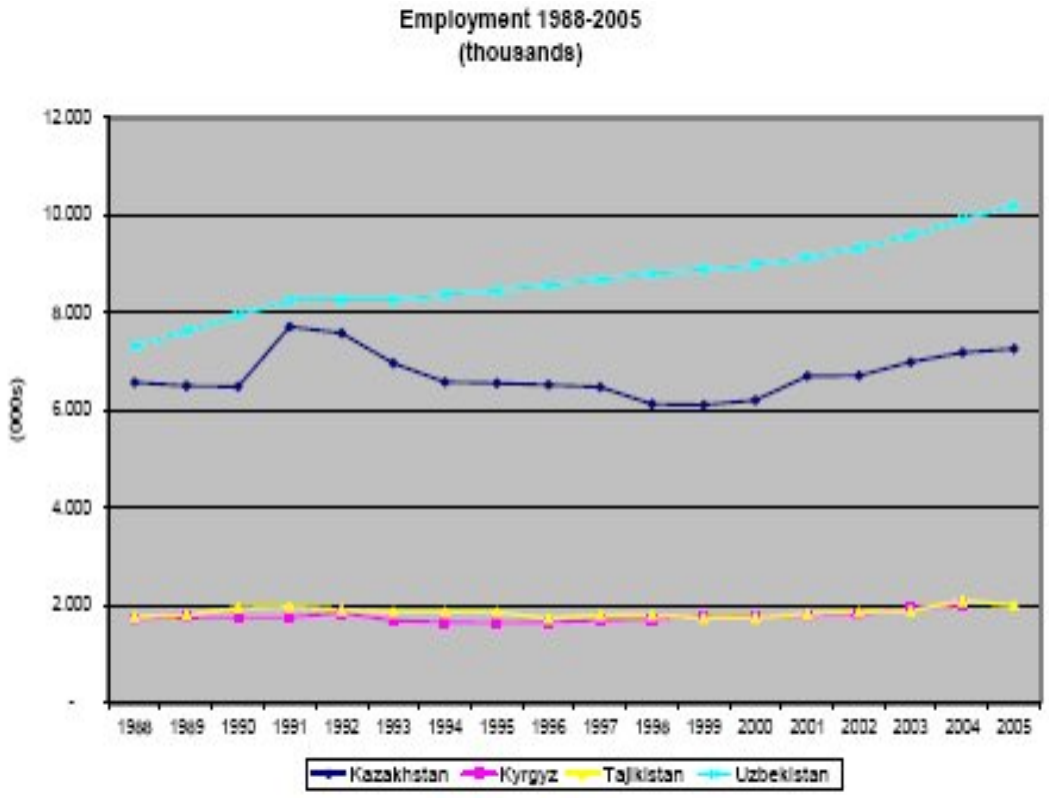
In the CAR's the unemployed are forced by law to register as work seekers in order to qualify for benefits. For many people there is little incentive to register as few are entitled to any benefits and few vacancies are available. Many employees go unpaid for several months. Rising unemployment has resulted in an increase in the number of children living in households of which one or more members are unemployed. In Kyrgyzstan in 1996 about 34 percent of children under the age of 10 lived in a household where no one was employed (Falkingham, 2000).

Under the Soviet regime participation rates for women in the labour force were much higher than in other industrialised countries. Since independence, however, a greater proportion of female employees have been laid off, and

more were 'on leave without pay' than their male counterparts (Evans-Klock & Samorodov, 1998; Tadjbakhsh, 1999).

According to the IMF (1998) real wages have declined even further than real output. There is also evidence that women's wages have fallen more than those of men. Lower real wage levels have obvious implications for child welfare in terms of the material resources available to families. Furthermore, literature reports that a greater proportion of the income earned and controlled by women is spent on children than the income earned by men. Thus, the greater decline in the relative value of women's wages may mean that the proportion of household resources from which children benefit may also be shrinking (Falkingham, 2000).

Figure 5.4: Employment 1988-2005 (thousands)



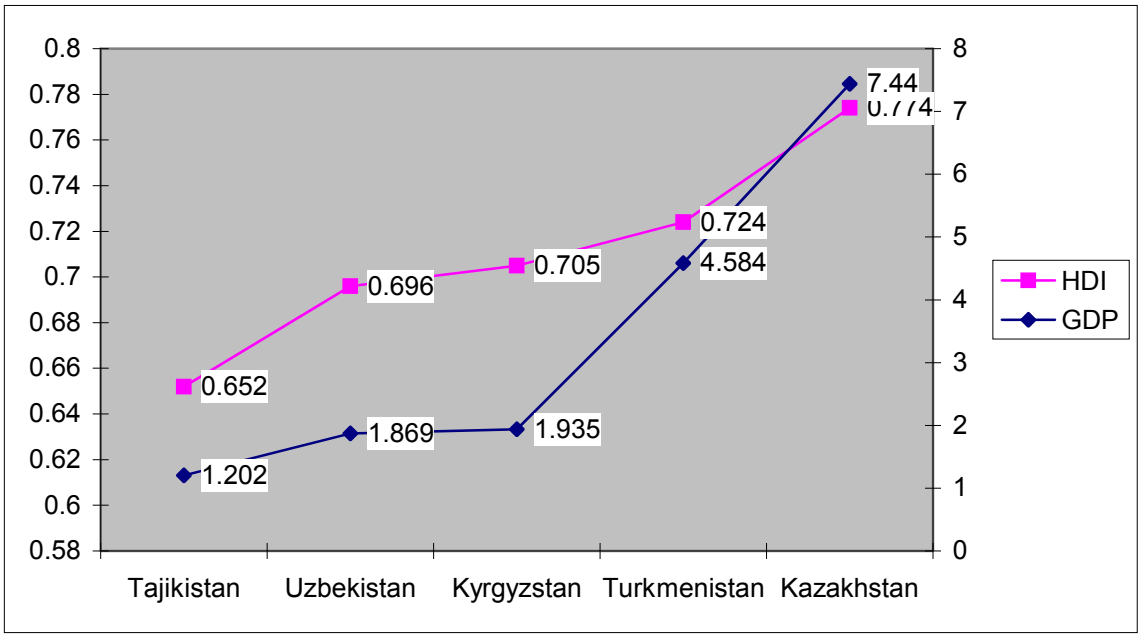
Source: Asian Development Bank 2007

The Soviet system of social welfare, which remained in place in Kazakhstan in the early 1990s, presumed a very high level of public services. The 1993 constitution maintained most of the postulations of the Soviet era, without

providing a clear mechanism for paying for what was supposed to be "guaranteed" workers' benefits, such as free education, medical care, pensions and vacations. The constitution ratified in 1995 somewhat reduced the list and scale of guaranteed protections, but guaranteed minimum wage, pensions for the retired and the disabled, social benefits for orphans and for the elderly or infirm, legal assistance, housing, and what is termed "social defence against unemployment". In practice, social benefits have proved difficult to provide because of financial issues, due in part to tax collection failures and the demographic imbalance between pension contributors and pension recipients (US Library of Congress On-Line, 2007c).

As may be seen in Table 5.1 above income inequality has been increasing since 1989. The Gini coefficients for per capita income in the CARs ranged from 0.29 in Kazakhstan and Kyrgyzstan to 0.31 in Tajikistan and Turkmenistan, with Uzbekistan occupying the middle position of 0.30. By 2003 the Gini coefficient had increased to 0.32 in Kazakhstan, 0.33 in Tajikistan and 0.35 in Uzbekistan, while it dropped by one point in Kyrgyzstan.

Figure 5.5: HDI and GDP for Central Asian Republics 2005



Source: Human Development Report 2006 (UNDP)

The social costs of this transition period are high. The widespread depression and lack of social assistance have meant an increase in the number of families and individuals living below the poverty line.[13] Moreover, social and economic distress is magnified in certain localities, and there are considerable disparities in the HDI and GDP in the five Central Asian Republics (Figure 5.5). Kazakhstan has the highest HDI and GDP levels, while Tajikistan shows the lowest levels.

The fall in GNP has been accompanied by the growing inability of governments throughout the region to mobilise resources. Government expenditure has fallen from approximately a third in Uzbekistan to a fifth in Kyrgyzstan. Despite their tremendous potential Central Asian economies remain among the poorest in the developing world. The region's average per capita gross national product (GNP)--$726 in 2002--places it with the low-income developing economies. However the average masks a significant variation in GNP per capita within Central Asia (Kazakhstan at $1510, Turkmenistan at $1200, Uzbekistan at $450, Kyrgyzstan at $290, and Tajikistan at $180). Figures for 2003 show a significant growth in the GNP in certain of the countries and a decline in others (Kazakhstan at $1780, Turkmenistan at $1120, Uzbekistan at $420, Kyrgyzstan at $340, and Tajikistan at $210) (ADB On-Line, 2007c).

In 2000 Uzbekistan reformed its state funded pension system. This system covers all employed persons, while the government subsidises shortfalls and pays substantial amounts in pensions to special categories. Social support payments are often late, and high inflation decreases their value. In Kyrgyzstan workers are eligible for state funded pensions. The state, which controls almost all pension funds, has been chronically late in pension payments. As part of a long-term pension reform programme certain private

[13] The **poverty threshold**, or **poverty line**, is the minimum level of income deemed necessary to achieve an adequate standard of living. Poverty lines vary in time and place, and each country uses lines which are appropriate to its level of development, societal norms and values. Poverty in this region is related more to the $1 poverty line although the World Bank uses $4.30 for these countries. Extreme poverty is measured at $2.15 per person per day (PPP/day).

pension funds began to appear in 2003 (Kort, 2004; US Library of Congress On-Line, 2007).

5.3.3 Health

For several decades until independence in 1991, children in the Central Asian Republics enjoyed a high degree of state public support, considerable social protection, and relatively good living conditions. There was no problem in accessing healthcare. Health care utilisation rates were high and, by international standards, indicators of population health were good (UNECE, 2002). However, since independence it has become increasingly difficult to maintain the traditional commitment to the needs of the children in the difficult economic climate in Central Asia, even though individual family care and parental affections may be strong (Bauer et al., 1998). During the Soviet era the CARs built up an extensive public healthcare system with one of the most favourable doctor-patient ratios in the world. It is widely assumed that, since the socialist system had been providing virtually free and universal access to healthcare services, the general health needs of the vast majority of the children were provided for; at least in comparison to other countries with the same level of income (Falkingham, 2000).

Immunisation, dental care and other primary healthcare services were also provided, usually within the education system. The economic and fiscal crises experienced in the region have meant that this impressive healthcare system has deteriorated rapidly since independence. In certain cases facilities have been closed because of lack of funds (Bauer et al., 1998; Falkingham, 2000; Buckley, 1998). In Russia there was increased concern over the possible deterioration of the health status of the children when the infant mortality rate increased by 40 percent between 1990 and 1994, and prevalence of stunting among children aged 2 years and younger varied between 8 and 15 percent (Goskomstat, 2001; Zohoori et al., 2002). These figures are not very significant in comparison to those in developing countries; however, they represent a clear indication that malnutrition is a serious problem in Russia. The most basic measure of the wellbeing of a population is life expectancy at birth. Life expectancy at birth is a hypothetical measure stating the number of

years a person could expect to live, on average, if they were exposed to the risk of dying at the prevailing age-specific mortality rates of that year throughout their entire life.

From Figure 3.12 (chapter 3 p54) it is clear that the health of the population in most of Central Asia deteriorated during the 1980-1990 period. At face value the graph presents good news. Although Infant Mortality rates in certain countries are high by international standards from the mid 1990s the trend has been downwards. However, recent data shows that the rates calculated from surveys are consistently higher than those from official data. There are several hypotheses for this discrepancy, including the definition of a live birth and a decline in the proportion of all births registered as a result of increased birth registration fees (UNECE, 2002).

The under-five mortality rate, measured as the number of deaths in a given period before the age of 5 per 1000 live births in the same period, is an important indicator of the development and wellbeing of children. Approximately 7 out of every 10 deaths among children under the age of five in developing countries may be attributed to largely preventable causes - acute respiratory infections, diarrhoea, measles, malaria, HIV/AIDS and the underlying causes of malnutrition (Black et al., 2003; Jones et al, 2003). Malnutrition contributes to about half of these deaths. Despite the noticeable decline in the number of children dying each year, as well as the progress since the 1950's in reducing child mortality, the numbers are still excessively high. A useful comparison is the more than 10 million children under five who die each year of malnutrition and the approximately 9 million annual average killed during the Second World War (Kent, 2000).

The under-five mortality rate is a closely observed public health indicator because it reflects the access of children and communities to basic health interventions such as vaccination, to medical treatment of infectious diseases, and to adequate nutrition. Between 1950 and 1980 a sharp decline in the under-five mortality rate was observed, while there was a steady decline between 1980 and 1999. Figure 3.13 (chapter 3, p55) shows the under-five

mortality rates of the CARs between 1990 and 2005. The trend from 2000 onwards has not been decisive albeit with a very slow decline. The under-five mortality rate fell from 148 per 1 000 live births in the 1980s to 66 per 1000 live births in the late 1990s (United Nations, 2006, 2007a and c). Children's deaths account for about half of all deaths worldwide.

The incidence of child diseases has increased substantially. Many childhood diseases now seen in Kazakhstan, Kyrgyzstan and Uzbekistan are caused directly by the poor environmental conditions inherited from the former Soviet Union. Total expenditure on health as a percentage of GDP in certain of the CARs is lower than in some African and Latin American countries (WHO 2007). Data from Central Asia indicates that environmental problems have a definite and negative impact on the health of children (Bauer et al., 1998).

Before 1991 Kazakhstan had an extensively developed public health system that delivered at least basic care free of charge even to the very remote communities. By 1993, however, Kazakhstan rated below average or lower among the former Soviet republics in terms of medical system, sanitation, medical industry, medical research and development, and pharmaceutical supply. Conditions at healthcare facilities varied widely – it was not uncommon, for example, for rural clinics to be without running water. While the 1995 constitution perpetuates the Soviet-era guarantee of free basic healthcare, financing has remained a consistent problem. Low wages and even non-payment of existing low wages is a common occurrence. This has led to the emigration of many doctors and nurses.

Many pharmaceutical plants have closed, thus causing a shortage of medicine and facilities, while supply connections from other Soviet republics or from East European trading partners have been terminated, with the result that certain types of drugs are virtually unobtainable. As a result the vaccination of infants and children, which had reached 93 percent in 1990, had decreased sharply by 1999 to 81 percent. Despite the fact that Kazakhstan has no system of medical insurance patients are often expected to pay for certain "free" services received at state medical facilities. The health system is in

crisis in rural regions such as the Aral Sea region, where health is most affected by pollution (Kort, 2004; US Library of Congress On-Line, 2006, 2007a and c)

Smoking is almost universal, especially among men, and alcoholism is common. Other forms of substance abuse, such as the use of hemp, morphia products and glue are common, especially among young people. Occupational hazards constitute another major health problem. Especially during the economic hardships of the early 1990s, out of reluctance to accelerate the general decline in production, public health authorities refrained from measures such as closing polluting factories or restricting the use of fertilisers, pesticides and irrigation water. As a result of the dangers posed by exposure to toxic smoke and fumes lead and phosphate plants limit workers to a period of ten years of employment. With little restriction on how they operate factories in Kazakhstan note high rates of morbidity, absenteeism, and permanent disability among their employees (US Library of Congress On-Line, 2006, 2007a and c).

While infant mortality and overall mortality rates increased in the 1990s the fertility rate decreased, contributing to the first drop in Kazakhstan since World War II. The infant mortality rate in Kazakhstan, although the lowest of the five Central Asian republics, was higher than that of any non-Central Asian republic. The general deterioration in physical environment and living standards, promoted outbreaks of several potentially epidemic diseases, respiratory infections and cardiovascular conditions. The incidence of tuberculosis has also grown substantially, as has the incidence of human immunodeficiency syndrome (HIV) and environment-linked cancers. The shortage of healthcare has put children at particular risk. Approximately 10 percent of newborns in 2000 were unhealthy, with most suffering from bronchio-pulmonary and cardiovascular problems. While statistics varied, a reasonable estimate was that life expectancy during the first half of the 1990's fell by two to four years (Kort, 2004)

In the post-Soviet era the quality of healthcare in Uzbekistan has also declined. Spending on healthcare decreased by nearly 50 percent between 1992 and 2001, and Russian emigration in that same decade deprived the health system of many practitioners. Basic medical supplies, such as disposable needles, anaesthetics, and antibiotics, are in very short supply. In the early 2000 policy has focused on improving primary healthcare facilities and cutting the cost of inpatient facilities. Among the most common diseases are those associated with polluted drinking water and various types of cancer (Kort, 2004; US Library of Congress On-Line, 2006, 2007 a & c).

The health system in Kyrgyzstan has suffered increasing shortages of health professionals and medicine. Kyrgyzstan imports nearly all its pharmaceuticals. The increasing role of private health services has supplemented the deteriorating state-supported system. A national primary healthcare system was adopted in 1996 in order to restructure the Soviet system that Kyrgyzstan had inherited. A mandatory medical insurance fund was established in 1997. Drug shortages in the late 1990s and early 2000's meant that the incidence of infectious diseases, especially tuberculosis, increased. The major causes of death are cardiovascular and respiratory conditions. Official estimates of the incidence of human immunodeficiency virus (HIV) have been very low. However, HIV is concentrated in narcotics-abusing and prison populations. With the abuse of narcotics increasing rapidly in the cities the incidence of HIV is expected to do the same (Kort, 2004; US Library of Congress On-Line, 2006, 2007a and c).

5.3.4 Environment and agriculture

The environment of Kazakhstan has been badly damaged by human activity. Most of the water in Kazakhstan is polluted by industrial effluents, pesticide and fertilizer residue, and, in certain places, by radioactivity. Increasing salinity and reduced habitat have killed the fish in the Aral Sea, hence destroying its once-active fishing industry. The depletion of this large body of water has increased temperature variations in the region, and this, in turn, has had an impact on agriculture. A much greater agricultural impact, however, has resulted from the salt- and pesticide-laden soil. Deposition of this heavily

saline soil on nearby fields effectively sterilizes them. Evidence suggests that salts, pesticides, and the residue of chemical fertilizers are also adversely affecting human life around the former Aral Sea - infant mortality in the area around the Aral Sea approaches 10 percent, compared with the 1991 national rate of 2.7 percent. The introduction of wide-scale dry land wheat farming has meant that wind erosion has also had an impact in the northern and central parts of the republic (Falkingham, 2000).

By the mid-1990s an estimated 60 percent of the pastureland of Kazakhstan was in various stages of desertification. Industrial pollution is a bigger concern in Kazakhstan's manufacturing cities, where aging factories pump huge quantities of unfiltered pollutants into the air and groundwater. The former capital, Almaty, is under special threat, in part because of the post-independence boom in private automobile ownership. The gravest environmental threat to Kazakhstan comes from radiation, especially in the Semey region of the northeast where the Soviet Union tested almost 500 nuclear weapons, 116 of them above ground. Such tests were often conducted without first evacuating the local population. Although nuclear testing was halted in 1990 radiation poisoning, birth defects, severe anaemia, and leukaemia are very common in the area (United Nations, 1996; Kort, 2004).

Extensive pollution and the degradation of large segments of the natural environment have increased the pressure on public health. Disability at birth, as well as ill health of one form or another, is common in certain areas. As recently as 1999 only 47 percent of homes had sewerage systems although vast improvements in sanitation facilities have been noted in the urban areas (Olcott, 1996; Kort, 2004).

Kyrgyzstan has avoided the serious environmental problems encountered by the other Central Asian countries. The main problems in Kyrgyzstan are the inefficient use and pollution of water resources, land degradation, and improper agricultural practices such as overgrazing which then leads to soil erosion. Mining is one of the few causes of environmental damage in

Kyrgyzstan. Gold and uranium mining operations have seeped toxic chemicals into soil and water in the eastern half of the country, and salinisation is a problem along the eastern stretches of the Naryn River. Overuse of the forest reserves has led to further soil erosion, while landslides also constitute environmental issues that negatively affect, for example, agriculture production (Kort, 2004; US Library of Congress On-Line, 2006, 2007a and c).

Water is in critically short supply in Uzbekistan. There is water in the mountainous eastern periphery of the country, but other areas face a serious water crisis. About 90 percent of Uzbekistan's water is used to irrigate crops, mainly cotton and rice both of which need large quantities of water to flourish. The quality of drinking water is also a major problem, especially in the western province of Karakalpakstan, where water is not properly distributed and sources are exposed to various types of surface and underground contamination. Inadequate sewage disposal exacerbates Uzbekistan's water pollution problem – only 40 percent of the population is served by sewerage systems. Soil contamination is highest in areas that have been subjected to annual overdoses of fertilizers and pesticides. Furthermore, several hectares of pastureland are lost to salt and dust annually (Bauer et al, 1998; Kort 2004).

In some areas near the Aral Sea environmental factors have contributed to micro-nutritional deficiencies such as iron deficiency, which is prevalent especially among pregnant women, who then give birth to anaemic children, and face difficulties in breastfeeding, which in turn leads to child malnutrition (Bauer et al., 1998).

Agriculture is the single largest provider of employment in Central Asia, but between 1990 and 2004 its share of gross domestic product shrank from 35 to 7 percent. Few agricultural products have export value. Kazakhstan has good quality agricultural land, but the continental climate, exacerbated by soil-depleting agricultural practices, limits utilisation. Agriculture remains a vital part of the economy of Kyrgyzstan and a refuge for workers displaced from

industry. After a sharp reduction in the early 1990s, subsistence farming increased in the early 2000s. Grain production in the lower valleys and livestock grazing on upland pastures provide employment for the largest proportion of the agricultural workforce. About 55 percent of the total agricultural output comes from private household plots, 40 percent from private farms and 5 percent from state farms. The irrigation infrastructure is, however, in poor condition (Dowling & Wignaraja 2006).

The non-oil exporting countries in the CARs (Kyrgyzstan, Uzbekistan and Tajikistan) resorted to almost full-scale agriculture in the late 1990s in an effort to drive economic growth. The success of this effort has been attributed to agricultural reforms, high world cotton and wheat prices as well as generally favourable weather conditions. Almost immediately Kyrgyzstan implemented a wide range of agricultural reforms that emphasised collective farm privatisation. In contrast Uzbekistan undertook limited agricultural reform (Rumer, 2002; Rozelle & Swinnen 2004). Peasants were granted small plots of land to grow fruit and vegetables in an effort to improve food security. Farmers were allocated land conditional on using the land according to state dictates (Dowling & Wignaraja 2006).

Agriculture and industries supplied by agriculture contribute more than 40 percent of Uzbekistan's GDP. However, expansion of the sector has been hindered by state control of agricultural markets, equipment shortages, and the ban on private land ownership. Privately worked plots contribute an estimated 75 percent of non-wheat food output. Uzbekistan is the world's fourth largest producer and second largest exporter of cotton. Cotton accounts for approximately 45 percent of the country's exports. In recent years, Uzbekistan has switched some farmland from cotton to grains, especially wheat, in an effort to reduce imports. Most of Uzbekistan's natural fish come from reservoirs and lakes. The management of rivers primarily for irrigation reduces the natural fish yield (Babu & Reidhead, 2000).

5.3.5 Food security

Following independence the Central Asian republics faced a choice between self-sufficiency in food production and food security through a combination of own production and regional trade. Regional and international trade are not new concepts in the CARs but were controlled by Russia through the SOEs during Soviet rule (see Chapter 1, p9). Coupled with this was the lack of opportunities to develop marketing relationships with foreign buyers or investors under Soviet rule as well as during the early transition period (Babu & Reidhead, 2000; Dowling & Wignaraja, 2006).

The region was not prepared for the huge economic adjustments it was forced to make – tight credit policies, reductions in subsidies, increase in real interest rates, general disorganisation within the economy, development of new business habits among both producers and consumers, major adjustments in the labour market, and the dissolution of governing trade among Soviet bloc members (Svejnar, 2002; Campos & Coricelli, 2002; Djankov & Murrell, 2002). Regional trade arrangements fell out because the countries were unable to benefit from comparative advantage through the regional trade arrangements – there was a drastic fall in government revenue. Each country decided to produce only the amount of grain needed by its population. For countries that were previously net importers of grain this meant increased domestic grain production accompanied by increased market prices and farming of marginal lands. For countries that were previously net exporters of grain this meant reductions in grain production and net decreases in prices and national export revenues. Both categories of countries have suffered in terms of security with the former category hurting the consumers and the latter the farmers and national accounts (Babu & Reidhead, 2000).

There is limited information of food security at household level in Central Asia due to the limited number of household surveys in the region. The meagre data available suggest a decline in household food security following the dissolution of the FSU, especially in Kazakhstan, Uzbekistan and Tajikistan (see Figure 5.6 below). For many poor families declining real incomes result in decreased levels of total caloric consumption.

The diet and lifestyle of many citizens, especially in the cities, contribute further to poor health. The average diet is high in meat and salt and low in vegetables and fruit. The hyperinflation of 1992-1993 cut deeply into family budgets, limiting both the variety and quantity of food consumed by most ordinary people (Pomfret, 1999).

The decreasing levels of food consumption in the republics were accompanied by changes in diet composition. Information on food consumption in Kazakhstan reveals that the consumption of protein, fat, vegetables and fruit has decreased radically since 1990 (Pomfret, 1995; Bauer et al., 1998). Expenditure on non-food items is lower than that on food, although meat and dairy product consumption has fallen drastically in recent years, especially in poor households with children. The decline in average food consumption, combined with the sharp increase in income inequality and the deterioration of the relative position of households with dependent children has led to malnutrition, especially among children in poor households (Bauer et al., 1998). No data is available on food consumption levels in the other CARs.

Table 5.2 shows the consumption of basic foodstuffs in Kazakhstan between 1985 and 1994. In the five years leading up to independence total food consumption increased by almost five percent. However, consumption decreased over the next several years. Between 1990 and 1994 total per capita consumption fell by more than 20 percent.

Table 5.2: Per capita food consumption in Kazakhstan 1985-1994 (kg/year)

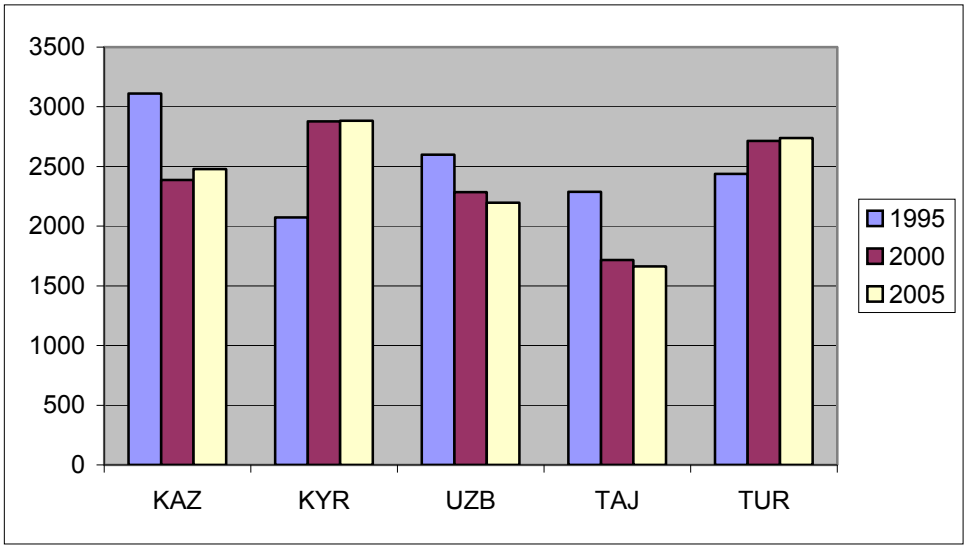
Food products	1985	1990	1991	1992	1994
Meat and meat products	58.0	70.0	65.0	57.0	46.0
Dairy products	260.0	305.0	280.0	270.0	263.0
Eggs (number)	217.0	222.0	198.0	179.0	162.0
Fish and fish products	10.9	10.1	7.0	3.6	5.4
Sugar	37.1	37.4	26.2	24.0	19.5
Vegetable oil	9.8	11.0	9.0	6.0	7.2
Potatoes	89.0	82.0	73.0	75.0	66.0
Vegetables	90.0	76.0	66.0	62.0	55.0
Fruits and berries	22.0	28.0	13.0	11.0	13.0
Bread, macaroni, cereals and beans	146.0	142.0	146.0	160.0	140.0
Total	939.8	983.5	883.2	847.6	777.1

Source: Falkingham 2000.

National and regional level data also clearly indicate the high level of food insecurity in Central Asia (not shown here). As discussed earlier the CARs which used to import some of its supplies from the other Soviet provinces have had to expand their domestic production. Land use has also suffered in the process because farms had to be expanded in order to provide larger tracts of arable land (Babu & Reidhead, 2000).

Evidence of nutrition security may be found in the data on child malnutrition in the CARs. Chapter seven of this thesis analyses the child malnutrition levels in the CARs in greater detail. In a 1996 survey conducted in Tajikistan several districts revealed stunting rates in excess of 50 percent. These figures are comparable to those for some African countries (Popkin & Martinchik, 1999). According to Babu and Reidhead (2000) the food insecurity and nutritional challenges facing the countries of Central Asia may be attributed mainly to unfinished policy reforms and changes in the institutional structures of the countries.

Figure 5.6: Per capita daily calorie consumption Central Asia 1995-2005



Source: UNDP 2006

Howell (1996) found that in Kyrgyzstan households had resorted to restricting their consumption of food and luxury items. Substitution of higher grade foods with lower grade foods has become standard, leading to a less varied diet.

Households sell their livestock and household items such as television sets in order to buy food and other essential items. The sale of cows, for instance, means there will not be enough milk for the growing children in the household, and this has an adverse effect on the nutritional status of children. The danger of depleting the productive assets is that this practice undermines the long-term capacity of households to extricate themselves from poverty (Howell, 1996).

Overall, after a decade of independence, agriculture and services remain the most important sectors of the economy in Kyrgyzstan, while industry remains concentrated in specific regions. As industrial enterprises have failed workers have moved from industry to agriculture. As much as 50 percent of the gross GDP is contributed by the grey economy. The GDP has been increasing by a steady 6 percent since 2003. In 2004 the contributions of the services and industrial sectors to GDP decreased, while that of agriculture increased. In 2004 per capita GDP was US$404 (US Library of Congress On-Line, 2006, 2007a and c).

5.3.6 Natural resources

In Kyrgyzstan, the state agency Kyrgyzaltyn owns all mines, many of which are operated as joint ventures with foreign companies. Although between 1992 and 2003 coal output dropped from about 2.4 million tons to 411 000 tons, nevertheless the government plans to increase utilisation of Kyrgyzstan's considerable remaining deposits in order to reduce dependency on foreign energy resources. The domestic output of oil and natural gas does not meet national needs (Kort, 2004; US Library of Congress On-Line, 2006, 207a and c).

In the post-Soviet era industries in Kyrgyzstan suffered sharp reductions in productivity because the supply of raw materials and fuels was disrupted, and Soviet markets had disappeared. The sector has not yet recovered appreciably. If gold production is excluded, industry contributed 13 percent only of the gross GDP in 2004. Government support is moving away from the machine industries, which were a major contributor to the Soviet economy,

toward clothing and textiles; food processing accounts for 10 to 15 percent of industrial production. Kyrgyzstan is very dependent on foreign sources of energy due to its limited deposits of fossil fuels and low investment in extraction industries. Most natural gas imports come from Uzbekistan. Per capita energy consumption is high considering average income, and the government has no comprehensive plan to reduce the demand. As a result of its rich source of hydroelectric power, through its fast-flowing rivers, Kyrgyzstan supplies electricity to Kazakhstan and Uzbekistan in return for fossil fuels. However, antiquated, poor management make Kyrgyzstan more dependent on foreign energy when water levels are low (Kort, 2004; US Library of Congress On-Line, 2006, 2007a and c).

Substantial post-Soviet growth in the services is mainly attributable to the appearance of small private enterprises. Although Kyrgyzstan's mountains and lakes are an attractive tourist destination, the tourism industry has grown very slowly because it has received little investment. Land transportation is a critical element of national unity because the regions of Kyrgyzstan (particularly north and south) are separated by natural barriers. The upgrading of road linkages with China is underway and is expected to be completed by 2008. The limitations of Kyrgyzstan's pipeline system are a major impediment to fuel distribution. The telecommunications infrastructure does not meet the needs of the vast majority of people. In 2002 there were 7.7 telephone lines per 100 inhabitants. However the telecommunications infrastructure is currently being upgraded (US Library of Congress On-Line, 2007).

Although the economy in Uzbekistan declined by about 18 percent between 1991 and 1995 it nevertheless suffered less economic shock from the dissolution of the Soviet Union than did most other former Soviet Republics. This may be attributed to the fact that Uzbekistan large amounts of cotton and gold, which are commodities of value in world markets, and because the government stressed the development of import-replacement industries in the post-Soviet era. In the 1990s oil and gas production increased significantly, providing limited exports of natural gas and eliminating the Soviet-era need to import oil. In the same period the expansion of grain cultivation reduced food

imports. Although cotton remains the most valuable agricultural product cotton output has declined since the mid-1990s.

Uzbekistan's economy has retained many elements of Soviet economic planning. Economic policy remains under state control, the government has strictly limited foreign direct investment, and little privatisation has occurred aside from small enterprises (Olcott, 1996; Kort, 2004). In the early 2000s agriculture remained the most important economic sector, but the contribution of industry was increasing. Informal economic activity accounts for between one-third and one-half of output. The GDP of Uzbekistan has been increasing steadily since 2002. In 2004 it was estimated at US$9.2 billion. In both the Soviet and the post-Soviet eras minerals and mining have been vital to the economy. Uzbekistan's natural gas reserves satisfy all domestic needs and are an important export product, while oil reserves are nearly sufficient for domestic needs.

In the early 2000s, all of Uzbekistan's large industrial enterprises remained state-owned, and many unproductive Soviet-era plants remained in operation. During the 1990s Uzbekistan became self-sufficient as regards fuels, although the fuel industries have remained inefficient and wasteful. Owing to the smuggling of oil into neighbouring countries, oil production has been on the decline since 2000. In the post-Soviet era Uzbekistan has increased its production of natural gas by an estimated 40-50 percent. Uzbekistan is also self-sufficient in electrical power. However, because of the poor state of the infrastructure, experts estimate that, in the near future, Uzbekistan will no longer produce a net surplus of electrical power (US Library of Congress On-Line, 2006, 2007a and c).

Uzbekistan has desirable tourist destinations in the cities of the ancient Silk Road, and the travel infrastructure is adequate. However, because of low investment and poor maintenance, Uzbekistan's overland transportation infrastructure has declined significantly in the post-Soviet era. Air transport is the only branch that has received substantial government investment. In the early 2000's Uzbekistan's telephone system was in a poor condition, however,

a government programme has made substantial progress in modernising the system. In 2005 Uzbekistan adopted a new telecommunications and information transfer programme to accelerate development through 2010 (US Library of Congress On-Line, 2006, 2007a and c).

Four percent only of Kyrgyzstan is classified as forested, all of which is state-owned and none classified as available for wood supply. The main commercial product of the forests is walnut. Kyrgyzstan does not have a fishing industry of any significance. In 2002 aquaculture contributed 66 percent of the country's total output of 142 tons of fish (Kort, 2004; US Library of Congress On-Line, 2006, 2007a and c).

Of the 4.8 percent of Kazakhstan territory that is forested approximately 9 percent is nominally protected. Forestland is concentrated along the Chinese and Kyrgyz border and north of the Fergana Valley. A small amount of timber only for export is produced, but imports of timber far outnumber exports. The desiccation of the Aral Sea ruined the prosperous fishing and fish-processing industry. In the Caspian Sea pollution, poaching and overfishing has drastically depleted the fish. Kazakhstan has rich deposits of a range of sought after minerals including gold, iron ore, copper and uranium (US Library of Congress On-Line, 2006).

Kazakhstan's economy was closely linked to that of Russia in the centrally planned system of the Soviet Union, and hence the break-up of the union in 1991 caused a severe economic downturn in the years that followed. As elsewhere living standards deteriorated, with both industry and agriculture experiencing hard times. During In the 1990s the contribution of industry to the gross domestic product (GDP) fell from 31 to 21 percent, and GDP fell by 36 percent between 1990 and 1995. Since 2000 the GDP has increased every year. By the end of 1995 Kazakhstan's economy was less than half the size it had been in 1991. In 2004 per capita GDP was US$2650. By 2002 new oil extraction operations restored the GDP share of industry to about 30 percent, and overall economic indicators rose substantially. The economy has remained poorly diversified.

Since the early 2000s, oil has accounted for more than half of Kazakhstan's industrial output, and many other industries are dependent on the oil industry. In the post-Soviet era the labour intensive agricultural sector became less productive. However machine building, metal processing and the manufacture of construction materials have grown (Bauer et al., 1998; Falkingham, 2000; Kort, 2004; US Library of Congress On-Line, 2006).

From 1990 to 1995, the production of Kazakhstan's industrial sector fell by 52 percent compared with the last years of the Soviet era. Local industries suffered when demand from Russia and other parts of the Soviet Union collapsed. The defence industry, which had made a significant contribution to the Soviet system, virtually disappeared. Despite its fossil fuel riches Kazakhstan is a net importer of electricity and gas, mainly from Russia and Uzbekistan respectively. A major cause of the energy imbalance is an extremely high ratio of energy consumption to GDP output. The inefficient domestic delivery system means that there are periodic power cuts due to late payments. In the first half of 2005, as production continued to increase, Kazakhstan became a net exporter of natural gas for the first time (US Library of Congress On-Line, 2006, 2007a and c).

Uzbekistan has deposits of natural gas, coal, gold, uranium, copper, silver, and a number of other valuable nonferrous metals such as lead, zinc, tungsten, and lithium. It is also the world's eighth-largest producer of gold (Kort, 2004; US Library of Congress On-Line, 2007 c).

Kazakhstan's manufactured goods have not been competitive on Western markets. The transportation infrastructure does not meet the needs of a vast country of which the per capita volume of road and railroad shipping is one of the highest in the world, and whose climatic extremes put particular stress on the transportation infrastructure. Although Kazakhstan has the best telephone system in Central Asia the telecommunications infrastructure is nevertheless inadequate to meet contemporary needs because the system rates poorly by world standards (US Library of Congress On-Line, 2006).

5.4 INDIVIDUAL CHANGES

In this model, as earlier introduced, the child is the individual whose health outcomes are negatively affected by the sociopolitical and socio-environmental changes as a result of the forceful acceptance of these changes by their parents under the government. This forceful acceptance, and promotion and integration of these changes are what James et al. (2003) term "violent messages" that foster oppression. These changes, as we have seen in discussions elsewhere in this thesis, were systematically repeated and directed at certain groups of people in the USSR. One such group was the children of Central Asia.

The transactional relationship between socio-political, socio-environmental and individual changes is strengthened by poverty, because poverty, as we have seen earlier, may function both as the context in which structural violence flourishes (as happened in the FSU) as well as a consequence of structural violence (Tainter, 2000). For example, state-wide health funding formulae may lead to a lack of access to health services for a particular group of people (structural violence: unequal resources, sociopolitical system), which may lead to chronic and widespread unemployment in the country concerned (consequences of structural violence).

The interaction between socio-political and socio-environmental factors which produces nutritional outcomes in populations, and children especially, has highlighted the important role that policies and programmes developed by countries play in the overall health outcomes of individuals. The changes that take place in individuals (children) will be explained further in subsequent chapters.

The patterns of the nutritional status of children are rooted in the structures of societies as these structures have changed over time. If one tries to understand and explain them one is able to identify the links between what is happening/has happened and the nature of the structure as it is illustrated institutionally. In other words, structure is/has determined much – it has

resulted in the “violence” to which young children have been exposed that in turn translates into their serious nutritional problems.

5.5 SUMMARY

In this chapter the effects that social, political and economic transformations have of the health and welfare of people, especially children under five years of age were examined. Special attention was focused on the effects of socio-political, socio-environmental and individual changes on the people of Central Asia especially on children under five years and their parents.

CHAPTER 6

6. SOURCES OF DATA AND METHODS OF ANALYSIS

6.1 INTRODUCTION

This chapter discusses the sources of data and methods used in this study. The chapter is divided into three sections. The first section describes the sources of data. The second and third sections describe the procedures and methods used in the study. The main statistical method used was the binary logistic regression.

6.2 SOURCES OF DATA

This section provides a brief description of the data used in the study. The Demographic and Health Survey III (DHS) data sets for Kazakhstan (1999), Uzbekistan (1996) and Kyrgyzstan (1997) were the main sources of data used. For a detailed description of these surveys, the interested reader should consult the DHS reports of the three countries. The purpose of the surveys was to develop single integrated sets of data for the governments of the respective republics to use in the planning of effective policies and programmes in the areas of health and nutrition. Permission was sought from and granted by Macro International Inc. to conduct a secondary analysis of selected variables for the purposes of this study. Selected variables included, among others, breastfeeding practises, nutrition, vaccination coverage and episodes of illness among children under the age of three years, anaemia levels, and weight and height measurements for both the children and the mothers.

The DHS data sets provide one of the best sources of data for the study of child malnutrition worldwide. In fact, the DHS provides far more detailed data on child malnutrition than any relevant data available from other sources. This is particularly true for developing countries such as the Central Asian Republics, which had either no data or scanty data on a range of demographic and health issues covered by the DHS.

6.2.1 Target population

The survey respondents included women aged 15-49 and all children younger than 60 months. In Uzbekistan and Kyrgyzstan only children below the age of 36 months were included in the surveys, while in Kazakhstan the survey included all children below the age of 60 months. The target population for analysis therefore included all children the ages of 0 and 35 months at the time of the surveys, together with their mothers, so that results would be comparable.

6.2.2 Sample design

(a) Sampling frame

The DHS for the three countries employed a nationally representative probability sample of women aged 15-49 and included approximately 4 000 women in each country. Complex sample designs were used. Selected regions, (both urban and rural), which are divided into oblasts[14], were included in the survey. In the urban areas, the sampling frame was the list of therapeutical uchastoks,[15] mainly cities. For the small towns, each town was divided into smaller segments, which were treated as if they were uchastoks. In the rural areas, the sampling frame was the list of all villages in the whole country. The primary sampling units (PSUs) were raions,[16] which were selected with probabilities proportional to population size.

The sample was selected in two stages. In the urban areas, the primary sampling units selected during the first sampling stage corresponded to the uchastoks. In the field, large uchastoks were divided into smaller segments, only one of which was selected for the survey. A complete listing of all the households residing in each selected segment was carried out. The lists of households obtained were used as the frame for the second stage sampling – in each cluster households were selected with the women aged between 15 and 49 being eligible to be interviewed.

[14] Oblasts are provinces.
[15] Each city is divided into uchastoks (health blocks), each of which is the responsibility of one physician. People living in the uchastoks go to a designated health centre for service.
[16] Raions are districts.

In the rural areas, the first stage-sampling units were the villages. In the field, very large villages that had been selected were divided into smaller segments of which only one was selected. The nonproportional distribution of the sample in the different survey regions meant that sampling weights were applied to the data.

(b) **Questionnaires**

Two main questionnaires with similar requirements were used for the DHS in these countries – the Household Questionnaire and the Individual Questionnaire. In Kazakhstan a third questionnaire, the Male Questionnaire, was also used. The questionnaires were based on the model survey instruments developed in the DHS programme. During consultations with specialists in the areas of reproductive health, child health and nutrition, the questionnaires were adapted to the data needs of the three countries. The questionnaires were all developed in English and translated into both Russian and one of the major languages in each country. After a pre-test, the questionnaires were further modified.

The Household Questionnaire was used to enumerate all the usual members and visitors in the sample households and to collect information relating to the socioeconomic position of the household. In the first part of the Household Questionnaire, information was collected on age, gender, educational attainment, marital status, and relationship to the head of the household of each person listed as a household member or visitor. A primary objective of this first part of the Household Questionnaire was to identify women eligible for the individual interview. The second part of the Household Questionnaire included questions relating to the dwelling unit, such as the number of rooms, the flooring material, the source of water, and the type of toilet facilities. This second part also included questions on the availability of a variety of consumer goods.

The Individual Women's Questionnaire was used to collect information from women aged 15-49. These women were asked questions on the following major topics:

- background characteristics
- pregnancy history
- outcome of pregnancies and antenatal care and attendance with more detailed information collected for postnatal care and attendance that occurred in the three years immediately preceding the surveys
- child health and nutrition practices
- child immunisation and episodes of diarrhoea and respiratory illness
- knowledge and use of contraception
- marriage and fertility preferences
- background of husband and woman's occupation
- anthropometry of mothers and children
- haemoglobin measurement of women and children

(c) Training and fieldwork

The questionnaires were pre-tested in all three countries. A number of females were selected and trained over a two-week period at different centres within these three countries. Training consisted of classroom lectures and practice, as well as practice interviews conducted in the field. The pre-test included one week of interviews in an urban area and one week in a rural area. The pre-test interviewers were retained to serve as supervisors and field editors for the main survey. All interviewers were female, while most of the supervisors and technicians were male. Interviewers were selected based on their performance during the training period. Teams consisting of between eight and nine members carried out the data collection. Each team consisted of a team supervisor, one editor, one household interviewer, four to five individual female interviewers, and one medical technician (responsible for height and weight measurement, and anaemia testing).

(d) Response rates

In all three countries the overall response rate, which was the product of the household and the individual interviews, was 97 percent for the individual

interviews and 99 percent for the household interviews (see Table 6.1 below). The principal reason for non-response was a failure to find an eligible woman at home after repeated visits to the households.

(e) Limitations of the study

While it is well documented that the DHS limits data errors through rigorous cleaning and interrogation of the data, it is, however, still possible to find errors in the data. A global assessment of DHS data collected in 22 countries did not, however, detect any serious errors that could have an effect on demographic estimates (Desai & Alva, 1998). A systematic bias and/or rounding-off errors are possible while reading and recording the height and weight of a child. Age heaping and digit preference also constitute possible measurement errors. In addition, this study is based on cross-sectional data, which implies that it is not always possible to determine the direction of causal relationships explicitly.

Table 6.1 Results of the household and individual interviews

	Kazakhstan (1999)			Kyrgyzstan (1997)			Uzbekistan (1996)		
Results	**Urban**	**Rural**	**Total**	**Urban**	**Rural**	**Total**	**Urban**	**Rural**	**Total**
Household interviews									
Households sampled	4 311	1 990	6 301	1 757	2 064	3 821	2 228	1 717	3 945
Households found	4 038	1 922	5 960	1 686	2 009	3 695	2 099	1 664	3 763
Households interviewed	3 939	1 905	5 844	1 668	2 004	3 672	2 062	1 641	3 703
Household response rate	97.5	99.1	98.1	98.8	99.8	99.4	98.2	98.6	98.4
Individual interviews									
Number of eligible women	2 989	1 917	4 906	1 517	2 437	3 954	2 388	2 156	4 544
Number of eligible women interviewed	2 927	1 873	4 800	1 485	2 363	3 848	2 306	2 109	4 415
Eligible women response rate	97.9	97.7	97.8	97.9	97.0	97.3	96.6	97.8	97.2

Sources: UZDHS 1996, KRDHS 1997, KDHS 1999

6.3 ANALYTICAL FRAMEWORK

Univariate analyses of all variables relevant to the study of undernutrition[17] were carried out for each country. A joint model for the three countries was developed. This joint model was based on the assumption that the Central Asian countries are similar in a political, demographic and socioeconomic sense. The surveys were also carried out over a relatively short period of time in all three countries.

The assumption of a joint model was further supported by the absence of a significant interaction between country and other variables in the analysis. Multicollinearity of the predictors was assessed using the standardised methods as described by Pallant (2003). Thereafter bivariate analyses of the nutritional status of children in terms of demographic and background characteristics were carried out. Variables that indicated a significant association in the bivariate tabulations were tested for inclusion in the models for multivariate analyses. Multivariate logistic regression analysis was carried out separately to study the chances of underweight and stunted children being included in the study. Wasting was excluded in the analysis because very few independent variables showed any significant relationship with the dependent variables. Thereafter models predicting determinants of undernutrition were postulated. The forward selection procedure with a significance level of 0.5 for the Wald statistic was used. All potential interactions were included one by one as proposed by Hosmer and Lemenshow (2000). All those variables that appeared significant were used in the logistic regression. Data analysis was carried out using statistical package SPSS version 14.

6.3.1 Operational definitions of variables

The selection of potential predictors of child malnutrition was based on a literature review. The independent variables used in the analysis refer to different categories to which they could be said to belong, namely, socioeconomic and environmental (maternal education, number of household members, household

[17] In this study, the term “undernutrition” refers collectively to stunting, underweight and wasting.

wealth, number of children under the age of five years, toilet and water facilities), and biodemographic and health (child age, birth weight, length of preceding birth interval, number of immunisations, breastfeeding, child haemoglobin level, birth order, heard of ORT, BMI, ethnicity and delivery assistance).

The central variable in this study, which has already been introduced in chapter one is undernutrition, which is composed of height-for-age (*HTA*), weight-for-age (*WTA*) and weight-for-height (*WHT*).

(a) Undernutrition (dependent variable)

Height-for-age (*HTA*): Standard deviations from the reference median (stunting) treated as a dichotomous variable. Weight-for-age (*WTA*): Weight-for-age standard deviations from the reference median (underweight) treated as a dichotomous variable. Weight-for-height (*WHT*)*:* Weight-for-height standard deviations from the reference median (wasting) treated as a dichotomous variable.

(b) Socioeconomic and environmental factors

Three educational categories were defined for the mother *(MEDUC): 0-Part two* which includes *no education* and *primary education* (six years duration), *secondary education* (eleven years duration) and *higher education* (university degree). Household wealth *(HOWE):* a household wealth index consisting of four levels – very *low, medium, high* and very *high* – was created to be used as proxy for economic conditions of the household. Economic conditions of the household included ownership or possession of the following items: a car, bicycle, telephone, radio, television, electricity, main floor material, refrigerator and motorcycle. The number of people per household *(NOHOUSE)* was recoded into three categories: *1-4 persons*, *5-7 persons* and *more than 7 persons.* Three categories were defined for the number of children per household under the age of five *(NOCH): one child or no other child, two children and more than two children.* As far as environmental variables were concerned two variables only –

toilet and water facilities – revealed a significant association with the nutritional variables. Toilet facility *(TOIL)* was defined in terms of two categories; *flush toilet* and *pit toilet*.

The original variable source of drinking water *(WATER)* consisted of different categories. This variable was recoded into a binary variable: having access to piped water or unpiped water.

(c) Biodemographic and health factors

A set of four variables was defined for the variable child age *(CAGE): 0-5 months, 6-11 months, 12-23 months* and *24-35 months.* Birth weight (*BWE*) was recoded into a binary variable: below 2.5kg and above 2.5 kg. Four categories were defined for the variable length of the preceding birth interval *(BINT): first order births, interval less than 24 months, between 24 and 47 months* and *above 47 months.* According to WHO all children should have received at least eight immunisations by age of three years. Three categories for the number of immunisation *(NIMM)* received were created: *0-3 immunisations, 4-7 immunisations* and *8 immunisations.* Duration of breastfeeding in months *(BREAST),* measured as the number of months a child has been breastfed between the date of birth and the date of the interview, was divided into three categories: *0-6 months, 7-12 months* and *13-35 months*. The original haemoglobin *(HAEMO)* levels for the child were retained: severe, moderate, mild and none. Birth order *(BORD)* number which gives the order in which the children were born is measured as an interval variable, 1, 2, 3, & 3+.

Health variables included the number of immunisations, whether the mother had heard of ORT, and whether or not the mother had received professional health assistance during delivery of child, were included in the survey. Three categories of the number of immunisation *(NIMM)* received were created: *0-3 immunisations, 4-7 immunisations* and *8 immunisations.* The original variable assessing the type of assistance received during delivery *(DEL)* consisted of

different categories. These were recoded into *professional* (doctor and/or nurse) and *non-professional* assistance (traditional birth attendant, relative and/or friend). Ethnicity *(ETHN)* was an additional characteristic of the mothers. Five categories were identified as the major ethnic groups in the study – *Kazakhs, Uzbeks, Kyrgyz, Russian and other*. The health and nutritional status of the mother was measured (in the DHS) using the body mass index *(BMI)*. Three categories of the BMI were created: *<18.5, 18.5-29.9 and >30*.

All variables used in this analysis had nearly complete responses with less than 5% missing values. Data from all three countries was merged and the variable country was included in the model.

6.3.2 Omitted "Traditional" explanatory variables

There are certain "traditional" variables that have been omitted in the analyses constructed in this study and these deserve mention. They include place of residence, mother's age, father's age, mother's occupation, father's occupation, father's education, and prenatal care. A number of these variables had a significant association and/or inverse relationship with the nutritional status of the child at country level, but this disappeared after the data was pooled.

(a) Place of residence: It is a well-established fact that, in any developing country, malnutrition among urban dwellers is generally much lower than that of rural dwellers. This is simply because of urban bias development. Most high quality health and educational services, housing and water services, and well-paid jobs in developing countries are concentrated in the urban areas. Thus, the inverse relationship between child malnutrition and urban or rural residence does not reflect the effects of the type of residence per se, but other factors associated with it. A number of recent studies have either suggested or found no significant inverse association between urban residence and child malnutrition within a multivariate context. Other factors such as education, marital status, family size, occupation, and unemployment may be underlying factors, which account for

urban-rural differentials (see Chapter 3, p61). Trial runs for bivariate association showed similar results.

(b) Ages of mother and father: Babies born to young and to old mothers, compared to those born to mothers of intermediate age, for example, 25-35, have a higher risk of malnutrition. Several studies have found that malnutrition decreases with maternal age. Younger mothers experience higher child malnutrition levels as compared to older mothers. This may be due to a number of reasons such as lack of experience or undeveloped physiology. However, the mother's age may also reflect socioeconomic status, including status in the household hierarchy, and this may constitute one of the underlying factors, which account for the significant effect observed of the mother's age on child malnutrition. The age of the mother did not reveal any correlation with child malnutrition. Similarly, the age of the father did not reveal any correlation with child malnutrition (see Chapter 3, p52).

(c) Occupation and employment of mother and father: Parental occupational status especially that of the mother is expected to have an effect on the health status of children. According to Delpeuch et al., (2000) a salaried mother might be in a position to devote her income to her own and her children's needs, thus resulting in the improved nutritional status of her children.

The father's occupation and employment has been found to be positively associated with child nutritional status. Single country data analyses revealed an association between the father's occupation and employment and child nutritional status, but this disappeared with pooled data. Neither occupation nor employment shows any association with child malnutrition.

(d) Education of father: The father's education has been found to have a positive and statistically significant effect on child nutritional status in a number of studies conducted in developing countries (see Chapter 3, p68). However, the

educational level of the father has been found to affect child health and nutritional status mainly through its income generating properties (Glewwe 1999), did not show any significant association with child nutritional status in the three countries studied

(e) Prenatal care: It is expected that prenatal care will have a positive and significant effect on the nutritional status of children because of the routine health examinations and parenting skills given to mothers during pregnancy. Infants and children of mothers who received prenatal care, either from a medical doctor or a nurse, were more likely to survive (see Chapter 3, pp56-57).

6.4. REGRESSION ANALYSES

The outcome measure of interest in the study on the nutritional status of children is the prevalence of undernutrition. The best method for the analysis of cross-sectional data is to treat anthropometrical indicators as continuous variables, and to focus on patterns of covariation rather than on the odds of being in one discrete category rather than another (McMurray, 1996:161). Certain authors prefer to use cut-off points to transform Z-scores or percentages of the reference median into dichotomous dependent variables so that odds ratios may be estimated with logistic regression models (Timaeus & Lush, 1995). However, this approach does not guarantee the reliability of the data; especially because the approach makes questionable assumptions to the effect that, the data allow meaningful classification to either side of a cut-off point, and that there are real differences between children on either side of the cut-off point.

An appropriate analytical technique for this purpose is linear regression, in terms of which categorical independent variables are converted into dichotomous dummy variables. With linear regression, it is possible to avoid the need to classify cases to either side of a cut-off point while the odds ratios derived from logistic regression might compromise the analysis (McMurray, 1996:164). However, multiple regression estimates of covariation with growth attainment, as

well as logistic regression, which looked at the relative risk of being 2 Standard Deviations (SD) below the reference median, were carried out.

Logistic regression is the form of analysis most suited to studying the variability in the prevalence of undernutrition The theoretical advantages of using logistic regression are two-fold: its weighted form of analysis stabilises the variance, and the logit transform adjusts for skewness in the distribution of prevalence. It is possible to see whether a distribution is skewed by comparing the values of the mean and the median. For a normal distribution, the mean and the median are numerically identical. As the distribution becomes progressively more skewed the difference between the median and the mean increases. The one disadvantage for logistic regression lies in its complexity – logistic regression coefficients are in units of log odds ratios, which could compromise the analysis (Mascie-Taylor, 2003). An alternative method would be to work with a simpler transformation than the logit, such as the logarithmic transformation. This adjusts for skewness but does not stabilise the variance as effectively (Pelletier, et al., 1993: 1130-1133).

6.4.1 Logistic regression

The logistic regression model examines the estimates and the probability that an event may or may not occur. This model requires far fewer assumptions than the linear regression model. The logistic model may be written in terms of the odds of an event occurring. The odds of an event occurring are defined as the ratio of the probability that it will occur to the probability that it will not occur. As discussed earlier the percentage of children expected to fall above -2SDs is only 2.3 percent, which indicates severe obesity, and 13.6 percent between -1.00 and –1.99 indicating moderate obesity. In developing countries only a very small percentage (3.3%) of children under the age of five years are classified as obese, as the majority are either nourished or malnourished. Owing to this small percentage of obese children studies of child nutrition normally examine the odds of a child being nourished or malnourished. The logistic regression model looked at the odds of cases in various categories being 2SDs below the reference

median. An odds ratio of less than one indicates lower odds relative to the category for that variable, and a value greater than one indicates higher odds.

The logistic regression model in terms of the log odds, which is called a logit, is written as follows:

$$\log\left[\frac{P(event)}{1-P(event)}\right] = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots\ldots\ldots\ldots + \beta_k X_k$$

where P (event) is the probability that an event will occur.

Since it is easier to think of odds rather than log odds the logistic equation may be written in terms of odds as follows:

$$\left[\frac{P(event)}{1-P(event)}\right] = e^{\alpha+\beta_1 X_1+\beta_2 X_2+\ldots\ldots\ldots\ldots\ldots\ldots+\beta_k X_k}$$

and

P (event) = $\frac{1}{1+e^{-z}}$ where z = $\alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots\ldots\ldots\ldots + \beta_k X_k$

6.5 SUMMARY

These then are the tools for the analysis that is discussed in Chapter 7. The variables selected for inclusion in the models are justified by what is known about their influence on child malnutrition in other populations as reviewed in chapter three. In this study, these are the most explanatory variables. However, the claim is by no means made that these are the best variables for explaining child malnutrition in Central Asia as a whole, especially in view of the fact that only three of the five countries were included in this study. For the moment it is thought that, with the evidence provided in Chapters 4 and 5 about these

variables, they are the most suitable explanatory variables. Chapters 7 and 8 present the discussion of the impact of the selected independent variables on child malnutrition estimated using binary logistic regression. The following chapter discusses the effects of these variables on child malnutrition.

CHAPTER 7

7. EFFECTS OF CERTAIN BIODEMOGRAPHIC, SOCIOECONOMIC, HEALTH AND ENVIRONMENTAL FACTORS ON CHILD MALNUTRITION

7.1 INTRODUCTION

Firstly, this chapter presents and discusses the descriptive statistics for the three countries individually. Secondly, descriptives for the selected variables from the combined three countries used in the regression model are then discussed. This discussion is followed by a presentation of the effects of socio-economic status, environment, biodemographic and health factors, and lastly by a discussion of the parameter estimates from the model. Chapter 8 provides findings, conclusions, policy implications, methodological limitations and future research possibilities.

The categorisation of the prevalence of malnutrition among children of less than 5 years of age in a population is made on the basis of the percentage of children with Z-scores below -2 using anthropometric measurements. Table 7.1 indicates the criteria used to classify malnutrition levels. The criterion is different for WHZ, WAZ and HAZ. For example, if the prevalence of malnutrition is less than 10 percent for WAZ among children under five, then the population is considered to have a low prevalence of malnutrition. The corresponding upper limits for low prevalence of malnutrition for WHZ and HAZ are 5 percent and 20 percent respectively.

Table 7.1: Criteria for prevalence of malnutrition on the basis of percentage of children under 5 years of age with Z-scores < –2

Index	Low	Medium	High	Very High
HAZ	<20.0%	20.0-29.9%	30.0-39.9%	≥40.0%
WAZ	<10.0%	10.0-19.9%	20.0-29.9%	≥30.0%
WHZ	<5.0%	5.0-9.9%	10.0-14.9%	≥15.0%

Source: World Health Organization (1995)

Since the results are based on data for children of less than 3 years of age, this type of classification for the CARs, which were the subject of this study, should not be made. However, assuming that the same rate of prevalence exists for the remainder of the children of less than 5 years of age certain observations may be made on the prevalence of malnutrition in the three republics.

One reason to use child anthropometric measurements is that they provide useful information about the living standards and wellbeing of households. Child anthropometric measurements assess body size and composition, and reflect inadequate or excess food intake, and disease. Martorell and Ho (1984) describe anthropometry as the single most universally applicable, inexpensive and non-invasive method available to assess the size, proportion and composition of the human body. Moreover, anthropometry offers many advantages over the other indicators of nutritional status. The foremost of these is that body measurements are sensitive over the full range of malnutrition. Data on body measurements are also highly reliable and are less expensive and easier to obtain than most nutritional data. A detailed description of anthropometric indices and their use may be found in Chapter 1.

7.2 DESCRIPTIVE STATISTICS

7.2.1 Kyrgyzstan

This section presents summary statistics describing the overall characteristics of the households in the survey. Table 7.2 shows that the prevalence of malnutrition in Kyrgyzstan is generally moderate. Chronic malnutrition (HAZ) is high in the east, moderate in the south, and low in the north and in the Bishkek area. Acute malnutrition (WHZ) is low in three of the provinces and moderate in one, whereas the incidence of overall malnutrition (WAZ) is moderate in the east and in the south, low in the north and in Bishkek. A comparison of the percentages of severely malnourished children (Z<-3) in the provinces shows that chronic cases of severely malnourished children are more frequent in the eastern province than in any of the other provinces. On average, the children in Kyrgyzstan are stunted.

A total of 252 children, representing 24.8 percent of the 1 015 children studied, are stunted, 11 percent are underweight, and 3.4 percent are wasted.

Table 7.2: Percentage of malnourished (Z-score<-2) moderately and severely malnourished (Z-score <-3) children in Kyrgyzstan by province

Province	HAZ	WAZ	WHZ
Bishkek[18]			
Malnourished (Z< -2)	10.3	4.3	1.7
Moderately malnourished (-3 ≤ Z < -2)	8.6	4.3	1.7
Severely malnourished (Z<-3)	1.7	0.0	0.0
North			
Malnourished (Z< -2)	18.0	6.0	2.1
Moderately malnourished (-3 ≤ Z <-2)	14.0	4.7	1.6
Severely malnourished (Z<-3)	4.0	1.3	0.5
East			
Malnourished (Z<-2)	32.4	12.3	7.1
Moderately malnourished (-3 ≤ Z <-2)	21.7	8.6	5.4
Severely malnourished (Z<-3)	10.7	3.7	1.2
South			
Malnourished (Z<-2)	28.9	14.0	3.9
Moderately malnourished (-3 ≤ Z <-2)	21.9	12.2	3.1
Severely malnourished (Z<-3)	6.9	1.8	0.8
Kyrgyzstan (total country)			
Malnourished (Z<-2)	24.8	11.0	3.4
Moderately malnourished (-3 ≤ Z <-2)	18.8	9.4	2.8
Severely malnourished (Z<-3)	6.0	1.7	0.7

The mean, standard deviation, and the minimum and maximum values of selected continuous variables for the analysis are presented in Table 7.3. The working sample consisted of 1 015 children aged 0-35 months. Other background characteristics of certain of the non-continuous variables included in the analysis may be found in Appendix 1. These include water facility, toilet

[18] Capital city of Kyrgyzstan

facility, mother heard of ORT,[19] and type of assistance received at delivery. The majority (70%) of the children in the sample lived in households that had piped water, and a traditional pit toilet (89%), while 75 percent of their mothers had received professional assistance at delivery. The mean HAZ score was –1.14, the mean WAZ score was –0.51, and the mean WHZ score was 0.25. The mean scores (not shown here) varied with the age of the child. The average age of the children in the sample was approximately 17 months. Education is defined as the number of years spent at school. Mothers had spent approximately 11 years at school. The mean preceding birth interval is about 41 months.

Table 7.3: Variable names, definition and descriptive characteristics (Kyrgyzstan)

Variable Definition	n	Mean	Standard Deviation	Minimum	Maximum
Age of child (months)	1 015	17.46	10.42	0	35
Z-score Height-for-age	1 015	-1.14	1.30	-5.34	5.59
Z-score Weight-for-age	1 015	-0.51	1.30	-5.06	5.09
Z-score Weight-for-height	1 015	0.25	1.22	-3.97	5.69
Preceding birth interval	727	40.62	25.41	9.00	220.00
Birth weight (kg)	995	3.27	0.50	1.40	5.50
Mother's education	1 015	10.66	1.72	0	16
Number in household	1 015	6.87	2.68	2.0	21.0
Child haemoglobin (g/dl)*	956	10.89	17.59	4.7	18.5
Household wealth	1 013	4.31	1.49	0	8
Number of inoculations	898	6.47	2.30	0	8
Number of children under five	1 015	1.80	0.91	0	6.
Birth order	1 015	2.70	1.69	1	11
Duration of breastfeeding (months)	1 015	11.31	7.00	0	34

*g/dl grams per decilitre

The mean number of family members per household was seven. The majority (73% not shown here) of the children came from households that had between 5

[19] ORT (Oral Rehydration Therapy) is a rehydration solution used to replace fluid loss in young children resulting from diarrhoea and vomiting. It is taken at certain intervals until diarrhoea and vomiting have stopped.

and 10 people per household. The mean birth weight (3.27 kg) of the children is above the acceptable normal weight at birth of 2.5kg. The mean haemoglobin level (10.89g/dl) of the children in the sample is within normal limits (10-10.9 g/dl). The majority of the households owned at least 4.30 of the nine items that were used to measure household wealth. On average, the children had received between six and seven of the eight inoculations that a child should have had by the age of 35 months. There were approximately 1.8 children under the age of five per household in the study sample. The mean duration of breastfeeding was about 11 months.

7.2.1.1 Distribution of nutritional status indicators

Figure 7.1 suggests that the distribution of height-for-age is skewed to the left, indicating the presence of a large proportion of stunted children in the target areas of Kyrgyzstan. The distribution of children based on weight-for-age and weight-for-height is close to normal. However, the curve for weight-for-age is displaced to the left of the reference median. These patterns indicate that a large proportion of the children in the sample have failed to achieve the reference median height and weight for their age. The curve for weight-for-height is closer to the reference population with a slight displacement to the right.

Figure 7.1 Kyrgyzstan Z-score frequencies

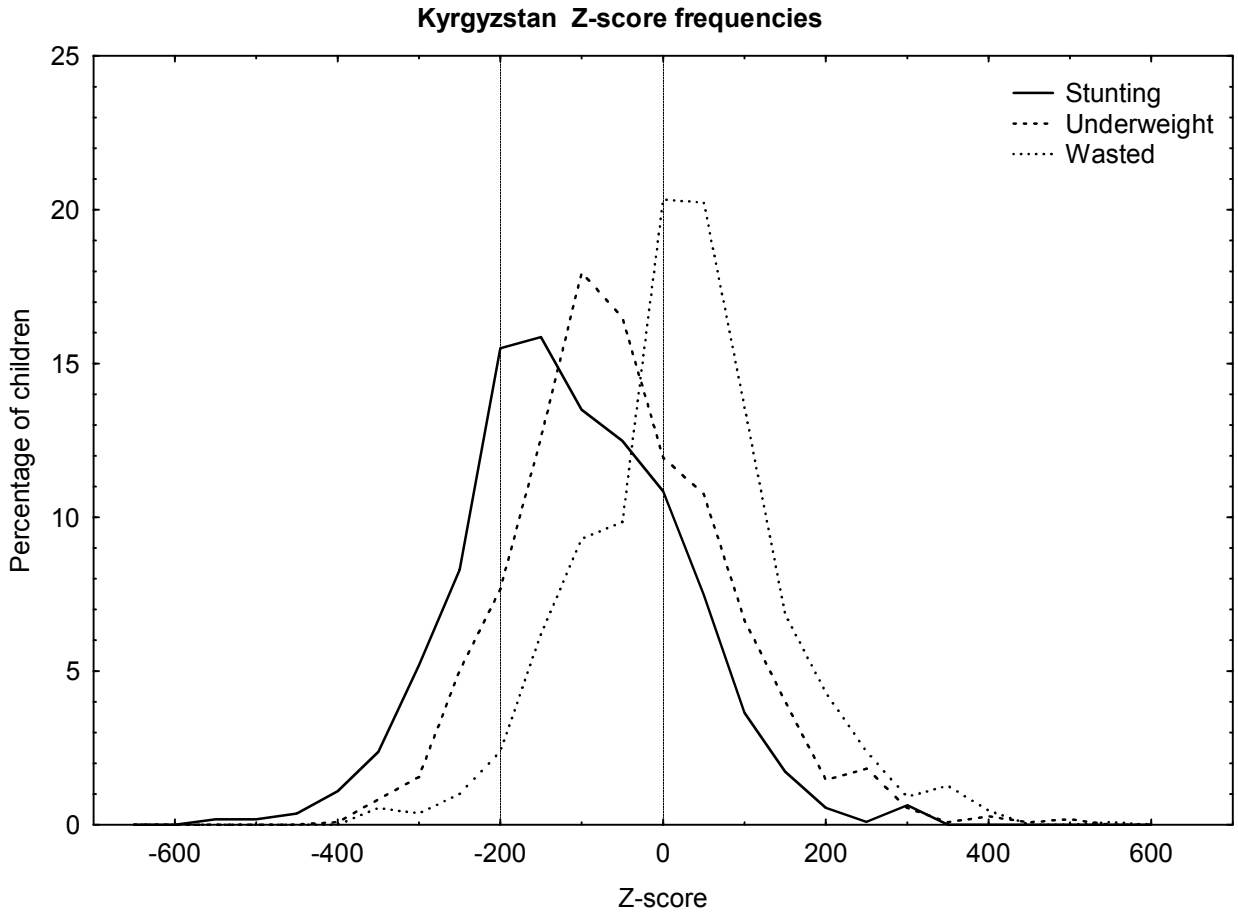
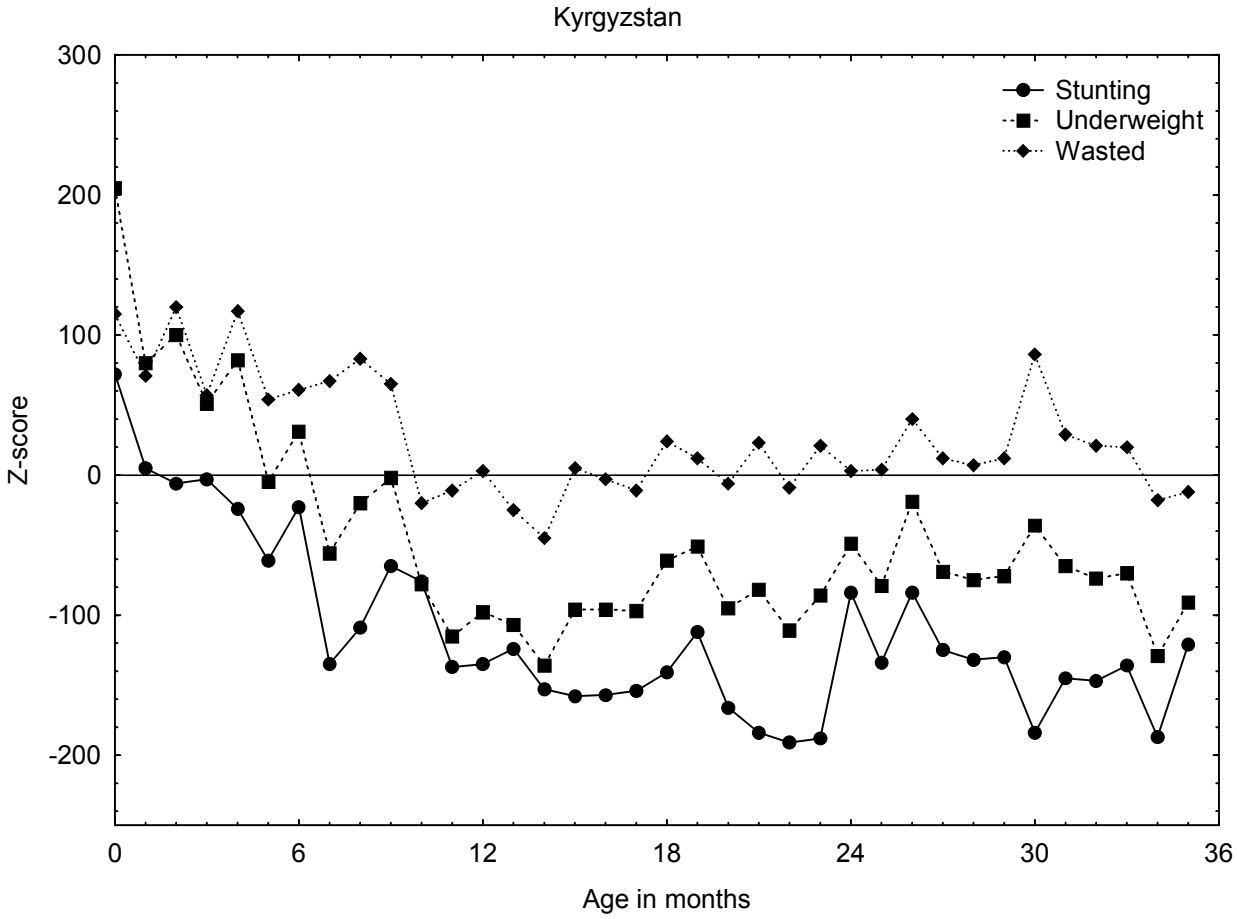


Figure 7.2 depicts the magnitude of nutritional deficiencies at different ages of the child. Nutritional status changes when the child reaches seven months, especially in terms of stunting and underweight. The figure shows that nutritional status deteriorates sharply between eleven and eighteen months, deteriorates further between the ages of eighteen and twenty-three months, then improves until the child is about twenty-four months, and thereafter fluctuates.

Figure 7.2 Mean height-for-age (HAZ), weight-for-age (WAZ), and weight-for-height (WHZ) Z-scores by age of child in months (Kyrgyzstan)



7.2.2 Uzbekistan

Table 7.4 shows that the prevalence of malnutrition in Uzbekistan is generally very high. Chronic malnutrition (HAZ) is moderate in Tashkent, Province 1 and Province 3, and high in Province 2 and Province 4. Acute malnutrition (WHZ) is low in Tashkent, moderate in two provinces, high in one, and very high in Province 3, whereas the incidence of overall malnutrition (WAZ) is low in Tashkent, moderate in Provinces 1 and 3, and high in Provinces 2 and 4. A comparison of the percentages of severely malnourished children (Z<-3) in the provinces shows that chronic cases of severe malnourishment are low in all the provinces except Province 2. On average, the children in Uzbekistan are stunted. A total of 309 children, representing 31.3 percent of the 989 children studied, are stunted, 18.8 percent are underweight, and 11.6 percent are wasted.

Table 7.4: Percentage of malnourished (Z-score <-2) moderately and severely malnourished (Z-score <-3) children in Uzbekistan by province

Province	HAZ	WAZ	WHZ
Tashkent[20]			
Malnourished (Z<-2)	22.7	4.2	2.5
Moderately malnourished (3 ≤ Z <-2)	16.8	1.7	2.5
Severely malnourished (Z<-3)	5.9	2.5	0.0
Province 1			
Malnourished (Z<-2)	26.7	14.5	7.2
Moderately malnourished (3 ≤ Z <-2)	16.9	12.0	5.3
Severely malnourished (Z<-3)	9.9	2.6	1.9
Province 2			
Malnourished (Z<-2)	39.8	24.5	14.7
Moderately malnourished (3 ≤ Z <-2)	19.4	19.6	10.3
Severely malnourished (Z<-3)	20.3	4.9	4.4
Province 3			
Malnourished (Z<-2)	24.1	16.3	17.9
Moderately malnourished (3 ≤ Z <-2)	11.1	8.2	14.4
Severely malnourished (Z<-3)	13.0	8.1	3.5
Province 4			
Malnourished (Z<-2)	35.2	21.4	6.6
Moderately malnourished (3 ≤ Z <-2)	22.4	17.8	5.0
Severely malnourished (Z<-3)	12.8	3.6	1.6
Uzbekistan (total country)			
Malnourished (Z<-2)	31.3	18.8	11.6
Moderately malnourished (3 ≤ Z <-2)	17.3	13.8	9.0
Severely malnourished (Z<-3)	14.0	5.0	2.8

The mean, standard deviation, and the minimum and maximum values of selected variables for the analysis are presented in Table 7.5. The working sample consisted of 989 children aged 0-35 months. Other background characteristics of certain of the non-continuous variables included in the analysis may be found in Appendix 1. These include water facility, toilet facility, mother

[20] Capital city of Uzbekistan

heard of ORT, and type of assistance received at delivery. The majority (72%) of the children in the sample lived in households that had piped water, and a traditional pit toilet (89%), while 97 percent of their mothers had received professional assistance at delivery. The mean HAZ score was –1.05, the mean WAZ score was –0.62 and the mean WHZ score was 0.10. The mean scores (not shown here) varied with the age of the child. The average age of the children in the sample is around 18 months. Mothers had spent approximately 11 years at school. The mean preceding birth interval is approximately 36 months.

The mean number of family members per household was seven. The majority (64% not shown here) of the children came from households that had between 5 and 10 people per household. The mean birth weight (3.33 kg) of the children is above the acceptable normal weight at birth of 2.5kg. The mean haemoglobin level (10.56g/dl) of the children in the sample is within normal limits (10-10.9 g/dl). The majority of the households owned at least 4.68 of the items that were used to measure household wealth. The children had received about seven of the eight inoculations that a child should have had by the age of 35 months. There were about 1.98 children per household in the study sample. The mean duration of breastfeeding was about 12 months.

Table 7.5 Variable names, definition and descriptive characteristics (Uzbekistan)

Variable definition	n	Mean	Standard Deviation	Minimum	Maximum
Age of child	989	17.93	9.83	0	35.0
Z-score Height-for-age	989	-1.05	2.00	-5.93	5.70
Z-score Weight-for-age	989	-0.62	1.64	-5.81	5.56
Z-score Weight-for-height	989	0.10	1.75	-3.98	5.77
Preceding birth interval	675	35.94	21.02	0	161
Birth weight (kg)	952	3.33	4.51	1.90	5.50
Mother's education	954	10.51	1.69	3.00	16.0
Number in household	989	6.80	2.97	2.0	27.0
Child haemoglobin level (g/dl)	876	10.56	13.86	4.0	16.1
Household wealth index	989	4.68	1.80	0	9.0
Number of inoculations	989	7.02	1.82	0	8.0
Number of children under 5	989	1.98	0.94	0	6.0
Birth order	989	2.50	1.60	1	11.0
Duration of breastfeeding (months)	989	12.03	7.30	0	34.0

7.2.2.1 Distribution of nutritional status indicators

Figure 7.3 suggests that the distribution of height-for-age is displaced to the left, indicating the presence of a large proportion of stunted children in the target areas of Uzbekistan. The distribution of children based on weight-for-age is also displaced to the left, while the curve for weight-for-height appears normal. These patterns, as with Kyrgyzstan, indicate that a large proportion of the children in the Uzbekistan sample failed to achieve the reference median height and weight for their ages.

Figure 7.3 Uzbekistan Z-score frequencies

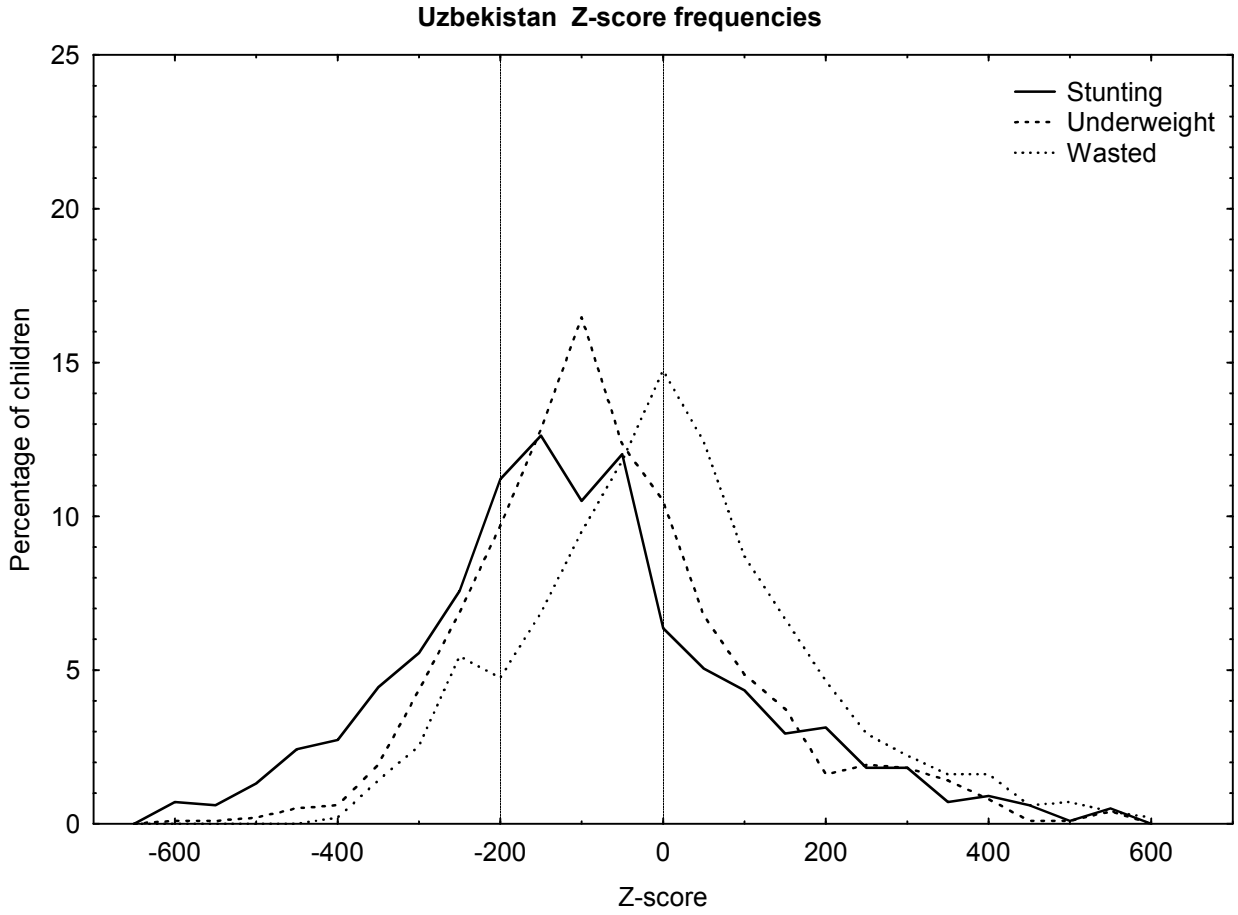
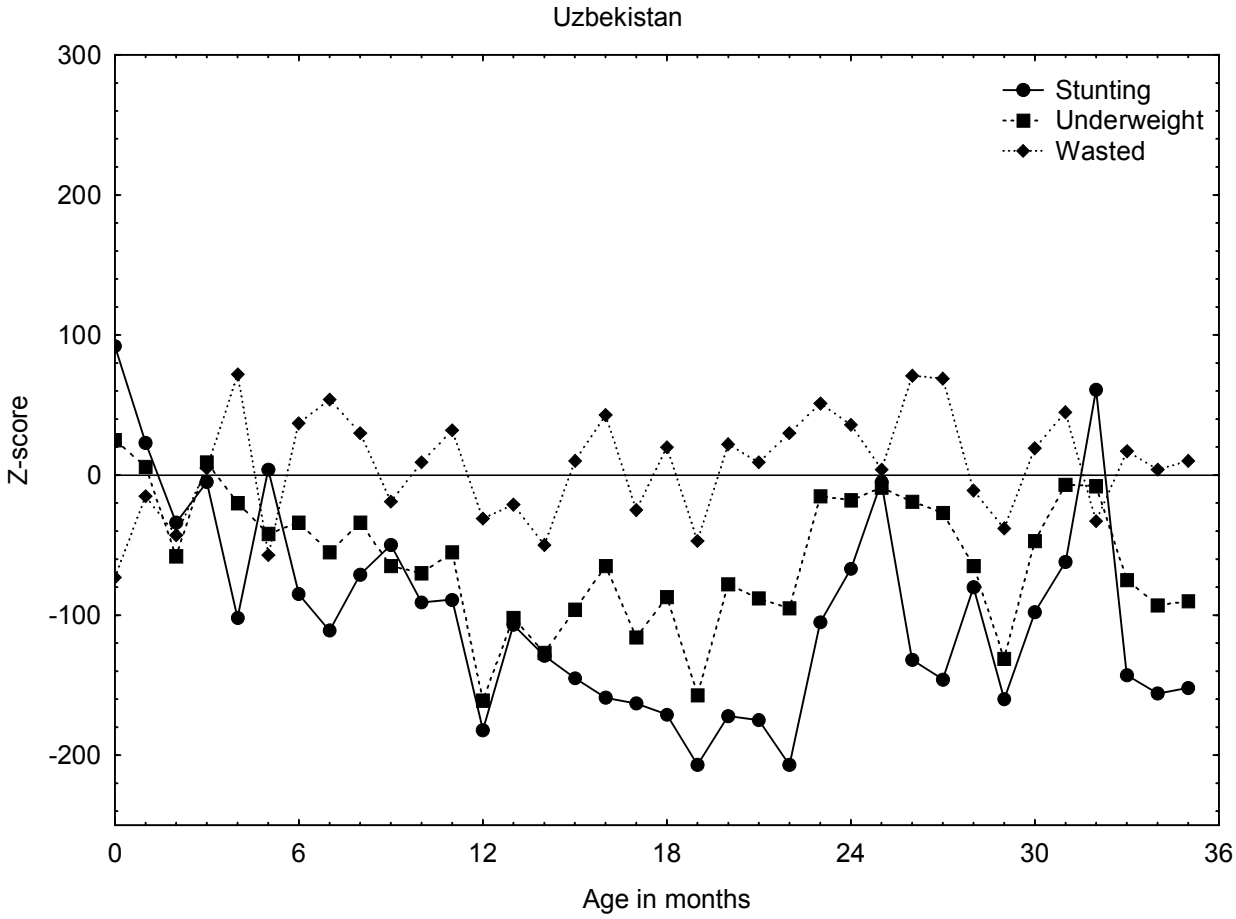


Figure 7.4 depicts the magnitude of nutritional deficiencies at different ages of the child. Nutritional status changes drastically when the child reaches twelve months, especially stunting and underweight. Z-scores become progressively worse with age. This may be expected, as stunting is a cumulative process. The figure shows that nutritional status deteriorates sharply between thirteen and twenty-two months, picks up until the child is approximately twenty-six months old, picks up again until the child is about thirty-two months, thereafter deteriorates sharply, and then fluctuates. A clear deterioration in nutritional status between the ages of eighteen and twenty-four months may be seen in the graph.

Figure 7.4 Mean height-for-age (HAZ), weight-for-age (WAZ), and weight-for-height (WHZ) Z-scores by age of child in months (Uzbekistan)



7.2.3 Kazakhstan

Table 7.6 shows that the prevalence of malnutrition in Kazakhstan is generally at a low level. Chronic malnutrition (HAZ) is low in all the provinces. Acute malnutrition (WHZ) is low in five of the six provinces, moderate in one province, while the incidence of overall malnutrition (WAZ) is low in all the provinces. A comparison of the percentages of severely malnourished children (Z<-3) in the provinces shows that chronic cases of severe malnourishment are low in all the provinces. About 10 percent of the 354 children studied are stunted, 4.6 percent are underweight, and 1.9 percent are wasted.

Table 7.6 Percentage of malnourished (Z-score<-2) moderately and severely malnourished (Z-score <-3) children in Kazakhstan by province

Province	HAZ	WAZ	WHZ
Almaty[21]			
Malnourished (Z<-2)	3.4	6.9	0.0
Moderately malnourished (3 ≤ Z <-2)	3.4	6.9	0.0
Severely malnourished (Z<-3)	0.0	0.0	0.0
South			
Malnourished (Z<-2)	8.2	4.5	2.0
Moderately malnourished (3 ≤ Z <-2)	6.5	4.5	2.0
Severely malnourished (Z<-3)	1.6	0.0	0.0
West			
Malnourished (Z<-2)	17.1	4.5	3.0
Moderately malnourished (3 ≤ Z <-2)	12.0	4.5	1.5
Severely malnourished (Z<-3)	5.1	0.0	1.5
Central			
Malnourished (Z<-2)	11.7	3.5	6.6
Moderately malnourished (3 ≤ Z <-2)	10.2	2.0	4.6
Severely malnourished (Z<-3)	1.5	1.5	2.0
North			
Malnourished (Z<-2)	9.4	6.4	0.0
Moderately malnourished (3 ≤ Z <-2)	2.9	3.2	0.0
Severely malnourished (Z<-3)	6.4	3.2	0.0
East			
Malnourished (Z<-2)	10.1	1.5	0.0
Moderately malnourished (3 ≤ Z <-2)	10.1	1.5	0.0
Severely malnourished (Z<-3)	0.0	0.0	0.0
Kazakhstan (total country)			
Malnourished (Z<-2)	9.8	4.6	1.9
Moderately malnourished (3 ≤ Z <-2)	7.1	3.9	1.5
Severely malnourished (Z<-3)	2.7	0.7	0.4

The mean, standard deviation, and the minimum and maximum values of the selected variables for the analysis are presented in Table 7.7. The working sample comprises 354 children aged 0-35 months. Other background

[21] Former capital city of Kazakhstan

characteristics of certain of the non-continuous variables included in the analysis may be found in Appendix 1. These include water facility, toilet facility, mother heard of ORT, and type of assistance received at delivery. The majority (60%) of the children in the sample lived in households that had piped water (60%), and a traditional pit toilet (72%), while almost all (99%) of their mothers had received professional assistance at delivery. The mean HAZ score was –0.53, the mean WAZ score was –0.29, and the mean WHZ score was 0.07. The mean scores (not shown here) varied with the age of the child and the educational level of the mother. The average age of the children in the sample is about 18 months. Mothers spent approximately 11 years at school. The mean birth interval is about 48 months.

Table 7.7 Variable names, definition and descriptive characteristics (Kazakhstan)

Variable Definition	n	Mean	Standard Deviation	Minimum	Maximum
Age of child	354	18.03	10.05	0	35
Z-score Height-for-age	354	-0.53	1.26	-4.82	3.82
Z-score Weight-for-age	354	-0.29	1.13	-3.62	2.72
Z-score Weight-for-height	354	0.07	1.01	-3.46	4.06
Preceding birth interval (months)	236	48.46	35.92	0	218
Birthweight (kg)	351	3.33	0.56	1.50	5.50
Mother's education	354	10.69	1.95	0	16.0
Number in household	354	6.04	2.57	2	17.0
Child haemoglobin (g/dl)	321	10.99	20.06	5.0	17.4
Household wealth index	337	4.35	1.72	0	9.0
Number of inoculations	354	6.31	2.72	0	8.0
Number of children under 5	354	1.84	0.73	0	4.0
Birth order	354	2.41	1.43	1	7.0
Duration of breastfeeding (months)	327	10.15	7.07	0	35.0

The mean number of family members per household was six. The majority (62% not shown here) of the children came from households that had between 5 and 10 people per household. The mean birth weight (3.33 kg) of the children is

above the acceptable normal weight at birth of 2.5 kg. The mean haemoglobin level (10.99g/dl) of the children in the sample is within normal limits (10-10.9 g/dl). The majority of the households owned at least 4.35 of the items that were used to measure household wealth. The children had received about six of the eight inoculations that a child should have had by the age of 35 months. There were approximately 1.84 children per household in the study sample. The mean duration of breastfeeding was about 10 months.

7.2.3.1 Distribution of nutritional status indicators

Kazakhstan presents a different picture of the nutritional status of children under the age of three years. Height-for-age and weight-for-age are slightly skewed to the left, and are actually closer to the reference median. The distribution of children based on weight-for-height appears normal. These patterns indicate that the majority of the children in this country have achieved the reference median height and weight for their ages.

Figure 7. 5 Kazakhstan Z-score frequencies

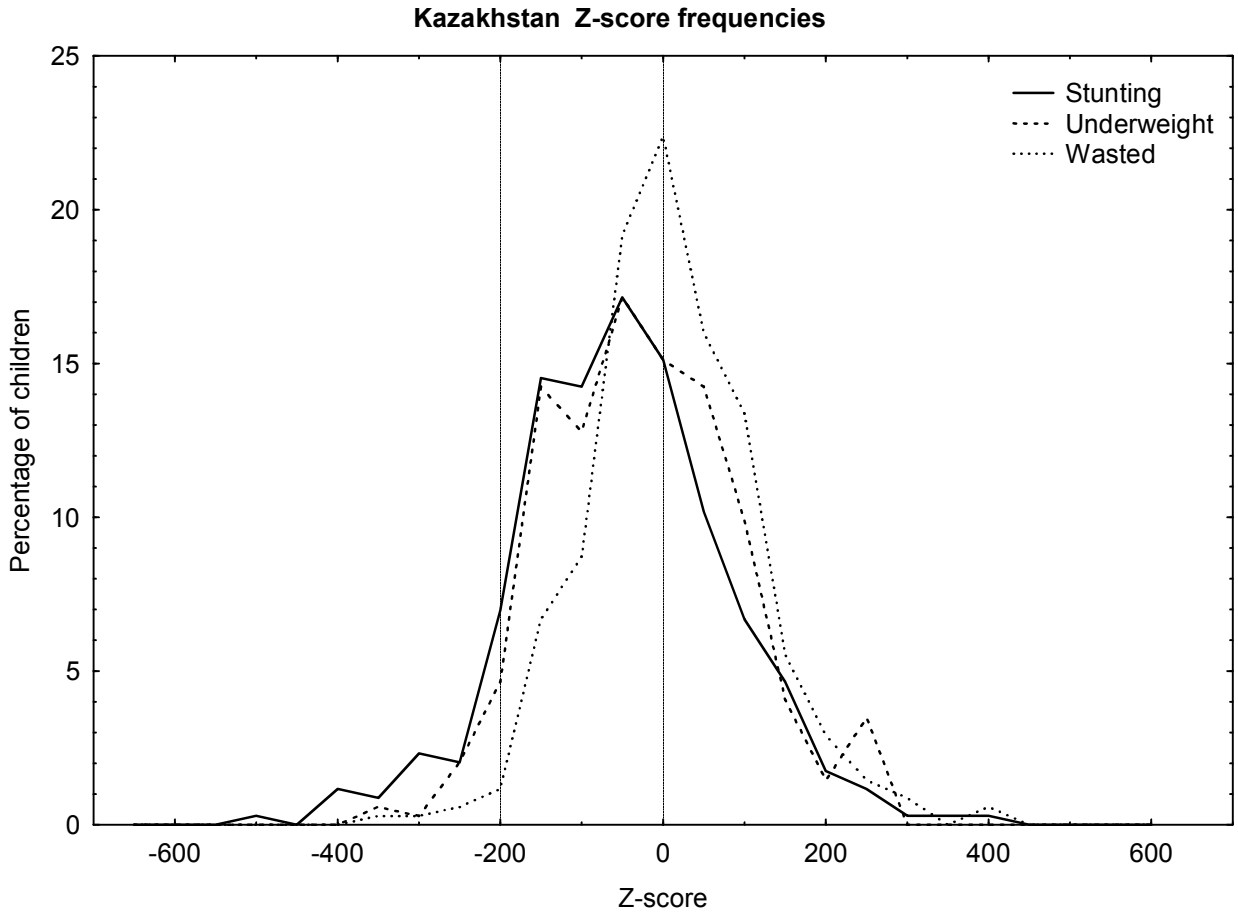
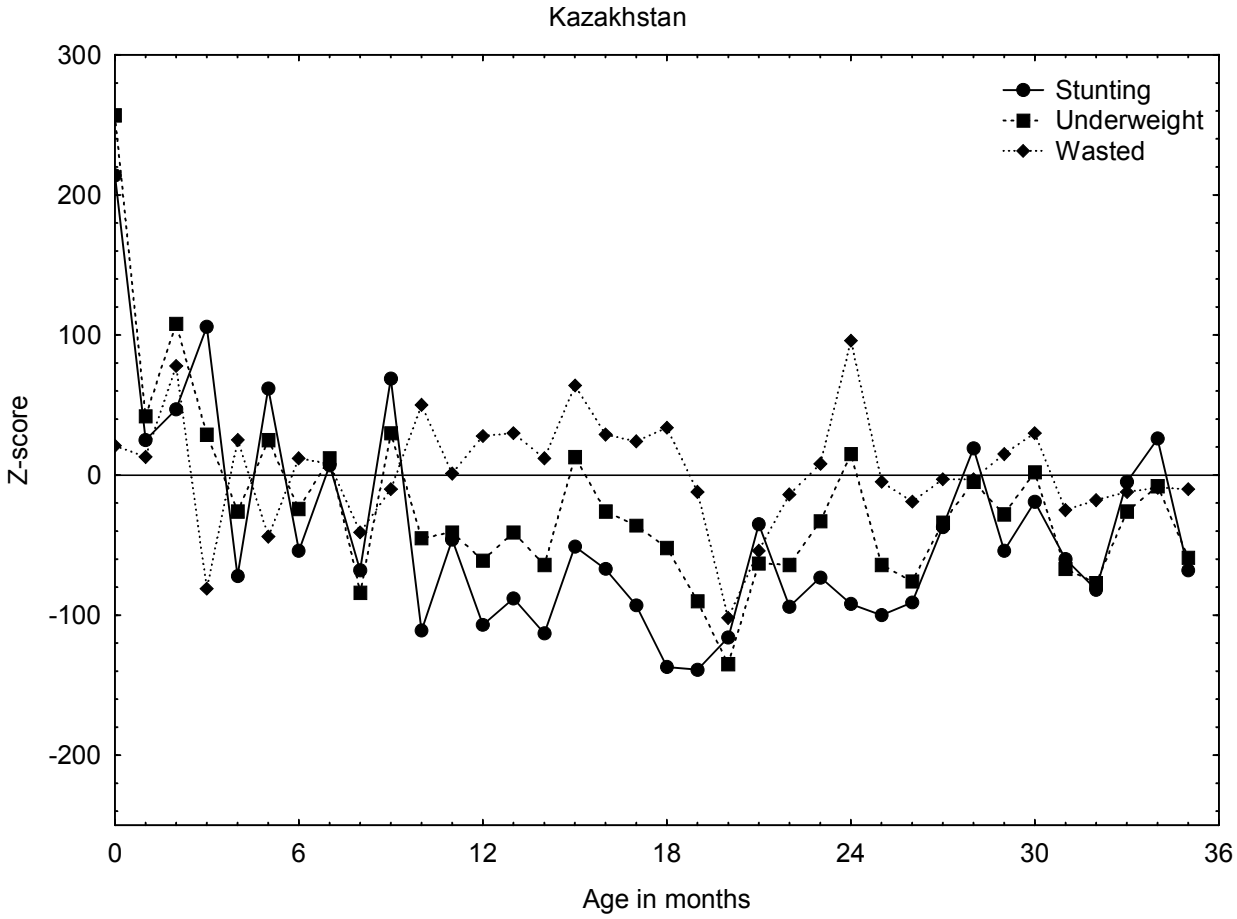


Figure 7.6 depicts the extent of the nutritional deficiencies at different ages of the child. Nutritional status changes when the child reaches nine months especially in terms of stunting and underweight. Thereafter it fluctuates between 0 and 1 standard deviation from the mean, but none of the children are below –2SDs.

Figure 7.6 Mean height-for-age (HAZ), weight-for-age (WAZ), and weight-for-height (WHZ) Z-scores by age of child in months (Kazakhstan)



7.3 BIVARIATE ANALYSES

In the previous sections, the different countries were discussed separately, while in Tables 7.8 to 7.10 the data of the three countries were combined in order to create a more usable dataset for multivariate analyses. This descriptive analysis was carried out on all relevant variables in order to obtain a better understanding of the dynamics involved in the data. Although the effect of all the other variables on a particular variable was not taken into account, this analysis will give some indication of the variables to be used in more sophisticated analyses.

The questions applicable in this study were the same in the different countries and therefore posed no problems in the merging process. Some authors (Vella et al., 1992) make a strong case for using weight-for-age as a better predictor of

children at high risk of death than height-for-age or weight-for-height, while others (McMurray, 1996) have argued that for cross-sectional data weight-for-height is the best predictor of current malnutrition. However, the proportion of children who are wasted is too small for studies of determinants of undernutrition. The restriction of the regression analysis to weight-for-age and height-for-age z-scores is based on the above argument, as there were too few cases for weight-for-height data.

7.3.1 Weight for age z-scores descriptive statistics for the combined countries

In the descriptive statistics discussion, univariate analyses of the data were carried out separately for each of the three countries under discussion. We will now focus our attention on bivariate data analyses in which a combination of the three countries will be the input data. The questions applicable in this study were the same in the three different countries and therefore posed no problems in the merging process.

Table 7.8 presents the results of the bivariate analyses aimed at identifying factors associated with underweight.

7.3.2 Geographical distribution of weight-for-age Z-scores

Substantial disparities in underweight in terms of countries were found, for instance, children living in Kazakhstan fared much better than those living in Uzbekistan and Kyrgyzstan. Only 4.6 percent of the children in Kazakhstan were underweight (see Table 7.8), while child underweight increased fourfold in Uzbekistan and more than twofold in Kyrgyzstan.

Table 7.8: Underweight (<-2WAZ) and associated factors

Variables	<-2WAZ	≥-2WAZ	N
Country			
Uzbekistan	18.8	81.2	989
Kyrgyzstan	11.0	89.0	1015
Kazakhstan	4.6	95.4	354
Toilet facility			
Flush	8.6	91.4	309
Pit	14.1	85.9	2022
Water facility			
Piped	12.1	87.9	1621
Unpiped	16.4	83.6	714
Mother's education			
0-Part 2	14.3	85.7	263
Secondary	14.1	85.9	1825
Higher	6.9	93.1	272
Household wealth			
0-3 items	19.1	80.9	626
4 items	12.4	87.6	558
5 items	9.6	90.4	517
6-9 items	11.7	88.3	639
Number of people per household			
1-4	11.1	88.9	536
5-7	11.7	88.3	1064
8 and more	17.1	82.9	759
Number of children under five			
0-1	8.3	91.7	902
2	16.1	83.9	1035
3 and more	17.2	82.9	421
Child haemoglobin level			
Severe	19.4	80.6	41
Moderate	16.9	83.1	564
Mild	13.3	86.7	537
None	10.6	89.4	1935
Respondent ever heard of ORT			
No	17.1	82.9	308
Used	22.3	77.7	102
Yes	12.2	87.8	1914
Birth order			
1	9.9	90.1	719
2-3	13.3	86.7	1102
4 and more	17.8	82.2	537
Age of child (months)			
0-5	2.8	97.2	345
6-11	12.7	87.3	421
12-23	19.7	80.3	795
24-35	11.8	88.2	797
Birth weight			
≤ 2.5	25.6	74.4	130
> 2.5	12.2	87.8	2169
Duration of breastfeeding (months)			
0-6	7.6	92.4	586
7-12	13.6	86.4	729
13-35	17.0	83.0	960
Birth interval			
First	9.9	90.1	720
< 24 months	18.7	81.3	460
24-47	16.1	83.9	748
> 47	8.5	91.5	429
Number of Immunisations			
0-3	5.8	94.2	296
4-7	12.7	87.3	647
8 and more	15.5	84.5	1278
Sex of child			
Male	15.3	84.7	1194
Female	11.2	88.8	1164
Place of residence			
Urban	10.6	89.4	648
Rural	14.3	85.7	1710

The strong differentials observed between the countries may be due to differences in diet, access to health care, standards of living, and environmental pollution. The results further imply that decreased child malnutrition rates are more likely to occur in countries that have greater gross national product per capita, low poverty rates, and higher human development index (Figure 3.6 and Table 5.1).

7.3.3 Bivariate association between socio-economic and environmental factors and weight-for-age z-scores

The extent of malnutrition with respect to WAZ, which indicates a combined effect of both chronic and acute undernutrition, is higher (14.1% among children living in households that use a pit toilet than among children who live in a household with a flush toilet (8.6%). Several studies examining factors influencing child malnutrition in aggregate (national) populations conclude that good sanitation, especially the presence of a flush toilet facility, tends to reduce child malnutrition (Huttly, 1990; Daniels et al., 1991; Merchant et al., 1993; Ricci & Becker 1996; Jones et al., 2003). The availability of toilet facilities clearly influences the way a household disposes of children's stools. Households that had a piped water facility reported lower WAZ (12.1%) than those with an unpiped water facility (16.4%). A positive effect of maternal education on child nutritional status was noted on children born to mothers with a higher educational level. A higher level of education could be associated with lower malnutrition because it is a proxy for an increased command of resources, resulting in a better quality of life. This in turn means a better quality of clothing, shelter, nutrition, medical care, sanitary facilities and practices, and water supply (Barrera, 1990; Alderman & Garcia 1994; Lavy et al., 1996; Handa, 1999). Only 6.9 percent of the children whose mothers had higher education were underweight, compared to 14.3 percent whose mothers had either no education or primary education only (14.1%). Although it is known that, there is an association between education and infant mortality education is similarly strongly associated with child growth. The reasons for such a correlation may be related

to differences in knowledge, power, and/or wealth among women with different levels of education.

A clear effect on nutritional status was also found in the case of household wealth, which is used as a proxy for the economic condition of the family. When a household owned less that three items, 19.1% of the children were underweight. This result mirrors the findings of Silva (2005) in a study he conducted on child malnutrition in Ethiopia. Very poor households do not usually acquire many durable goods and spend most of their income on consumption, particularly food consumption. However, the quality and distribution of the food within the household might be unequal, especially with regard to very young children and their mothers. Household size may affect the way in which household resources are distributed among household members, especially in poor households. The larger the household size the smaller the allocation of resources especially for children and women. Children who belonged to households that had less than seven people reported lower WAZ (11.1%) than those who belonged to households that had more than seven people.

The number of children under the age of five per household had a clear effect on the child nutritional status of children in the sample. As expected, a child who lives in a household with two or more children under the age of five suffers a risk of malnutrition (16.1%) which is higher than that of children in households with less than two children under the age of 5 or without other children under the age of five (8.3%). In Congo and Ethiopia (Delpeuch et al., 2000; Silva, 2005) found that the number of children under five years in a household increased the probability of the children being malnourished. A household with a relatively large number of children, especially when they are under five years, creates conditions that are conducive to the propagation of the transmission of micro-organisms, which lead indirectly to malnutrition. Moreover, in very poor households that experience food insecurity it is the children who suffer most.

7.3.4 Bivariate association between biodemographic and health factors and weight-for-age z-scores

The impact of anaemia status of the child and birth order is illustrated in Table 7.8. The results show that 19.4% children with severe levels of anaemia had lower WAZ than those with mild (13.3%), moderate (16.9%) or no anaemia (10.6%). Lack of iron in the diet, which is the main cause of anaemia, has been found to be more pronounced in undernourished children. High levels of anaemia, especially among children, have been found in Kazakhstan and Uzbekistan (Kort, 2004).

As expected, the birth order of the child reveals that lower birth order children have a better nutritional status (9.9%) than higher birth order children. It has also been found that children with three or more older siblings are more likely to be malnourished than children from smaller families, most probably because competition for food increases with family size (Mishra & Retherford, 2000). Generally, older children are more likely to be stunted and underweight, probably indicating resource crowding as more children are born, and parents strive to maintain the health of the newly born and very young children. The older children would also be those who are already weaned from breastfeeding, and hence more vulnerable to malnutrition. The rate of underweight was 22.3% in children whose mothers had used ORT and lower among those whose mothers had knowledge of it or did not know about it. An explanation for this could be that children whose mothers had used ORT had had diarrhoea before the survey and had therefore lost weight due to the illness.

From Table 7.8 it may be deduced that the age of child, birth interval, the number of immunisations, duration of breastfeeding, birth weight, sex of child and place of residence all had a negative effect on the nutritional status of children under three years. On average WAZ decreased rapidly to reach the minimum at 12-23 months. Three factors may explain this decrease in WAZ. First, children at this

age are consuming other foods as they are being weaned off the breast and may ingest contaminated food and liquids. This result confirms the findings of studies conducted in several developing countries on the role played by weaning in underweight, especially during the 12-23 month period (Waters et al., 2004; FANTA, 2003). Secondly, children of this age are more mobile and therefore may come into contact with potential hazards in their surroundings. Thirdly, poverty, coupled with a lack of nutritious food, may be the cause of malnutrition. The survey reported that children aged 0-5 months had the highest WAZ, probably because they are exclusively breastfed at this age. The size of the child at birth affected his nutritional status. Children with a low birth weight (<2.5kg), tended to have lower WAZ (25.6%) than those who weighed above 2.5kg at birth (12.2%). This could be due to premature birth or uterine undernutrition as compared to those of average or large birth size. Although there was no relationship between the BMI of the mother and underweight children, certain studies have highlighted the effect of maternal malnutrition on child nutritional status (Adair, 1987; Scholl & Hediger, 1994).

Children who were never breastfed or breastfed up to six months by the time of the survey were better off (7.6%) than those who were breastfed for longer than seven months. This difference may reflect the fact that the nutrients in the breast milk may only be sufficient for a child's growth for a certain number of months, after which other food supplements are needed. Women who breastfeed for longer may be doing so because they lack the resources and nutritional knowledge to provide their children with adequate nutrition (Ukwuani & Suchindran, 2003). Another explanation for the negative relationship between breastfeeding and nutritional status beyond infancy which was observed is that of reverse causality, where mothers continue to breastfeed children who appear small for their age. The spacing pattern of the children shows that firstborn children and those who were born 47 months or more after their immediate elder sibling were better off than those whose preceding birth interval was less than 24 months or between 24 and 47 months. Bastien (1992) and Gubhaju (1986)

reported that children spaced two or more years apart have a greater chance of being well cared for, of being breastfed for longer, and of being taller and heavier.

A child is considered to be fully vaccinated if he has received all eight standard immunisations. The relationship between child malnutrition and immunisation is expected to be such that when the number of immunisations increases the nutritional status of the child is supposed to be better. Immunisation protects the child against infectious diseases, which could lead to child malnutrition. It is therefore extremely surprising to find that the prevalence of undernutrition is higher (15.5%) for children who had received all eight expected immunisations than for those who had received fewer. On the other hand, Devi and Geervani (1994) found that although the immunisation given to a child did not have a significant association with chronic malnutrition, it emerged as a significant factor in terms of current nutritional status. This, however, was not the case for the three nutrition indicators in the three republics studied. This result could also be an indication that good healthcare services, as found in these Central Asian republics, do not necessarily translate into better nutrition. A negative association with WAZ was found. Female children had a lower WAZ score (11.2%) than the male child. Living in a rural area had a negative effect on underweight (14.3%).

7.3.5 Height-for-age z-scores descriptive statistics for the combined countries

Table 7.9 presents the results of the bivariate analyses aimed at identifying factors associated with stunting.

7.3.6 Geographical distribution of height-for-age Z-scores

A negative association was noted between country of residence and stunting levels (see Table 7.9). Levels of stunting are generally much higher than underweight levels in all three countries studied. The results show that children in Kazakhstan had the lowest stunting levels (9.5%), while HAZ increased more

than threefold fold in Uzbekistan and more than twofold in Kyrgyzstan. The explanation given above for WAZ disparities is also applicable in this instance.

7.3.7 Bivariate association between socioeconomic and environmental factors and height-for-age z-scores

It may be deduced from Table 7.9 that in the case of stunted (HAZ) children the results are similar to those of underweight children (WAZ), with the exception of certain variables, namely, birth interval, mother heard of ORT and number of people per household, which had no association with stunting. Surprisingly, the type of water facility used by households had a positive effect on stunting, although it had no association with underweight. Households that had a piped water facility reported lower HAZ (23%) than those with an unpiped water facility (31%). One reason why safe water is related to stunting may be a lower likelihood of the child contracting illnesses such as diarrhoea. This result is common. Thomas and Strauss (1992) give a review of studies indicating a negative correlation between the quality of drinking water and child mortality rates. Stunting, which indicates the effect of chronic undernutrition, is more pronounced (27.1%) in children living in households with a pit toilet than in children who live in households with a flush toilet (15.5%). This result is similar to the result for underweight.

A higher level of maternal education should result in better child nutrition, reflecting various factors including a better knowledge of health and sanitation, and increased utilisation of health services (Thomas & Strauss, 1992).

Table 7. 9: Stunting (<-2HAZ) and associated factors

Variables	<-2HAZ	≥-2HAZ	N
Country			
Uzbekistan	31.3	68.7	988
Kyrgyzstan	24.8	75.2	1015
Kazakhstan	9.5	90.5	354
Toilet facility			
Flush	15.5	84.5	309
Pit	27.1	72.9	2021
Water facility			
Piped	23.0	77.0	1621
Unpiped	31.0	69.0	714
Mother's education			
0-Part 2	20.7	79.3	262
Secondary	27.1	72.9	1825
Higher	17.0	83.0	271
Household wealth index			
0-3 items	33.7	66.3	626
4 items	24.2	75.8	558
5 items	19.7	80.3	517
6-9 items	23.0	77.0	639
Number of people per household			
1-4	19.8	80.2	535
5-7	26.4	73.6	1063
8 and more	27.4	72.6	759
Number of children under five			
0-1	20.8	79.2	901
2	27.1	72.9	1035
3 and more	30.1	69.9	422
Child haemoglobin level			
Severe	34.3	65.7	41
Moderate	28.9	71.1	565
Mild	26.9	73.1	536
None	21.8	78.2	1036
Respondent ever heard of ORT			
No	28.7	71.3	309
Used	23.5	76.5	102
Yes	24.7	75.3	1914
Birth order			
1	21.8	78.2	719
2-3	24.3	75.7	1102
4 and more	31.7	68.3	537
Age of child (months)			
0-5	6.5	93.5	345
6-11	19.1	80.9	420
12-23	35.6	64.4	795
24-35	26.3	73.7	798
Birth weight			
≤ 2.5	37.6	62.4	130
> 2.5	24.1	75..9	2168
Duration of breastfeeding (months)			
0-6	14.4	85.6	585
7-12	25.5	74.5	729
13-35	32.6	67.4	959
Preceding birth interval			
First	21.8	78.2	720
< 24 months	28.1	71.9	460
24-47	28.8	71.2	749
> 47	21.7	78.3	429
Number of Immunisations			
0-3	10.5	89.5	296
4-7	21.3	78.7	647
8 and more	30.6	69.4	1278
Sex of child			
Male	27.7	72.3	1194
Female	22.7	77.3	1164
Place of residence			
Urban	21.0	79.0	648
Rural	26.8	73.2	1710

Contrary to the results for underweight a negative effect of maternal education on child nutritional status was noted in the case of children born to mothers with secondary school educational level (27.1%) rather than those born to mothers with lower or no education (20.7%). A possible explanation for this phenomenon could be that mothers with secondary education are gainfully employed, buy nutritional food, earn an income and are able to either employ other people to care for the children at home or to send the children to kindergarten. However, the children might not be well cared for by the care-givers, and the mother might not have sufficient time to care for her baby herself. On the other hand, those mothers with lower or no education could be stay at home mothers whose husbands are gainfully employed and financially supportive, and therefore the mothers are better able to care for their children.

An association was also found in the case of household wealth, which is used as a proxy for the economic condition of the family. The percentages of stunted children in all four categories measuring household wealth were higher than for underweight children. A generally lower impact of household wealth on stunting was expected, as stunting is a measure of chronic malnutrition reflecting the impact of the household's current as well as past wealth. As expected, the number of children under the age of five per household had an effect on the nutritional status of the children in the sample. Similar to the underweight results female children had a lower WAZ than male children, while living in a rural area also had a negative effect on stunting levels.

7.3.8 Bivariate association between biodemographic and health factors and height-for-age z-scores

As expected, the birth order of the child reveals that firstborns have a better nutritional status (21.8%) than do children of higher birth order births. This is contrary to the result for underweight. The following results are similar to the underweight results. The age of child, the number of immunisations, duration of

breast-feeding, and birth weight all had a negative effect on the nutritional status of children under the age of three years.

Having had all eight routine immunisations had a negative association with height-for-age (30.6%). On average HAZ decreased rapidly to reach a minimum at 12-23 months. Children aged 0-5 months by the time of the survey reported the lowest stunting levels. Children who were never breastfed or were breastfed up to six months by the time of the survey were better off than those who were breastfed for longer than seven months. The size of the child at birth affected his nutritional status. From Table 7.9 it may be seen that an effect was also found in the case of the anaemia status of the child. Children with severe levels of anaemia (although very few) had higher HAZ than those with mild moderate or no anaemia.

7.3.9 Weight-for-height z-scores descriptive statistics for the combined countries

Although this measurement is not suitable to be used in a multivariate analysis, the bivariate analyses that follow will shed some light on the wasting levels associated with a number of characteristics.

7.3.10 Geographical distribution of weight-for-height Z-scores

An association was noted between country of residence and wasting levels. Levels of wasting are generally much lower than underweight and stunting levels in all three countries studied. The rate of wasting (1.9%) was lowest for children in Kazakhstan, while wasting increased almost twofold in Kyrgyzstan and more than six-fold in Uzbekistan. Again, the explanation given above for WAZ and HAZ disparities is applicable here as well.

Table 7.10: Wasting (<-2WHZ) and associated factors

Variables	<-2WHZ	≥-2WHZ	N
Country			
Uzbekistan	11.6	88.4	989
Kyrgyzstan	3.4	96.6	1015
Kazakhstan	1.9	98.1	355
Toilet facility			
Flush	5.5	94.5	309
Pit	6.9	93.1	2022
Water facility			
Piped	5.4	94.6	1621
Unpiped	9.6	90.4	714
Mother's education			
0-Part 2	8.4	91.6	262
Secondary	7.0	93.0	1824
Higher	2.7	97.3	271
Household wealth index			
0-3 items	9.7	90.3	627
4 items	5.3	94.7	557
5 items	5.4	94.6	517
6-9 items	6.0	94.0	638
Number of people per household			
1-4	6.8	93.2	536
5-7	6.2	93.8	1063
8 and more	7.1	92.9	759
Number of children under five			
0-1	4.8	95.2	901
2	6.9	93.1	1036
3 and more	9.8	90.2	421
Child haemoglobin level			
Severe	0.0	100.0	41
Moderate	7.4	92.6	565
Mild	5.3	94.7	537
None	7.5	92.5	1035
Respondent ever heard of ORT			
No	10.5	89.5	308
Used	11.9	88.1	102
Yes	5.8	94.2	1914
Birth order			
1	6.3	93.7	719
2-3	6.1	93.9	1102
4 and more	8.2	91.8	537
Age of child (months)			
0-5	7.3	92.7	345
6-11	6.7	93.3	420
12-23	8.5	91.5	796
24-35	4.5	95.5	797
Birth weight			
≤ 2.5	7.2	92.8	130
> 2.5	6.0	94.0	2169
Duration of breastfeeding (months)			
0-6	6.9	93.1	586
7-12	7.7	92.3	729
13-35	5.8	94.2	959
Preceding birth interval			
First	6.2	93.8	720
< 24 months	6.9	93.1	460
24-47	8.0	92.0	749
> 47	4.6	95.4	430
Number of Immunisations			
0-3	6.3	93.7	297
4-7	6.1	93.9	647
8 and more	7.4	92.4	1278
Sex of child			
Male	7.7	92.3	1194
Female	5.6	94.4	1164
Place of residence			
Urban	6.4	93.6	648
Rural	6.7	93.3	1710

*** ORT = Oral rehydration therapy**

Table 7.10: Wasting (<-2WHZ) and associated factors (continued)

Ethnicity			
Kazak	3.0	97.0	304
Kyrgyz	3.6	96.4	658
Uzbek	10.2	89.8	1108
Other	5.9	94.1	170
Russian	0.8	99.2	118
Body mass index (BMI)			
<18.5	11.8	88.2	212
18.5-29.9	6.4	93.6	2059
>30	0.0	100.0	81
Professional delivery assistance			
Assisted	6.3	93.7	2307
Not Assisted	24.5	75.5	49

7.3.11 Bivariate association between socioeconomic and environmental factors and weight-for-height z-scores

In this study it may be seen that not all the variables are equally important in determining whether a baby is underweight, or suffering from acute or chronic malnutrition. Surprisingly, variables that did not show any association with nutritional status in underweight and stunting (ethnicity, delivery assistance and BMI) had a negative association with underweight. The following results are similar to certain of the underweight and stunting results. The household wealth, the number of children under the age of five, maternal education, and knowledge of ORT all had a negative effect on the nutritional status of children under three years.

The extent of malnutrition with respect to WHZ, which indicates a short-term nutritional deficiency, is higher (9.6%) among children living in households that use unpiped water than in children who live in households that use piped water (5.4%). Lack of running water in the household has an effect on weight-for-height, presumably indicating poor hygiene and exposure to infections. The positive effect of maternal education on child nutritional status was noted in respect of children born to mothers with higher educational levels. Only 2.7 percent were malnourished compared to 7.0 percent and 8.4 percent for children born to mothers with secondary and lower or no education respectively.

A clear effect on nutritional status was also found in the case of household wealth, which is used as a proxy for the economic condition of the family. An association was found between child nutritional status and ownership of less than three items. The number of children under the age of five per household had a negative effect on the child nutritional status of children in the sample. Approximately 9.8 percent of the children that were wasted came from households with more than two children under the age of five while about 4.8 percent came from households with only one child. Children whose mothers had used ORT had lower WHZ than those whose mothers either had knowledge of it or did not know about it. None of the other variables that had a significant relationship with nutritional status in stunting and underweight revealed any association with wasting.

7.3.12 Bivariate association between biodemographic and health factors and weight-for-height z-scores

Differences found for children who are wasted were mainly related to ethnicity, BMI, and delivery assistance. As explained earlier wasting is a short-term nutritional deficiency, so the lack of a considerable difference with the expected health variables might be due to the fact that the impact of illness in Central Asia is long term rather than short term. Ethnicity has a marked effect on wasting. The prevalence of wasting prevalence reached 10.2 percent among Uzbek children, compared to 0.8 percent among Russian children. There is no particular reason to expect Russian ethnicity to have an impact (genetic differences associated with race that determine final weight-for-height should manifest themselves in adolescence and not at the preschool age). However, the fact that the Central Asian Republics were the poorest republics under Soviet Rule could be a reason for differences in weight-for-height. This result may be influenced by the fact that the majority of the children in the sample are Uzbeks, while the minority are Russian. Ethnicity has generally been found to be a strong predictor of malnutrition in the Central Asian republics studied. The results of the three DHS in this study reveal that children of ethnic Kazakhs, Uzbeks and Kyrgyz have

higher levels of malnutrition than children from other ethnic groups (not shown here).

On average, children whose mothers' BMI was less than 18.5 kg/m^2 (the critical value) reported the highest weight-for-height z-scores (11.8%). Since a low BMI is a reflection of current nutritional status it may come as a surprise that this measure affects wasting only. BMI is based on the weight-to-height ratio, which is considered a good index of body fat and protein stores. Body stores are of interest because they reflect the stores needed to cope with physiological stress due to reduced food intake and increased demands due to increased activity, pregnancy and diseases (Cogill, 2003). The results in Table 7.9 suggest that the degree of utilisation of professional delivery assistance is positively associated with wasting.

7.4 LOGISTIC REGRESSION

A binary logistic regression analysis estimating models using the stepwise forward method (based on Wald statistics) on the pooled dataset was carried out controlling socio-economic, health and environmental characteristics. A separate analysis was carried out to study the chances of being underweight and stunted among children in the target population. Analyses for the possibility of being wasted were not performed because the percentage of wasted children was too low.

As mentioned in the section on method the statistical analysis of the logistic regression is used to identify groups that have a higher or lower risk of under-nutrition in the population under review. The odds ratio is greater in cases where the variable causes the response to increase more than that of the reference category. Otherwise the value is less than or equal to one.

Tests for co-linearity (see Appendix 1.1 and 1.2 in Appendix 1) were performed in order to identify independent variables for inclusion in the regression model that

displayed high co-linearity with the dependent variable. Bivariate analyses were used to evaluate the associations between the selected independent variables and the dependent variables in order to decide upon the variables to be used in the logistic regression. In order to assess the differences between the two groups Chi-square tests and Cramer's V tests were used to test the homogeneity with regard to the relevant dependent variable.

Chi-square tests were performed to test the null hypothesis of no relationship (see Cramer's V values in Appendix 1.3 and 1.4 in Appendix 1) in order to be sure that no independent variables were included in the multivariate analyses that have a strong relationship with other predictor (independent) variables.

7.4.1 Logistic regression: standardised weight-for-age

The following variables were used as input in the standardised weight-for-age logistic regression analyses: toilet facility, maternal education, household wealth, number of people in household, number of children under the age of five, birth order, birth interval, number of immunisations, age of child, duration of breastfeeding, birth weight, child haemoglobin, mother heard of ORT, country, water facility, and professional delivery assistance, but only those variables that fulfilled the entry criteria of the logistic regression are presented in Table 7.11.

Table 7.11 presents the regression results for child nutritional status for the pooled data for the three countries under review. The first column in the table contains the odds ratio for the explanatory variables employed in the logistic regression. The second column details the significance values for the Wald statistic, while the upper and lower confidence levels of the odds ratios are noted in the third and fourth columns in each table.

A number of variables that showed a significant association with child nutritional status in the univariate analyses did not show any relationship in the logistic

regression analyses. There are two possible explanations for this phenomenon. Firstly, there may be no causal relation between these variables and child malnutrition in the context of the countries studied due to various other reasons beyond the scope of this study, although significant associations between these variables and child malnutrition have been found in many studies conducted in developing countries. On the other hand, the consistency of the background characteristics could be responsible for the lack of association. More than 80 percent of the children (not shown here) in the study came from households that use pit latrines; the use of sanitary latrines such as pit latrines demonstrates improved household hygiene and subsequent better health. Breastfeeding is almost universal in Central Asia – more than 95 percent of the children in the study were breastfed. The duration of breastfeeding was approximately 12 months, while anaemia levels were normal at 11g/dl.

High levels of anaemia have been found in the area around the Aral Sea in Kazakhstan and Uzbekistan. In the individual country analyses anaemia showed a high correlation with nutritional status but this disappeared when the data was pooled, possibly due to lower levels of anaemia in Kyrgyz children. As discussed earlier (Chapter 2) health services, although poor, are easily accessible and certain of the services, including pre- and postnatal care, are free. More than 80 percent of the mothers in the study had received professional delivery care. About 98 percent of all the children under the age of 1 year had received all eight immunisations as expected. Fertility levels in Central Asia are low (see Chapter 2, p21). This could account for the lack of a significant relationship with child nutritional status – children might not be exposed to maternal depletion syndrome.

Table 7.11 shows the results of the logistic regression for weight-for-age indicating the odds of being underweight in various categories of the population observed. It is noted that living in Uzbekistan has an effect on the prevalence of underweight children. The logistic regression analysis shows that children living

in Uzbekistan were 4.4 times more likely to be underweight than children living in Kazakhstan. A child living in a household with one to four persons is 55 percent less likely to be underweight in comparison with a child living in a household with between five and seven people.

It was observed that ownership of durable household goods used as a proxy for economic condition has an effect on the prevalence of underweight children.

Table 7.11 Odds of being below –2SD for weight-for-age for pooled data: 95% confidence intervals

Factors	e^{β}	P value	95 % confidence for e^{β}	
			Lower	Upper
Country(reference: Kazakhstan)				
Uzbekistan	4.415	0.000	2.492	7.823
Kyrgyzstan	2.196	0.009	1.217	3.960
Number of people in household (reference: >7)				
1-4 persons	0.452	0.000	0.305	0.670
5-7 persons	0.836	0.311	0.591	1.182
Household wealth index (reference 6-9 items)				
0-3 items	1.613	0.009	1.125	2.311
4 items	0.990	0.960	0.663	1.478
5 items	0.796	0.289	0.522	1.214
Birth weight (reference <=2.5kg)				
> 2.5kg	0.363	0.000	0.220	0.591
Age of child (reference > 24 months)				
0-5 months	0.244	0.000	0.122	0.487
6-11 months	1.199	0.376	0.803	1.789
12-23 months	1.922	0.000	1.396	2.646
Heard of ORT (reference Yes)				
No	1.119	0.579	0.752	1.665
Used	2.119	0.010	1.20`	3.700

The odds of a child being underweight in a household that owns 0-3 durable household items is 1.6 times higher in comparison with households that own 6-9 durable items. Another important determinant of weight-for-age was the birth weight of the child. Children whose birth weights were more than 2.5 kg were 64 percent less likely to be underweight in comparison with children that weighed 2.5 kg and less at birth.

Poor nutritional growth was observed as the age of the child increased. Strangely, the odds of being underweight are 2.1 times higher for those children who had used ORT in comparison with those whose mothers had only heard of ORT. The questionnaire had posed the question to the mothers whether they had heard of ORT, had used it in the preceding two weeks or had never heard of it. The use of ORT two weeks prior to the survey is indicative of a child having suffered from diarrhoea, which could have led to weight loss.

7.4.2 Logistic regression: standardised height-for-age

The results of the logistic regression for height-for-age are given in Table 7.12. The following variables were used as input in the standardised height-for-age logistic regression analyses: toilet facility, water facility, maternal education, household wealth, number of children under the age of five, birth order, number of immunisations, age of child, duration of breastfeeding, birth weight, child haemoglobin, country, but only those variables that fulfilled the entry criteria for the logistic regression are presented in Table 7.12.

As is the case with weight-for-age, living in Uzbekistan has a significant impact on the stunting of children. The odds of being stunted are 3.7 times higher for children in Uzbekistan compared with children living in Kazakhstan. The same result was found when comparing Kyrgyzstan and Kazakhstan, although the odds of being stunted are lower.

Exposure to malnutrition peaks for the 12-23 months age group with an odds ratio of 1.57 compared with children above the age of 24 months. This means that the 12-24 month group are 1.57 times more likely to have a low height-for-age value when compared with children older than 24 months. These results are consistent with the findings of past studies that child nutritional status declines significantly with age, reflecting the typical deterioration of linear growth in children aged 1 to 3 years – the most vulnerable age category (Ndiaye, 2002).

Table 7.12: Odds of being below-2SD for height-for-age for pooled data: 95% confidence intervals

Factors	e^{β}	P value	95 % confidence for e^{β}	
			Lower	Upper
Country (reference: Kazakhstan)				
Uzbekistan	3.691	0.000	2.441	5.580
Kyrgyzstan	2.733	0.000	1.811	4.123
Number of children under 5 (reference: >2)				
0-1 children	0.596	0.001	0.439	0.809
2 children	0.774	0.078	0.583	1.030
Household wealth index (reference: 6-9 items)				
0-3 items	1.346	0.055	0.933	1.825
4 items	0.970	0.849	0.707	1.330
5 items	0.788	0.144	0.573	1.085
Birth weight (reference: <= 2.5kg)				
>2.5kg	0.422	0.000	0.272	0.655
Age of child (reference: 24 months)				
0-5 months	0.188	0.000	0.116	0.305
6-11 months	0.669	0.014	0.486	0.922
12-23 months	1.579	0.000	1.236	2.018
Mother's education (reference: Higher)				
0-part 2				
Secondary	1.839	0.017	1.117	3.029
	1.868	0.001	1.271	2.744
Water facility (reference: piped)				
Unpiped	1.408	0.006	1.102	1.799

The odds of a child being stunted in a household that owns more than six durable household items is 1.3 times higher in comparison with a household that owns 6-9 durable household items. Children with a birth weight of 2.5kg and less are more than twice as likely to be stunted in comparison with children with a birth weight of more than 2.5 kg. The same conclusions were reached in respect of weight-for-age. It would also seem that the number of children per household plays a significant role in respect of stunting. An only child is approximately 40 percent less likely to be stunted than a child living in a household with more than two children. The odds of being underweight for children living in a household with unpiped water are about 1.4 times higher in comparison with those children who live in a household with piped water.

Those children with mothers having 0-Part 2 education are nearly twice as likely to be stunted as children with mothers who have a secondary and higher than secondary education.

7.5 Summary

The results form the nutritional status models concur in part with other research results from developing countries (e.g., Smith & Haddad, 2000). Stunting levels within and between the three countries were higher than both underweight and wasting. Child nutritional status varies according to province of residence as indicated in the bivariate results for individual countries. The bivariate results for the combined countries indicate the variation in child nutritional status by country of residence. The regression results confirm that socio-economic, health and environmental factors significantly affect child nutritional status.

CHAPTER 8

8. FINDINGS AND CONCLUSIONS

8.1 SUMMARY OF FINDINGS

The first section in this chapter reiterates the results presented in the previous chapter and highlights important findings from the study. In the second section, reference to the theoretical tools used in Chapters 4 and 5 will be made in analyzing the results in Chapter 7.

After the breakup of the FSU, the poorer republics of Central Asia were faced with problems relating to child health, including child malnutrition, with the malnutrition rates ranking among the worst in the CIS. While this has been documented in official national surveys, the reasons behind this are still not properly understood. This thesis addressed this gap by conducting a secondary analysis of the data from the DHS' conducted in these former republics in 1996, 1997 and 1999. Accordingly, attention was paid to the role played by socioeconomic, environmental and health factors in child malnutrition.

The main results identify province of residence within a country, the country of residence, number of people in a household, household wealth, birth weight, age of child, mother's knowledge of ORT, maternal education, number of children under the age of five years, and source of drinking water as strong predictors of child nutritional status in the three Central Asian Republics. Furthermore, it has been shown that chronic malnutrition, which is long-term undernutrition, is most prevalent in all three countries.

Though largely consistent with findings from malnutrition studies in other developing countries, the results of the secondary data analysis with respect to religion, marital status, and ethnicity are less robust, because of confounding factors, such as a lack of variation in the variables. The majority of the population is Muslim, marriage is universal, and the majority of the natives in the three

countries under review (Uzbekistan, Kazakhstan and Kyrgyzstan) are Uzbeks, Kazakhs or Kyrgyz.

The main questions that this study addressed include the following:

- What is the variation of the prevalence of stunting, underweight and wasting among the three countries and within the three countries under review?
- Which factors explain differences in stunting, underweight and wasting among the three nations?
- What role does the economic development of a country play in the modification of child malnutrition status?
- What role do structural factors play in child nutritional status?

The findings are summarised along the following lines:

- Malnutrition rates in the CARs, which were the focus of the study rank among the highest CIS, with the exception of Kazakhstan, which has the lowest rate. Uzbekistan and Kyrgyzstan have rates similar to those of certain of the world's poorest developing countries. This study clearly suggests that factors influencing child nutrition vary from country to country. This is most probably due to geographic diversity and the unbalanced economic development in these countries. The proximity of Uzbekistan and Kyrgyzstan to neighbouring Afghanistan, Tajikistan and Pakistan, all countries which are fraught with uprisings, civil wars and instability, could have a negative effect on the economic stability of these two countries. Provinces bordering Tajikistan and China have higher than national average malnutrition levels. In addition, provinces close to the Aral Sea, which has contributed to a host of environmental health problems, especially in the case of the children, also had high malnutrition levels in both Kazakhstan and Uzbekistan.

- Inequalities in stunting, underweight and wasting were statistically significant in Uzbekistan and Kyrgyzstan. Stunting inequalities were greater than inequalities in underweight, which tended to be higher than inequalities in wasting. Kazakhstan did well in terms of both the average (prevalence of malnutrition) and the distribution (equality). Uzbekistan and Kyrgyzstan had higher levels of stunting and underweight while Uzbekistan had the highest levels of malnutrition of all three countries (see Tables 7.2, 7.4 and 7.6). Figures 7.1, 7.3 and 7.5, which show the distribution of the nutritional status indicators, further confirm the results from the provinces. In Uzbekistan and Kyrgyzstan, a large proportion of the children failed to achieve the reference median height and weight for their age while in Kazakhstan the majority of the children in the sample had achieved the reference median height and weight for their age.

- Provincial differences within each country were also distinguished. With the exception of Kazakhstan, this five-country region is mainly rural, with the highest concentrations of malnutrition observed in the southern oblasts (provinces) of the other four countries. Approximately 64 percent of the inhabitants of Central Asia reside in rural areas. The high proportion of population residing in the rural areas of Central Asia reflects the regional investment policies of the FSU (Buckley, 1998:71). Tables 7.2, 7.4 and 7.6 indicate the disparities within the provinces in each country. In Kyrgyzstan, children who live in the provinces to the east and to the south displayed the highest prevalence of malnutrition. The rates of stunting, underweight and wasting from these two provinces were higher than the national average. A similar picture was evident in Uzbekistan. Children who live in provinces 2 and 4 displayed the highest incidence of malnutrition and had higher than national average prevalence rates of malnutrition. Although Kazakhstan had the lowest overall malnutrition rates the disparities within the provinces were large. The stunting levels in the western, central and eastern provinces were higher than the national average, while the

province to the north had higher than national average underweight levels. The central and western provinces had higher than national average wasting levels.

- The geographic location variables for each country (not shown here) also provide an interesting insight into the pattern of child health in the three Central Asian Republics. Children living in densely populated, mountainous and predominantly rural provinces with harsh climatic conditions, and suffering from all forms of malnutrition displayed higher than national average rates in all three countries as indicated in the individual country data analyses. The combined bivariate analyses indicate disparities in the underweight and stunting levels of children by area of residence. These findings suggest that the relative advantage enjoyed by children living in cities over their rural counterparts as indicated in the bivariate analyses may be mediated by household socio-economic characteristics (see Tables 7.4, 7.6 and 7.8).

Among the variables used in the bivariate analysis which were not entered into the regression model ethnicity, body mass index and professional delivery assistance showed a significant correlation with wasting. Birth order, the number of immunisations, breastfeeding and child haemoglobin level were significantly associated with both underweight and stunting, while birth interval and toilet facility were significantly associated with underweight only.

- In Central Asia children born less than 24 months after the last sibling are more likely to be underweight than those born 47 months after the last sibling. Similar results were observed in Nepal, the Philippines, and Ethiopia (Gubhaju, 1986; Ricci & Becker, 1996; Frost et al., 2005). Children born at short birth intervals may create huge burdens biologically and in respect of childcare and these may result in reduced nutritional status. Gubhaju (1986:444) found previous birth interval to be the most

important factor affecting infant mortality in Nepal. In the Philippines (Ricci & Becker, 1996:970-971) found a short birth interval to be a risk factor for stunting and wasting.

- An unexpected finding is the high probability that fully vaccinated children were likely to be underweight and stunted compared to children who were partially vaccinated. Similar results were found in Ethiopia by Yimer (2000:289). On the other hand Macro International Inc. in Senegal (1996:5-12) and Uganda (1996:7-10) found a negative association between chronic malnutrition and the vaccination status of children. Since stunting appears in early ages in Central Asian children many of the children in this study may have been stunted before they received all the recommended vaccinations. This could also be influenced by the poor nutritional status of the mother who is not able to provide nutritious breast milk.

- The birth order of the child showed a significant association with stunting and underweight. Similar results have been reported in a number of studies. In Sri Lanka Aturupane et al. (2006:3) found a very clear pattern of child malnutrition rates increasing with the birth order of children. For sixth and higher order children the risk of malnutrition was nearly twice as great as that for first-born children. Recent studies indicate that stunting increases as birth order increases (Forste, 1998:122; Mishra & Retherford, 2000:4).

- Breast-feeding, especially in children older than six months, had an association with stunting and underweight. Similar results have been reported in a number of studies conducted in developing countries (Rao et al., 2004; Sasisaka, 2006). In Nicaragua, Sasisaka (2006:405) identified a breast-feeding duration of more than twelve months to be a risk factor for underweight. Rao et al. (2004:50) studied nutritional status in North East

India and found that children who were still being breastfed beyond the first birthday had highly significantly lower z-scores compared to those who had stopped breast-feeding.

- Access to a flush toilet had positive significant effects on underweight only in Central Asia. Merchant et al., (2003), Daniels et al., (1991), Huttly (1990), Ricci and Becker (1996), Magnani et al. (1993) found an association between good water and sanitation and improved nutritional status in studies conducted in various developing countries.

- Haemoglobin level is an important base for determining the health of children and the study confirms that the nutritional status of anaemic children was poor. A larger number of children who suffered from mild to moderate anaemia in Central Asia were stunted and underweight than those who did not. The main reason for the prevalence of anaemia in Central Asia is the iron deficiency in the diet due to nutritional deficiency and the structural problems as discussed in Chapter 2. Scrimshaw (2001:3-5) reports that the anaemia rates for children under the age of three years in Kazakhstan and Uzbekistan in 1995 and 1996 respectively ranged between 50 and 75 percent. In India, anaemic children tended to have poor nutritional status and it was highly significant (Rao et al., 2004:50).

- The relationship between ethnicity and child malnutrition is inconclusive: certain studies have reported higher malnutrition levels among indigenous children than among non-indigenous children, while others have found the opposite. In Nepal, Sah (2004:7) found a higher proportion of underweight and stunted children for Dalit (indigenous) than non-Dalit children under the age of three. Conversely, Hotchkiss et al. (2002:180), using the approach of Strickland and Tuffrey (1997), found that Mongoloid children had higher weight and height measurements than non-Mongoloid children.

Other factors could be responsible for the apparent ethnic differences found in Central Asia, especially the fact that the majority of the children are indigenous to the three countries.

- To a large extent the wellbeing of a child depends on the health of the mother. However, the standard, availability, accessibility and affordability of healthcare offered determine the wellbeing of the mother. The availability of professional healthcare for pregnant women in Central Asia had an association with wasting, although either a nurse or a doctor delivered nearly all the children in the study sample.

- Commonly found in many developing countries is the association between stunting and low BMI. Other studies have found an association between BMI and underweight (Silva, 2005:20). In this study low BMI had an unusual association with wasting. Children of nourished mother were 40 percent less likely to be wasted compared to children of acutely malnourished mother. Rayhan and Khan (2006:560) found similar results in Bangladesh. Sanghvi et al. (2001:352) found infant birth weight and maternal BMI were significant risk factors for current child wasting status in India. Children of well-nourished mothers had a lower risk of being underweight compared to children of acutely malnourished mothers. The reason may be that thin or malnourished mothers are not able to provide sufficient breast milk because of their nutritional deficiency. In India, the nutritional status of children born to mothers with a BMI below the critical value of 18.5 kg/m2 was significantly poor (Rao et al., 2004:51).

The regression analysis uncovered that the underlying determinants of the nutritional status of children under the age of three in Central Asia beyond toilet facility, child haemoglobin level, birth order, duration of breast-feeding, birth interval, number of immunisations are household wealth, age of child, birth weight, number of people in household, water facility, mother's education,

number of children under the age of five and whether the respondent had ever heard of ORT.

- As regards the assessment of the economic situation of the household, it is important to note that the variables used in computing the wealth index tend to reflect the permanent living conditions of the household rather than the current cash availability. A low economic level thus indicates medium to long-term poverty. It is, however, clear that, as the economic situation of a household improves (indicated in this study by household wealth index used as proxy for income) the nutritional level of children may improve. Correspondingly, chronic malnutrition levels among children who live in 'poor' households were lower than acute malnutrition levels for children living in similar households. Ukwuani and Suchindran (2003:2119) found that, among children under the age of six in Nigeria children born to mothers in wealthy households were less likely to be stunted than children born to mothers in poor households. Silva (2005:20) found that in Ethiopia household wealth had a greater impact on stunting than on underweight.

- Similarly, better growth is assured if the child belongs to a household consisting of four or fewer people. However, family size does not seem to have an effect on chronic malnutrition, as indicated by stunting. The finding on household size is consistent with Sahn's (1994:52) study of nutritional status in Cote d'Ivoire and Ndiaye's (2002:111) study in Niger.

- The positive effect of maternal education on child nutritional status found in this study is consistent with other studies on factors affecting child health, such as those conducted in India, Nepal, Bangladesh, and Russia (Choudhury & Bhuiya, 1993; Mishra & Retherford, 2000, Sah, 2004; Fedorov & Sahn, 2005). Mishra and Retherford (2000:3) found, among children under the age of age four in India, that those whose mothers had a certain degree of education but had not completed middle school were

much less likely to be malnourished than were children whose mothers were illiterate. In Nepal, Sah (2004:10) found maternal education to have an effect on the nutritional status of children under three years. Analysing the effects of biosocial variables on changes in nutritional status in Bangladesh, Choudhury and Bhuiya (1993:354) observed a decrease in the proportion of severely malnourished children with an increase in the mother's level of education after controlling for other socioeconomic and geographical factors. In Russia, Fedorov and Sahn (2005:492) found that the education of the mother had a very strong impact on child's health. Overall, the results confirm the importance of maternal education for child health and development.

- The positive nutritional effect of clean water found in this study is also consistent with other studies conducted in developing countries (Thomas & Strauss, 1992; Pongou et al., 2004; Silva, 2005). Silva (2005:21), in a study conducted in Ethiopia examining the impact of externalities associated with access to basic environmental services such as water and sanitation, found that there were significant externalities associated with access to water at the community level. In Cameroon, Pongou et al. (2004:27) found that drinking water was significantly associated with child nutritional status both at the national and at the rural-urban levels. Focusing on the impact of the community infrastructure on the height of children in Brazil, Thomas and Strauss (1992:321) found that water facilities significantly affected the height of children, especially in urban areas. Several reports from Central Asia identify waterborne diseases (mainly diarrhoea) as one of the major contributors to the diseases suffered by children, especially those living around the Aral Sea. Contamination means that drinking water is a major health problem in this region. Even when water is piped it is not necessarily safe. There are high concentrations of chlorine in the water in certain areas (Carpenter, et al., 2006:364).

- Measures of the mothers' knowledge concerning disease treatment and prevention and nutritional requirements are limited in the DHS. Maternal knowledge and use of oral rehydration therapy is commonly used as an indirect measure of general health knowledge. The negative association between use of ORT and underweight in this study could be explained in two ways. Bhuiya et al., (1990); Boerma et al., (1990) concluded that a lack of an understanding of infections as a cause of disease and improper use of ORT to treat diarrhoea negatively affected child nutritional status.

- The number of children under the age of five in the household is significantly associated with stunting – the greater the number of under-fives in the household the higher the possibility of stunting. This is not surprising since, as the number of children under five years of age increases, so may the strains on the inelastic resources in the household. In India, Mishra and Retherford (2000:4) found that children with three or more older siblings were more likely to suffer from stunting than are children from smaller families, probably because competition for food increases with family size. In the Congo, Delpeuch et al. (2000:46) found that the number of preschool children in a household had an effect on wasting, which was less likely when there was only one child below the age of six years in the household. When analysing levels and risk factors of malnutrition among children in South Ethiopia, Yimer (2000:289) found that the number of children in a household was significantly associated with the long-term nutritional status of children.

- Although a common result in many studies conducted in developing countries the significant effect of the age of the child on stunting and underweight highlights the first two years of life as the most nutritionally vulnerable for children in the study area, thus suggesting that the first two years of life are critical periods for public health intervention. Figures 7.2, 7.4 and 7.6 further confirm the bivariate analyses results. Similar results were found in Niger (Ndiaye, 2002:107). Using data from 39 different

countries Shrimpton, et al., (2001:5) found that growth faltering in length starts immediately after birth. This conclusion was supported by studies on the growth of individual children. These studies showed that most of those malnourished at ages 3-5 years had already presented anthropometric deficits at the end of their first year of life. In Sri Lanka, Aturupane, et al., (2006) found that malnutrition for a large proportion (about a fifth) of children begins after the first six months of life. Reasons for this include low birth weights, inadequate breastfeeding, poor weaning practices and insufficient consumption of nutritious food. The risk of malnutrition increases sharply in the second year of life (beginning at age 12 months), when most children stop breastfeeding and begin relying almost exclusively on solid foods.

- Birth weight is significantly associated with both underweight and stunting. Examining factors causing child malnutrition in Bangladesh Rayhan and Khan (2006:560) found that very small and smaller than average size children at birth were at a higher risk of stunting, underweight and wasting compared with children who were average size or larger at birth. Pongou et al. (2004:30) in Cameroon reported that the size of the child at birth affected the child's nutritional status. Children of low birth weight tended to have lower weight-for-age z-scores compared to those of average or larger birth weight. Other studies have found an association between birth eight and maternal socio-economic status, weight and nutritional status (Tinker & Ransom, 2002:3). Certain data suggests that, in India, better-nourished larger children receive more care (Arya, 1989:38). A study in Mexico found that mothers interacted more with better-nourished and larger children compared to smaller children (Allen et al., 1992:279).

These findings have important implications for policy and represent a further step towards gaining an improved understanding of the complex determinants of child (mal) nutrition in Central Asia.

8.2 STRUCTURAL FACTORS

The nutritional challenges facing the countries of Central Asia may be attributed largely to the ramifications of structural violence experienced by these countries under Soviet rule, unfinished policy reforms, and changes in the institutional structure of the countries. Policies and programmes to combat the food and nutritional deficiencies in children and women begun in the late 1990s need to be accelerated. Adequate policy analysis based on data regularly collected on the indicators and causal factors of food insecurity and malnutrition must be carried out. Food and nutrition policies, which are designed without adequate information on these parameters, may result in negative or unintended consequences for the food security of vulnerable households.

8.2.1 Sociopolitical transformations

Public policy may do much to improving child nutritional status in Central Asia. However, political stability within the countries and in the provinces must be achieved at the basic level before any policy may be instituted. Without political stability, it is more difficult for governments to develop and implement sound and sustained economic and social policies. The results of this study demonstrate that policies aimed at improving household economic status, living standards, and health environment could help to reverse the high child malnutrition levels in the Central Asian Republics. Greater efforts to improve child nutrition might be more useful if concentrated in the provinces where the problem is particularly severe.

8.2.2 Socio-environmental transformations

8.2.2.1 Alleviation of poverty

The level of poverty is high in the three CARs, affecting over 46% of the population (Table 5.1). Most of the poor live in rural areas (Figure 5.4). It is essential to take action to eradicate poverty because poverty is one of the most influential underlying determinants of the nutritional status of women, which is, in turn, linked to child nutritional status. In the short-term targeted social welfare

allowances to the unemployed and the poorest sections of the populations, social and infrastructure services, and increased food entitlements will provide a measure of immediate relief and create a safety net.

In the long-term improvements in the macro-economic environment through wage earnings, employment rates, decreased income inequality and living standards must be brought about. Off-farm income generating activities must be promoted, especially in rural areas where there has been an influx of the many urban unemployed looking for work on the state farms. This would reduce the number of members per household, especially in the poor homes, where already inelastic resources are further stretched. Moreover, this would also lessen the pressure of agricultural activity on the already nutrient depleted soils. This could be achieved by facilitating access to capital at the community and individual level, without gender and age discrimination, as is currently the case in these countries.

Employment opportunities and earnings could be increased through skills training. This would help bridge the gap created by the emigration of skilled Russians and Germans after independence. A revitalisation of the educational system in these countries would also help increase the income of households. It is critical that these governments support the creation of new jobs for educated citizens, especially the young new graduates and the skilled workers, in order to prevent the inevitable emigration of educated and skilled citizens. Therefore, the strengthening of institutional capacity and the creation of an enabling environment for faster economic growth is essential.

8.2.2.2 Access to adequate and safe drinking water

The governments of the countries in the study should invest in social amenities, thus increasing the proportion of people with access to potable water, especially in Uzbekistan, which has critical water shortages. There should also be a concerted effort on the part of the three governments for better coordination and

efficient use of water, desalination of water, and reduction of pollution of water sources. The quality of drinking water is a major problem, water is not properly distributed, and sources are exposed to various types of surface and underground contamination.

Threats to the health of children should be addressed and reduced as much as possible through the provision of safe and adequate drinking water. In this respect the dissemination of information on water management and education on water, especially in Uzbekistan where there is high contamination and pollution of water, is vital. Policies that address trade offs between Kyrgyzstan on the one hand, and Uzbekistan and Kazakhstan on the other hand, in respect of the supply of water to the latter two countries by Kyrgyzstan, and the exchange with fossil fuels by the other two, should be implemented.

8.2.2.3 Care of children

Particular attention should be paid to infant feeding. In the short-term targeted supplementary feeding needs to be offered to all infants who come from poor homes, and to those who display signs of growth deficiency as result of, for example, low birth weight from an early age. The dramatic rise of stunting with age up to the second year of life reflects the cumulative effect of repeated illness and inadequate nutrient intake. Therefore, supplementary feeding programmes should focus particularly on children between 6 and 24 months.

In the long-term, major efforts need to be made to improve the health knowledge of mothers as well as that of the caregivers. Private caregivers could be trained through child healthcare programmes initiated by government. Governments could create employment by either subsidising women to provide childcare or re-opening the kindergartens that once looked after the children of Central Asia under Soviet Rule so well, so that children may be professionally cared for while their mothers are at work. Kindergartens provide childcare for mothers, and this allows the mothers to work and thus earn an income. The kindergartens also

provide food that would not otherwise be available in the home. The relationship between educational status and child malnutrition reflects the deteriorating educational levels of young mothers, as well as a lack of health knowledge on the part of both the educated and uneducated. The value of education for girls could be stressed to families and communities through consistent social mobilisation and gender awareness activities.

8.2.2.4 Care for mothers

Programmes to improve the nutritional status of children in developing countries must give priority to women because improving the nutritional status of women enhances child nutritional status. In the short term an acceleration of the nutrient intake programme targeting pregnant women that is already in place in these countries could help reduce low birth weight. In order to be ultimately successful prenatal intervention programmes need to focus on both nutrient deficiency prevention and treatment, particularly iron and iodine deficiencies.

This study has shown that the deterioration in economic status, health environment, and the status of women as indicated by the higher level of malnutrition among children whose mothers had either no education at all or only went to primary school level, has led to a substantial decline in child nutritional status in Central Asia. Reversing the decline would necessitate improvements in all of these areas. In view of the fact that these countries are still experiencing the political and economic transitions that many other countries completed decades ago there are significant benefits to improving the nutritional status of the next generation of leaders of these countries.

8.3 CONTRIBUTIONS OF STUDY

This study shows the complexity of determining which factors influence child nutritional status and how this influence is realised. The study shows that child nutritional status is concomitantly influenced by national, community and household factors, and cannot be reduced to one factor alone. A comparative study of the three countries, as well an analysis of the combined data from the

three countries, contributes to the universal validity of empirical relationships that are observed in the pooled data.

In spite of the worsening nutritional status in the three CARs during the transition period, the rate of malnutrition has remained much lower than the rates found in many developing countries that have been independent from their colonial rulers for decades. It was, however, important to find out what factors were responsible for the high malnutrition levels in these countries. Determining which socioeconomic, environmental, health and geographic location features were linked to different types of malnutrition was of vital importance in this study. An assessment of whether the conceptual and theoretical framework used in this study of child malnutrition was valid in this context was performed.

The bivariate analyses indicate very high child malnutrition levels in certain provinces and very low levels in other provinces. Ironically, in both Uzbekistan and Kyrgyzstan, higher than national average underweight, stunting and wasting levels were concentrated in the same provinces, raising a concern about the determinants of malnutrition in these provinces. In Kazakhstan, children from the West province suffered from higher than national average stunting, underweight and wasting, while those from the Central province had higher than national average stunting and wasting levels.

The explanation why Kyrgyzstan and Uzbekistan have a higher prevalence of malnutrition than Kazakhstan may be due to the ramifications of structural violence factors (poor economic development, health care delivery, high unemployment levels etc.) perhaps to factors that are not easy to quantify. The large variability in the prevalence of stunting and underweight between the three countries and among provinces within a country means that whether or not children are malnourished is as much or more a consequence of factors at the national and provincial level than a consequence of individual household circumstances. The implication of this result is that, although interventions at the

household level are clearly important, interventions at the national and subnational level are also important because of determining effects on the conditions faced by households.

In order to help determine policy directions factors that have been identified as relating to stunting and underweight should be targeted as a priority in dealing with malnutrition in this region. Improvement in any of the factors identified by this study would require various initiatives on the part of government. There is considerable evidence in broad terms that changes in structural factors such as improved health care delivery, education of mothers, environment and food security result in improvements in the wellbeing of children. However, closer attention to regional/provincial factors would do much to address malnutrition in the CARs. Furthermore, the empowerment women by improving their health may prove to be one of the best approaches to promoting the heath and wellbeing of children in Central Asia.

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APPENDIX 1

Appendix 1.1: Tests co-linearity for three countries combined (stunting)

Determinants	Chi-p value	Cramer's V
Country	0.000	0.168
Number of people in household	0.004	0.068
Household wealth index	0.000	0.131
Birth weight	0.000	0.086
Age in months	0.000	0.225
Water facility	0.000	0.085
Duration of breastfeeding	0.000	0.172
Number of Immunisations	0.000	0.163
Child haemoglobin level (g/dl)	0.005	0.076
Toilet facility	0.000	0.098
Birth order	0.000	0.085
Number of children under 5	0.000	0.083
Mother's education	0.000	0.083
Preceding birth interval	0.002	0.078
Place of residence	0.003	0.060
Respondent ever heard of ORT	0.339	0.033
Sex of child	0.006	0.058

Appendix 1.2: Tests co-linearity for three countries combined (underweight)

Determinants	Chi-p value	Cramer's V
Country	0.000	0.152
Number of people in household	0.001	0.078
Household wealth index	0.000	0.106
Birth weight	0.000	0.114
Age in months	0.000	0.162
Water facility	0.010	0.062
Duration of breastfeeding	0.000	0.111
Number of immunisations	0.000	0.095
Child haemoglobin level (g/dl)	0.003	0.078
Toilet facility	0.014	0.060
Birth order	0.000	0.085
Number of children under 5	0.000	0.116
Mother's education	0.005	0.068
Preceding birth interval	0.000	0.118
Place of residence	0.019	0.048
Respondent ever heard of ORT	0.001	0.077
Sex of child	0.004	0.060

Appendix 1.3: Stunting Cramer's V

	Age of child	Country	Immunisations	Household wealth	Toilet facilities	Birth weight	Water facilities	Birth order	Children < 5	Mother's education	Child haemoglobin level	Preceding birth interval	People in household
Age of child	-	0.081	0.679	0.061	0.014	0.059	0.060	0.043	0.085	0.084	0.087	0.044	0.058
Breastfeed	-	0.070	0.468	0.049	0.128	0.052	0.051	0.081	0.063	0.096	0.066	0.076	0.061
Country	-	-	0.105	0.101	0.194	0.016	0.100	0.044	0.097	0.065	0.115	0.108	0.093
Immunisations	-	-	-	0.054	0.035	0.060	0.037	0.036	0.046	0.069	0.072	0.038	0.048
Household wealth	-	-	-	-	0.197	0.108	0.226	0.088	0.069	0.124	0.045	0.070	0.081
Toilet facilities	-	-	-	-	-	0.016	0.195	0.108	0.172	0.195	0.077	0.128	0.303
Birth weight	-	-	-	-	-	-	0.086	0.020	0.014	0.019	0.075	0.066	0.043
Water facilities	-	-	-	-	-	-	-	0.094	0.048	0.105	0.060	0.029	0.111
Birth order	-	-	-	-	-	-	-	-	0.285	0.054	0.049	0.714	0.216
Children < 5	-	-	-	-	-	-	-	-	-	0.051	0.056	0.422	0.274
Mother's education	-	-	-	-	-	-	-	-	-	-	0.042	0.038	0.057
Child haemoglobin level	-	-	-	-	-	-	-	-	-	-	-	0.042	0.062

Appendix 1.4: Underweight Cramer's V

	Age of child	Country	Immunisation	House hold wealth	Toilet facilities	Birth weight	Water facilities	Birth order	Children < 5	Mother's education	Child haemoglobin level	Preceding birth interval	People in household	Ever heard of ORT
Age of child	-	0.080	0.679	0.060	0.014	0.059	0.059	0.043	0.085	0.084	0.087	0.044	0.057	0.070
Breastfeed	-	0.071	0.469	0.048	0.128	0.052	0.051	0.081	0.064	0.096	0.066	0.077	0.061	0.065
Country	-	-	0.105	0.102	0.196	0.015	0.099	0.044	0.098	0.065	0.115	0.109	0.094	0.136
Immunisations	-	-	-	0.054	0.034	0.059	0.036	0.036	0.046	0.069	0.071	0.038	0.047	0.053
Household wealth	-	-	-	-	0.197	0.108	0.226	0.088	0.069	0.124	0.045	0.070	0.080	0.055
Toilet facilities	-	-	-	-	-	0.017	0.195	0.108	0.172	0.194	0.077	0.129	0.301	0.053
Birth weight	-	-	-	-	-	-	0.087	0.020	0.014	0.019	0.075	0.066	0.043	0.033
Water facilities	-	-	-	-	-	-	-	0.094	0.048	0.105	0.060	0.029	0.111	0.038
Birth order	-	-	-	-	-	-	-	-	0.286	0.054	0.049	0.714	0.216	0.075
Children < 5	-	-	-	-	-	-	-	-	-	0.051	0.057	0.423	0.274	0.054
Mother's education	-	-	-	-	-	-	-	-	-	-	0.041	0.038	0.057	0.073
Child haemoglobin level	-	-	-	-	-	-	-	-	-	-	-	0.042	0.061	0.034
Ever heard of ORT														0.058

APPENDIX 2

A sample of a questionnaire from the Demographic and Health Surveys conducted in Central Asia is included in this appendix. All the questionnaires are similar as they have been standardized for use in developing countries by Macro International.

APPENDIX 3

MAP OF CENTRAL ASIA

Source:http://www.maps.com

APPENDIX 4

REGIONAL MAP OF KAZAKHSTAN

Source:http://www.measuredhs.com

KAZAKSTAN

APPENDIX 5

REGIONAL MAP OF KYRGYZSTAN

Source:http://www.measuredhs.com

APPENDIX 6

REGIONAL MAP OF UZBEKISTAN

Source:http://www.measuredhs.com


UZBEKISTAN
Aral Sea
Republic of
Karakalpakstan
KAZAKSTAN
Navoiiskaya
Oblast
Tashkentskaya
Oblast
Namanganskaya
Oblast
TASHKENT
CITY
Andizhanskaya
Oblast
KYRGYZSTAN
Aidarkul Lake
Khorezmskaya
Oblast
Syrdaryinskaya
Oblast
Ferganskaya
Oblast
Bukharskaya
Oblast
Dzhizakskaya
Oblast
Samarkandskaya
Oblast
TURKMENISTAN
TAJIKISTAN
Kashkadaryinskaya
Oblast
Surkhandaryinskaya
Oblast
AFGHANISTAN

APPENDIX F

QUESTIONNAIRES

UZBEKISTAN DEMOGRAPHIC AND HEALTH SURVEY QUESTIONNAIRE
HOUSEHOLD SCHEDULE

REPUBLIC OF UZBEKISTAN
INSTITUTE OF OBSTETRICS AND GYNECOLOGY MINISTRY OF HEALTH

IDENTIFICATION

CITY/TOWN/VILLAGE NAME _____

NAME OF HOUSEHOLD HEAD _____

REGION . . . . . .

OBLAST . . . . . .

RAION . . . . . .

CLUSTER NUMBER . . . . . .

URBAN/RURAL (urban = 1; rural = 2) . . . . . .

LARGE CITY/SMALL CITY/TOWN/COUNTRYSIDE . . . . . .
(large city = 1, small city = 2, town = 3, countryside = 4)

HOUSEHOLD NUMBER . . . . . .

INTERVIEWER VISIT

	1	2	3	FINAL VISIT
DATE	_____	_____	_____	DAY MONTH YEAR
INTERVIEWER'S NAME	_____	_____	_____	NAME
RESULT*	_____	_____	_____	RESULT
NEXT VISIT: DATE	_____	_____		TOTAL NO. VISITS
TIME	_____	_____		

* RESULT CODES:

1 COMPLETED
2 NO HOUSEHOLD MEMBER AT HOME OR NO COMPETENT RESPONDENT AT HOME AT TIME OF VISIT
3 ENTIRE HOUSEHOLD ABSENT FOR EXTENDED PERIOD
4 POSTPONED
5 REFUSED
6 DWELLING VACANT OR ADDRESS NOT A DWELLING
7 DWELLING DESTROYED
8 DWELLING NOT FOUND
9 OTHER _____ (SPECIFY)

TOTAL IN HOUSEHOLD

TOTAL ELIGIBLE WOMEN

LINE NO. OF RESP. TO HOUSEHOLD SCHEDULE

SUPERVISOR	FIELD EDITOR	OFFICE EDITOR	KEYED BY
NAME _____	NAME _____		
DATE _____	DATE _____		

INFORMATION ABOUT HOUSEHOLD MEMBERS AND VISITORS

Now we would like some information about the people who usually live in your household or who are staying with you now.

LINE NO.	USUAL RESIDENTS AND VISITORS	RELATIONSHIP TO HEAD OF HOUSEHOLD*	RESIDENCE		SEX	AGE	EDUCATION			PENSION	PARENTAL SURVIVORSHIP AND RESIDENCE FOR PERSONS LESS THAN 15 YEARS OLD				ELIGIBILITY
							IF AGE 7 YEARS OR OLDER			IF AGE 50 YEARS OR OLDER					
	Please give me the names of the persons who usually live in your household and guests of the household who stayed here last night, starting with the head of the household.	What is the relationship of (NAME) to the head of the household?	Does (NAME) usually live here?	Did (NAME) stay here last night?	Is (NAME) male or female?	How old is (NAME)?	Has (NAME) ever been to school?	IF ATTENDED SCHOOL: What is the highest level of school (NAME) attended? What is the highest grade (NAME) completed at that level?**	IF AGE LESS THAN 35 YEARS: Is (NAME) still in school?	Is (NAME) pensioner	Is (NAME'S) natural mother alive?	IF ALIVE: Does (NAME'S) natural mother live in this household? IF YES: What is her name? RECORD MOTHER'S LINE NUMBER	Is (NAME'S) natural father alive?	IF ALIVE: Does (NAME'S) natural father live in this household? IF YES: What is his name? RECORD FATHER'S LINE NUMBER	CIRCLE LINE NUMBER OF WOMEN ELIGIBLE FOR INDIVIDUAL INTERVIEW
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
01			YES NO 1 2	YES NO 1 2	M F 1 2	IN YEARS	YES NO 1 2	LEVEL GRADE	YES NO 1 2	YES NO DK 1 2 8	YES NO DK 1 2 8		YES NO DK 1 2 8		01
02			1 2	1 2	1 2		1 2		1 2	1 2 8	1 2 8		1 2 8		02
03			1 2	1 2	1 2		1 2		1 2	1 2 8	1 2 8		1 2 8		03
04			1 2	1 2	1 2		1 2		1 2	1 2 8	1 2 8		1 2 8		04
05			1 2	1 2	1 2		1 2		1 2	1 2 8	1 2 8		1 2 8		05

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
			YES NO	YES NO	M F	IN YEARS	YES NO	LEVEL GRADE	YES NO	YES NO DK	YES NO DK		YES NO DK		
06			1 2	1 2	1 2		1 2		1 2	1 2 8	1 2 8		1 2 8		06
07			1 2	1 2	1 2		1 2		1 2	1 2 8	1 2 8		1 2 8		07
08			1 2	1 2	1 2		1 2		1 2	1 2 8	1 2 8		1 2 8		08
09			1 2	1 2	1 2		1 2		1 2	1 2 8	1 2 8		1 2 8		09
10			1 2	1 2	1 2		1 2		1 2	1 2 8	1 2 8		1 2 8		10
11			1 2	1 2	1 2		1 2		1 2	1 2 8	1 2 8		1 2 8		11
12			1 2	1 2	1 2		1 2		1 2	1 2 8	1 2 8		1 2 8		12

TICK HERE IF CONTINUATION SHEET USED ☐

Just to make sure that I have a complete listing:

1) Are there any other persons such as small children or infants that we have not listed? YES ☐ → ENTER EACH IN TABLE NO ☐

2) In addition, are there any other people who may not be members of your family (lodgers or friends) who usually live here? YES ☐ → ENTER EACH IN TABLE NO ☐

3) Are there any guests or temporary visitors staying here, or anyone else who slept here last night that have not been listed? YES ☐ → ENTER EACH IN TABLE NO ☐

* CODES FOR Q.3
RELATIONASHIP TO HEAD OF HOUSEHOLD:

01 . HEAD
02 . WIFE OR HUSBAND
03 . SON OR DAUGHTER
04 . SON-IN-LAW OR DAUGHTER-IN-LAW
05 . GRANDCHILD
06 . PARENT
07 . PARENT-IN-LAW
08 . BROTHER OR SISTER
09 . CO-WIFE
10 . OTHER RELATIVE
11 . ADOPTED/FOSTER/STEP CHILD
12 . NOT RELATED
98 . DK

** CODES FOR Q.9
LEVEL OF EDUCATION:

1 . PRIMARY AND SECONDARY
2 . SECONDARY SPECIAL
3 . HIGHER
8 . DK

GRADE
00 . LESS THAN 1 YEAR COMPLETED
98 . DK

*** THESE QUESTIONS REFER TO THE BIOLOGICAL PARENTS OF THE CHILD. RECORD 00 IF PARENT NOT MEMBER OF HOUSEHOLD.

No	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
17	What is the main source of drinking water for members of your household?	PIPED WATER PIPED INTO RESIDENCE/YARD/PLOT ..... 11 → 19 PUBLIC TAP ..... 12 WELL WATER WELL IN RESIDENCE/YARD/PLOT ..... 21 → 19 PUBLIC WELL ..... 22 SURFACE WATER SPRING WATER ..... 31 *RIVER/STREAM* ..... 32 POND/LAKE ..... 33 DAM ..... 34 *RAINWATER* ..... 41 → 19 TANKER TRUCK ..... 51 BOTTLED WATER ..... 61 → 19 OTHER _____ 96 (SPECIFY)	
18	How long does it take to go there, get water, and come back?	*MINUTES* ..... ☐☐☐ ON PREMISES 996	
19	What kind of toilet facility does your household have?	FLUSH TOILET OWN FLUSH TOILET ..... 11 SHARED FLUSH TOILET ..... 12 PIT TOILET/LATRINE TRADITIONAL TYPE ..... 21 IMPROVED - VENTILATED ..... 22 NO FACILITY (BUSH/FIELD) ..... 31 OTHER _____ 96 (SPECIFY)	
20	Does your household have: Electricity? A radio? A television? A telephone? A refrigerator	YES NO ELECTRICITY ..... 1 2 RADIO ..... 1 2 TELEVISION ..... 1 2 TELEPHONE ..... 1 2 REFRIGERATOR 1 2	
21	How many rooms in your household are used for sleeping?	ROOMS ..... ☐☐	
22	MAIN MATERIAL OF THE FLOOR RECORD OBSERVATION	NATURAL FLOOR EARTH/SAND ..... 11 *TEZEK* ..... 12 RUDIMENTARY FLOOR WOOD PLANKS ..... 21 STRAW/SAWDUST ..... 22 FINISHED FLOOR PARQUET OR POLISHED WOOD ..... 31 LINOLEUM OR ASPHALT ..... 32 CERAMIC TILES ..... 33 *CEMENT* ..... 34 CARPET ..... 35 OTHER _____ 96 (SPECIFY)	
23	Does any member of your household own A bicycle? A motorcycle? A car?	YES NO BICYCLE ..... 1 2 MOTORCYCLE ..... 1 2 CAR 1 2	
24	What type of salt is usually used for cooking in your household? (ASK TO SEE SALT PACKAGE).	*LOCAL SALT* ..... 01 PACKAGED SALT (IODIZED) ..... 02 PACKAGED SALT (NOT IODIZED) ..... 03 *OTHER* _____ 96 (SPECIFY)	

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

INDIVIDUAL WOMAN'S QUESTIONNAIRE

REPUBLIC OF UZBEKISTAN
INSTITUTE OF OBSTETRICS AND GYNECOLOGY MINISTRY OF HEALTH

IDENTIFICATION

CITY/TOWN/VILLAGE NAME _____
NAME OF HOUSEHOLD HEAD _____
REGION . . . . . .
OBLAST . . . . . .
RAION . . . . . .
CLUSTER NUMBER . . . . . .
URBAN/RURAL (urban = 1; rural = 2) . . . . . .
LARGE CITY/SMALL CITY/TOWN/COUNTRYSIDE . . . . . .
(large city = 1, small city = 2, town = 3, countryside = 4)
HOUSEHOLD NUMBER . . . . . .
NAME AND LINE NUMBER OF WOMAN _____

INTERVIEWER VISIT

	1	2	3	FINAL VISIT
DATE				DAY / MONTH / YEAR
INTERVIEWER'S NAME				NAME
RESULT*				RESULT
NEXT VISIT: DATE				TOTAL NO. VISITS
TIME				

*RESULT CODES:

1 COMPLETED
2 NOT AT HOME
3 POSTPONED
4 REFUSED
5 PARTLY COMPLETED
6 INCAPACITATED
7 OTHER _____ (SPECIFY)

	UZBEK	RUSSIAN
1. LANGUAGE OF INTERVIEW	1	2
2. NATIVE LANGUAGE OF RESPONDENT	1	2
	YES	NO
3. WHETHER TRANSLATOR USED	1	2

SUPERVISOR	FIELD EDITOR	OFFICE EDITOR	KEYED BY
NAME _____	NAME _____		
DATE _____	DATE _____		

Section 1. RESPONDENT'S BACKGROUND

No.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
101	RECORD THE TIME	HOUR ☐☐ MINUTES ☐☐	
102	First I would like to ask some questions about you and your household. For most of the time until you were 12 years old, did you live in a city, in a town, or in a countryside?	CITY 1 TOWN 2 COUNTRYSIDE 3	
103	How long have you been living continuously in (NAME OF CURRENT PLACE OF RESIDENCE)?	YEARS ☐☐ VISITOR 95 ALWAYS 96 → 105	
104	Just before you moved here, did you live in a city, in a town, or in the countryside?	CITY 1 TOWN 2 COUNTRYSIDE 3	
105	In what month and year were you born?	MONTH ☐☐ DON'T KNOW MONTH 98 YEAR ☐☐ DON'T KNOW YEAR 98	
106	How old were you at your last birthday?	AGE IN COMPLETED YEARS ☐☐	
107	Have you ever attended school?	YES 1 NO 2 → 114	

108	What is the highest level of school you attended: primary, secondary, secondary-special, or high	PRIMARY/SECONDARY . . . 1 → 109 SECONDARY SPECIAL . . . 2 HIGHER . . . 3
108A	What did you study?	_____ (NAME OF SPECIALITY))
109	How many years/classes/courses did you completed at that level?	
110	CHECK 106: 34 OR BELOW ☐	35 OR ABOVE ☐ → 114
111	Are you currently attending school?	YES . . . 1 → 114 NO . . . 2
112	What was the main reason you stopped attending school?	GOT PREGNANT . . . 01 GOT MARRIED . . . 02 TO CARE FOR YOUNGER CHILDREN . . . 03 FAMILY NEEDED HELP AT WORK . . . 04 NEEDED TO EARN MONEY . . . 05 HAD ENOUGH SCHOOLING . . . 06 DID NOT PASS ENTRANCE EXAMS . . . 07 DID NOT LIKE SCHOOL . . . 08 SCHOOL IS TOO FAR . . . 09 OTHER _____ (SPECIFY) . . . 96 DON'T KNOW . . . 98
114	Can you read or understand a letter or newspaper easily, with dificulty, or not at all?	EASILY . . . 1 WITH DIFFICULTY . . . 2 NOT AT ALL . . . 3 → 116

No.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
115	Do you usually read a newspaper or magazine at least once a week?	YES . . . 1 NO . . . 2	
116	Do you usually listen to the radio every day?	YES . . . 1 NO . . . 2	
117	Do you usually watch television at least once a week?	YES . . . 1 NO . . . 2	
118	What is your religion: Are you Muslim, Christian, another religion or do you not practice any religion?	MUSLIM . . . 1 CHRISTIAN . . . 2 OTHER 6 _____ (SPECIFY) NOT RELIGIOUS . . . 7 DON'T KNOW . . . 8	
119	What is your nationality? Are you Uzbek? Russian? Kazakh? Tadzhik? Korean? Other?	UZBEK . . . 1 RUSSIAN . . . 2 KAZAKH . . . 3 TADZHIK . . . 4 KOREAN . . . 5 OTHER _____ 6 (SPECIFY) DON'T KNOW . . . 8	
119A	What language is easiest for you to read: Only Uzbek? Uzbek more than Russian? Both equally? Russian more than Uzbek? Only Russian? Other language?	ONLY UZBEK . . . 1 MORE UZBEK THAN RUSSIAN . . . 2 SAME UZBEK AND RUSSIAN . . . 3 MORE RUSSIAN THAN UZBEK . . . 4 ONLY RUSSIAN . . . 5 OTHER _____ 6 (SPECIFY)	

119B	What language do you usually speak at home: Only Uzbek? Uzbek more than Russian? Both equally? Russian more than Uzbek? Only Russian? Other language?	ONLY UZBEK . . . . . 1 MORE UZBEK THAN RUSSIAN . . . . . 2 SAME UZBEK AND RUSSIAN . . . . . 3 MORE RUSSIAN THAN UZBEK . . . . . 4 ONLY RUSSIAN . . . . . 5 OTHER _____ (SPECIFY) 6
119C	Do you own dacha, or do you have access to a garden from which you obtain fruits and vegetables during the growing seasons?	YES . . . . . 1 NO . . . . . 2 OTHER _____ (SPECIFY) 6
119D	Do you have any chronic diseases?	YES . . . . . 1 NO . . . . . 2 → 120
119E	What kind of disease do you have?	_____ (NAME OF DISEASE) [ ][ ]
120	CHECK INTERVIEWER'S ASSIGNMENT SHEET THE WOMAN INTERVIEWED IS NOT A USUAL RESIDENT [ ] THE WOMAN INTERVIEWED IS A USUAL RESIDENT [ ] → 201	
121	Now I would like to ask about the place in which you usually live. What is the name of the place in which you usually live? _____ (NAME OF PLACE) Is that a city, town, or the countryside?	CAPITAL CITY, LARGE CITY . . . . . 1 SMALL CITY . . . . . 2 TOWN . . . . . 3 COUNTRYSIDE 4

No.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
122	*In which oblast is that located?*	OBLAST: KHOREZMSKAYA . . . . . 01 NAVOIYISKAYA . . . . . 02 BUKHARSKAYA . . . . . 03 KASHKADAINSKAYA . . . . . 04 SURKHANDARINSKAYA . . . . . 05 SAMARKANDSKAYA . . . . . 06 DZHIZAKSKAYA . . . . . 07 SYRDARINSKAYA . . . . . 08 TASHKENTSKAYA . . . . . 09 NAMANGANSKAYA . . . . . 10 FERGANSKAYA . . . . . 11 ANDIZHANSKAYA . . . . . 12 *THE CITY OF TASHKENT* . . . . . 13 OTHER _____ 96 *SPECIFY*	
123	Now I would like to ask about the household in which you usually live. *What is the main source of drinking water for members of your household?*	PIPED WATER *PIPED INTO RESIDENCE/YARD/PLOT* . . . . 11 → 125 PUBLIC TAP . . . . . 12 WELL WATER WELL IN RESIDENCE/YARD/PLOT . . . . . 21 → 125 *PUBLIC WELL* . . . . . 22 SURFACE WATER SPRING WATER . . . . . 31 RIVER/STREAM . . . . . 32 POND/LAKE . . . . . 33 DAM . . . . . 34 RAINWATER . . . . . 41 → 125 TANKER TRUCK . . . . . 51 BOTTLED WATER . . . . . 61 → 125 OTHER _____ 96 (SPECIFY)	

124	How long does it take to go there, get water, and come back?	MINUTES ☐☐☐ ON PREMISES 996	
125	What kind of toilet facility does your household have?	FLUSH TOILET OWN FLUSH TOILET 11 SHARED FLUSH TOILET 12 PIT TOILET/LATRINE TRADITIONAL TYPE 21 IMPROVED - VENTILATED 22 NO FACILITY (BUSH/FIELD) 31 OTHER 96 (SPECIFY)	
126	Does your household have: Electricity? A radio? A television? A telephone? A refrigerator	ELECTRICITY YES 1 NO 2 RADIO YES 1 NO 2 TELEVISION YES 1 NO 2 TELEPHONE YES 1 NO 2 REFRIGERATOR YES 1 NO 2	
127	Could you describe the main material of the floor of your home?	NATURAL FLOOR EARTH/SAND 11 TEZEK 12 RUDIMENTARY FLOOR WOOD PLANKS 21 STRAW/SAWDUST 22 FINISHED FLOOR PARQUET OR POLISHED WOOD 31 LINOLEUM OR ASPHALT 32 CERAMIC TILES 33 CEMENT 34 CARPET 35 OTHER 96 (SPECIFY)	
128	Does any member of your household own A bicycle? A motorcycle? A car?	BICYCLE YES 1 NO 2 MOTORCYCLE YES 1 NO 2 CAR YES 1 NO 2	

Section 2. PREGNANCY HISTORY

No.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
201	Now I would like to ask you about all the births you have had during your life. Have you ever given birth?	YES . . . . . 1 NO 2	→ 206
202	Do you have any sons or daughters to whom you have given birth who are now living with you?	YES . . . . . 1 NO 2	→ 204
203	How many sons live with you? And how many daughters live with you? IF NONE, RECORD '00'	SONS AT HOME . . . . . [ ][ ] DAUGHTERS AT HOME . . . . . [ ][ ]	
204	Do you have any sons or daughters to whom you have given birth who are alive but do not live with you?	YES . . . . . 1 NO 2	→ 206
205	How many sons are alive but do not live with you? And how many daughters are alive but do not live with you? IF NONE, RECORD '00'	SONS ELSEWHERE . . . . . [ ][ ] DAUGHTERS ELSEWHERE . . . . . [ ][ ]	
206	Have you ever given birth to a boy or a girl who was born alive but later died? IF NO, PROBE: Any baby who cried or showed signs of life but survived only a few hours or days?	YES . . . . . 1 NO 2	→ 208

207	How many boys have died? How many girls have died?	BOYS DEAD ..... [ ][ ] GIRLS DEAD ..... [ ][ ]
208	SUM ANSWERS TO 203, 205, 207, AND ENTER TOTAL IF NONE, RECORD '00'	TOTAL BIRTHS ..... [ ][ ]
209	Women sometime have pregnancies which do not result in a live born child. That is, a pregnancy can ended very early by a mini abortion or by an induced abortion, a miscarriage or a stillbirth. In total how many mini abortions, and induced abortions have you had?	TOTAL ABORTIONS ..... [ ][ ]
210	How many miscarriages?	TOTAL MISCARRIAGES ..... [ ][ ]
211	How many stillbirths?	TOTAL STILLBIRTHS ..... [ ][ ]
212	SUM ANSWERS TO 208, 209, 210, 211, AND ENTER TOTAL. IF NO PREGNANCIES, RECORD '00'	TOTAL PREGNANCIES ..... [ ][ ]
213	CHECK 212 ONE OR MORE PREGNANCY [ ] ↓ NO PREGNANCIES [ ] → 227	

214 Now I want to talk to you about each of your pregnacies, including those which ended in a live birth, an induced abortion, a miscarriage, and a stillbirth. Starting with your last pregnancy, *please tell me the following information*

215	216	217	218	219	220	221	222	223	224
When did your (last/next-to-last/ etc.) pregnancy end? In what *month and year?*	Did this pregnancy end in a live birth, an induced abortion, a *miscarriage*, or a stillbirth?	FROM YEAR OF LAST/NEXT-TO-THE LAST, ETC PREGNANCY SUBTRACT YEAR OF PREVIOUS PREGNANCY IS THE DIFFERENCE 4 OR MORE? TRY TO DETERMINE IF THERE WAS ANOTHER PREGNANCY BETWEEN THIS AND PREVIOUS PREGNANCY	CHECK 216 RECORD SAME RESPONSE	Was this a single or a multiple *birth*?	What name was given to this *child*?	Is (NAME) a boy or girl?	Is (NAME) still alive?	*How old was* (NAME) on his/ her last birthday? RECORD AGE IN *COMPLETED YEARS*	*How old was* (NAME) when he/she died? IF '1 YR.', PROBE: *How many months old* was (NAME)? RECORD DAYS IF LESS THAN 1 MONTH; MONTHS IF LESS THAN TWO YEARS, OR YEARS.
01 MONTH ☐☐ YEAR ☐☐	LIVE BIRTH 1 INDUCED ABORTION 2 *MISCARRIAGE* 3 STILLBIRTH 4	YES 1 NO 2	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4 NEXT PREGNANCY ←	SING 1 MULT 2	NAME _____	BOY 1 GIRL 2	YES 1 NO 2 → 224	AGE IN YEARS ☐☐ → 218	DAYS 1 MONTHS 2 YEARS 3 ☐☐
02 MONTH ☐☐ YEAR ☐☐	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4	YES 1 NO 2	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4 NEXT PREGNANCY ←	SING 1 MULT 2	NAME _____	BOY 1 GIRL 2	YES 1 NO 2 → 224	AGE IN YEARS ☐☐ → 218	DAYS 1 MONTHS 2 YEARS 3 ☐☐
03 MONTH ☐☐ YEAR ☐☐	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4	YES 1 NO 2	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4 NEXT PREGNANCY ←	SING 1 MULT 2	NAME _____	BOY 1 GIRL 2	YES 1 NO 2 → 224	AGE IN YEARS ☐☐ → 218	DAYS 1 MONTHS 2 YEARS 3 ☐☐
04 MONTH ☐☐ YEAR ☐☐	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4	YES 1 NO 2	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4 NEXT PREGNANCY ←	SING 1 MULT 2	NAME _____	BOY 1 GIRL 2	YES 1 NO 2 → 224	AGE IN YEARS ☐☐ → 218	DAYS 1 MONTHS 2 YEARS 3 ☐☐

05 MONTH YEAR	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4	YES 1 NO 2	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4 NEXT PREGNANCY	SING 1 MULT 2	NAME	BOY 1 GIRL 2	YES 1 NO 2 → 224	AGE IN YEARS 218	DAYS 1 MONTHS 2 YEARS 3
06 MONTH YEAR	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4	YES 1 NO 2	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4 NEXT PREGNANCY	SING 1 MULT 2	NAME	BOY 1 GIRL 2	YES 1 NO 2 → 224	AGE IN YEARS 218	DAYS 1 MONTHS 2 YEARS 3
07 MONTH YEAR	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4	YES 1 NO 2	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4 NEXT PREGNANCY	SING 1 MULT 2	NAME	BOY 1 GIRL 2	YES 1 NO 2 → 224	AGE IN YEARS 218	DAYS 1 MONTHS 2 YEARS 3
08 MONTH YEAR	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4	YES 1 NO 2	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4 NEXT PREGNANCY	SING 1 MULT 2	NAME	BOY 1 GIRL 2	YES 1 NO 2 → 224	AGE IN YEARS 218	DAYS 1 MONTHS 2 YEARS 3

09 MONTH / YEAR	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4	YES 1 NO 2	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4 NEXT PREGNANCY	SING 1 MULT 2	NAME	BOY 1 GIRL 2	YES 1 NO 2 → 224	AGE IN YEARS → 218	DAYS 1 MONTHS 2 YEARS 3
10 MONTH / YEAR	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4	YES 1 NO 2	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4 NEXT PREGNANCY	SING 1 MULT 2	NAME	BOY 1 GIRL 2	YES 1 NO 2 → 224	AGE IN YEARS → 218	DAYS 1 MONTHS 2 YEARS 3
11 MONTH / YEAR	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4	YES 1 NO 2	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4 NEXT PREGNANCY	SING 1 MULT 2	NAME	BOY 1 GIRL 2	YES 1 NO 2 → 224	AGE IN YEARS → 218	DAYS 1 MONTHS 2 YEARS 3
12 MONTH / YEAR	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4	YES 1 NO 2	LIVE BIRTH 1 INDUCED ABORTION 2 MISCARRIAGE 3 STILLBIRTH 4 NEXT PREGNANCY	SING 1 MULT 2	NAME	BOY 1 GIRL 2	YES 1 NO 2 → 224	AGE IN YEARS → 218	DAYS 1 MONTHS 2 YEARS 3

13 MONTH... YEAR....	LIVE BIRTH . . . . . 1 INDUCED ABORTION . 2 MISCARRIAGE . . . . . 3 STILLBIRTH 4	YES . . . . . 1 NO 2	LIVE BIRTH . . . . . 1 INDUCED ABORTION . 2 MISCARRIAGE . . . . . 3 STILLBIRTH . . . . . 4 NEXT PREGNANCY	SING . . . . . 1 MULT 2	NAME	BOY . . . . . 1 GIRL 2	YES . . . . . 1 NO . . . . . 2 → 224	AGE IN YEARS 218	DAYS . . . . . 1 MONTHS . . . . . 2 YEARS 3
14 MONTH... YEAR....	LIVE BIRTH . . . . . 1 INDUCED ABORTION . 2 MISCARRIAGE . . . . . 3 STILLBIRTH 4	YES . . . . . 1 NO 2	LIVE BIRTH . . . . . 1 INDUCED ABORTION . 2 MISCARRIAGE . . . . . 3 STILLBIRTH . . . . . 4 NEXT PREGNANCY	SING . . . . . 1 MULT 2	NAME	BOY . . . . . 1 GIRL 2	YES . . . . . 1 NO . . . . . 2 → 224	AGE IN YEARS 218	DAYS . . . . . 1 MONTHS . . . . . 2 YEARS 3
15 MONTH... YEAR....	LIVE BIRTH . . . . . 1 INDUCED ABORTION . 2 MISCARRIAGE . . . . . 3 STILLBIRTH 4	YES . . . . . 1 NO 2	LIVE BIRTH . . . . . 1 INDUCED ABORTION . 2 MISCARRIAGE . . . . . 3 STILLBIRTH . . . . . 4 NEXT PREGNANCY	SING . . . . . 1 MULT 2	NAME	BOY . . . . . 1 GIRL 2	YES . . . . . 1 NO . . . . . 2 → 224	AGE IN YEARS 218	DAYS . . . . . 1 MONTHS . . . . . 2 YEARS 3
16 MONTH... YEAR....	LIVE BIRTH . . . . . 1 INDUCED ABORTION . 2 MISCARRIAGE . . . . . 3 STILLBIRTH 4	YES . . . . . 1 NO 2	LIVE BIRTH . . . . . 1 INDUCED ABORTION . 2 MISCARRIAGE . . . . . 3 STILLBIRTH . . . . . 4 NEXT PREGNANCY	SING . . . . . 1 MULT 2	NAME	BOY . . . . . 1 GIRL 2	YES . . . . . 1 NO . . . . . 2 → 224	AGE IN YEARS 218	DAYS . . . . . 1 MONTHS . . . . . 2 YEARS 3

225 CAMPARE 212 WITH TOTAL PREGNANCIES IN PREGNANCY HISTORY IN QUESTION 215:

NUMBERS ARE THE SAME ☐ → CHECK: Q215 FOR EACH PREGNANCY: YEAR OF PREGNANCY ENDED IS RECORDED.

Q223 FOR EACH LIVING CHILD: CURRENT AGE IS RECORDED.

Q224 FOR AGE AT DEATH 12 MONTHS OR 1 YEAR: PROBE TO DETERMINE EXACT NUMBER OF MONTHS. ☐☐☐

NUMBERS ARE DIFFERENT ☐ → (PROBE AND RECONCILE)

226 CHECK 215 AND ENTER THE NUMBER OF PREGNANCIES ENDED SINCE JANUARY 1993. IF NONE, RECORD '0'. ☐

No	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
227	Are you pregnant now?	YES . . . 1 NO . . . 2 UNSURE . . . 8 → 229A	
228	How many months pregnant are you? RECORD NUMBER OF COMPLETED MONTHS	MONTHS . . . ☐☐	
229	At the time you became pregnant, did you want to become pregnant then, did you want to wait until later, or did you not want to become pregnant at all?	THEN . . . 1 LATER . . . 2 NOT AT ALL . . . 3	
229A	At what age did you have your first menstrual period?	MONTHS . . . ☐☐ NEVER MENSTRUATED . . . 96 → 231 DON'T KNOW . . . 98	
230	When did your last menstrual period start? _____ (DATE, IF GIVEN)	DAYS AGO . . . 1 ☐☐ WEEKS AGO . . . 2 ☐☐ MONTHS AGO . . . 3 ☐☐ YEARS AGO . . . 4 ☐☐ IN MENOPAUSE . . . 994 BEFORE LAST BIRTH . . . 995 NEVER MENSTRUATED . . . 996	
230 A	For how many days your menstrual cycle lasts?	DAYS . . . ☐☐	
230B	Is the time between your menstrual cycle regularor irregular?	REGULAR . . . 1 IRREGULAR . . . 2	

230 C	For how many days your menstruations usually last?	DAYS ..... ☐☐	
230D	Are your menstrual flows usually light, heavy or normal?	LIGHT ..... 1 NORMAL ..... 2 HEAVY 3	
230E	Do your menstruations usually occur without any pain, with little pain, or very painful?	WITHOUT PAIN ..... 1 WITH LITTLE PAIN ..... 2 VERY PAINFUL 3	
231	Between the first day of a woman's period and the first day of her next period, are there certain times when she has a greater chance of becoming pregnant then other times?	YES ..... 1 NO ..... 2 DON'T KNOW ..... 8 → 301	
232	During which times of the monthly cycle does a woman have the greatest chance of becoming pregnant?	DURING HER PERIOD ..... 01 RIGHT AFTER HER PERIOD HAS ENDED ... 02 IN THE MIDDLE OF THE CYCLE ..... 03 JUST BEFORE HER PERIOD BEGINS ..... 04 OTHER _____ (SPECIFY) 96 DON'T KNOW 98	

Section 3. OUTCOME OF PREGNANCIES

301 CHECK 226

ONE OR MORE PREGNANCY SINCE JANUARY 1993 ☐ → (CONTINUE)

NO PREGNANCY SINCE JANUARY 1993 ☐ → (SKIP TO 458)

302 *ENTER THE LINE NUMBER FOR EACH PREGNANCY ENDED SINCE JANUARY 1994 IN THE TABLE. (IF THERE ARE MORE THAN FOUR PREGNANCIES, USE ADDITIONAL QUESTIONNAIRE)*

Now I would like to ask you some questions about the pregnancies you have had in the last three years.

		LAST PREGNANCY	*NEXT-TO-THE-LAST PREGNANCY*	NEXT-TO-NEXT-TO THE LAST PREGN.	NEXT-TO-NEXT-TO-NEXT-TO THE LAST PREG.
303	LINE NUMBER FROM Q. 215	LINE NUMBER ☐☐	LINE NUMBER ☐☐	*LINE NUMBER* ☐☐	LINE NUMBER ☐☐
304	SEE Q. 216 AND 220: OUTCOME OF PREGNANCY OR THE NAME OF CHILD.	OUTCOME OR NAME	OUTCOME OR NAME	OUTCOME OR NAME	OUTCOME OR NAME
304A	When during your pregnancy did you learn that you are pregnant?	DAYS 1 ☐☐ WEEKS 2 ☐☐ *MONTHS* 3 ☐☐ DON'T KNOW 998	DAYS 1 ☐☐ *WEEKS* 2 ☐☐ MONTHS 3 ☐☐ DON'T KNOW 998	*DAYS* 1 ☐☐ WEEKS 2 ☐☐ MONTHS 3 ☐☐ DON'T KNOW 998	DAYS 1 ☐☐ WEEKS 2 ☐☐ MONTHS 3 ☐☐ DON'T KNOW 998
305	At the time you became pregnant (with NAME), did you want to become *pregnant then*, did you want to wait until later, or did you want no (more) childrenmat all?	*THEN* (SKIP TO 306A) 1 ☐ LATER 2 NO MORE (SKIP TO 306A) 3 ☐	*THEN* (SKIP TO 306A) 1 ☐ LATER 2 NO MORE (SKIP TO 306A) 3 ☐	*THEN* (SKIP TO 306A) 1 ☐ LATER 2 NO MORE (SKIP TO 306A) 3 ☐	*THEN* (SKIP TO 306A) 1 ☐ LATER 2 NO MORE (SKIP TO 306A) 3 ☐
305A	How much longer would you like to have waited?	MONTHS 1 ☐☐ YEARS 2 ☐☐ DON'T KNOW 998	MONTHS 1 ☐☐ YEARS 2 ☐☐ DON'T KNOW 998	MONTHS 1 ☐☐ YEARS 2 ☐☐ *DON'T KNOW* 998	MONTHS 1 ☐☐ YEARS 2 ☐☐ DON'T KNOW 998
306	At the time you became pregnant, were you using a method of contraception? Which method?	YES 1 NO 2 ☐☐	YES 1 NO 2 ☐☐	YES 1 NO 2 ☐☐	YES 1 NO 2 ☐☐
306A	CHECK 304: OUTCOME OF PREGNANCY	*INDUCED ABORTION* ☐ → 315A MISCARRIAGE ☐ → 325 STILLBIRTH ☐ LIVE BIRTH ☐	INDUCED ABORTION ☐ → 315A MISCARRIAGE ☐ → 325 STILLBIRTH ☐ LIVE BIRTH ☐	INDUCED ABORTION ☐ → 315A MISCARRIAGE ☐ → 325 STILLBIRTH ☐ LIVE BIRTH ☐	INDUCED ABORTION ☐ → 315A MISCARRIAGE ☐ → 325 STILLBIRTH ☐ LIVE BIRTH ☐

307	When you were pregnant (with NAME), did you see anyone for antenatal care for this pregnancy? IF YES: Whom did you see? Anyone else? PROBE FOR THE TYPE OF PERSONS PROVIDED ANTENATAL CARE	HEALTH PROFESSIONAL DOCTOR . . . . A NURSE/MIDWIFE . . . . B NONMEDICAL PERSONS TRADITIONAL BIRTH . . . . C REALTIVE/FRIEND . . . . D OTHER ________ X (SPECIFY) NO ONE . . . . Y (SKIP TO 312) ←	HEALTH PROFESSIONAL DOCTOR . . . . A NURSE/MIDWIFE . . . . B NONMEDICAL PERSONS TRADITIONAL BIRTH . . . . C REALTIVE/FRIEND . . . . D OTHER ________ X (SPECIFY) NO ONE . . . . Y (SKIP TO 312) ←	HEALTH PROFESSIONAL DOCTOR . . . . A NURSE/MIDWIFE . . . . B NONMEDICAL PERSONS TRADITIONAL BIRTH . . . . C REALTIVE/FRIEND . . . . D OTHER ________ X (SPECIFY) NO ONE . . . . Y (SKIP TO 312) ←	HEALTH PROFESSIONAL DOCTOR . . . . A NURSE/MIDWIFE . . . . B NONMEDICAL PERSONS TRADITIONAL BIRTH . . . . C REALTIVE/FRIEND . . . . D OTHER ________ X (SPECIFY) NO ONE . . . . Y (SKIP TO 312) ←
308	How many months pregnant were you when you first received antenatal care?	MONTHS . . . . [ ][ ] DON'T KNOW 98	MONTHS . . . . [ ][ ] DON'T KNOW 98	MONTHS . . . . [ ][ ] DON'T KNOW 98	MONTHS . . . . [ ][ ] DON'T KNOW 98
309	How many times did you receive antenatal care during this pregnancy?	NUMBER . . . . [ ][ ] DON'T KNOW 98	NUMBER . . . . [ ][ ] DON'T KNOW 98	NUMBER . . . . [ ][ ] DON'T KNOW 98	NUMBER . . . . [ ][ ] DON'T KNOW 98
312	Where did the (birth of NAME)/ pregnancy termination) take place?	HOME RESPONDENT'S HOME . . . . 11 OTHER HOME . . . . 12 IN THE HEALTH FACILITY OBGYN HOSPITAL . . . . 21 HOSPITAL . . . . 22 DOCTOR'S ASSISTANT/MIDWIFE POST (FAP) . . . . 23 OTHER HEALTH FACILITY ________ 26 (SPECIFY) OTHER ________ 96 (SPECIFY)	HOME RESPONDENT'S HOME . . . . 11 OTHER HOME . . . . 12 IN THE HEALTH FACILITY OBGYN HOSPITAL . . . . 21 HOSPITAL . . . . 22 DOCTOR'S ASSISTANT/MIDWIFE POST (FAP) . . . . 23 OTHER HEALTH FACILITY ________ 26 (SPECIFY) OTHER ________ 96 (SPECIFY)	HOME RESPONDENT'S HOME . . . . 11 OTHER HOME . . . . 12 IN THE HEALTH FACILITY OBGYN HOSPITAL . . . . 21 HOSPITAL . . . . 22 DOCTOR'S ASSISTANT/MIDWIFE POST (FAP) . . . . 23 OTHER HEALTH FACILITY ________ 26 (SPECIFY) OTHER ________ 96 (SPECIFY)	HOME RESPONDENT'S HOME . . . . 11 OTHER HOME . . . . 12 IN THE HEALTH FACILITY OBGYN HOSPITAL . . . . 21 HOSPITAL . . . . 22 DOCTOR'S ASSISTANT/MIDWIFE POST (FAP) . . . . 23 OTHER HEALTH FACILITY ________ 26 (SPECIFY) OTHER ________ 96 (SPECIFY)

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		LAST PREGNANCY OUTCOME OR NAME __________	NEXT-TO-THE-LAST PREGNANCY OUTCOME OR NAME __________	NEXT-TO-NEXT-TO THE LAST PREGN. OUTCOME OR NAME __________	NEXT-TO-NEXT-TO-NEXT-TO LAST PREG. OUTCOME OR NAME __________
313	Who assisted with the (delivery of (NAME)/ pregnancy termination? Anyone else?	HEALTH PROFESSIONAL DOCTOR . . . . . . A NURSE/MIDWIFE . . . . . . B NON MEDICAL PERSON TRADITIONAL MIDWIFE . . . . . . C RELATIVE/FRIEND . . . . . . D OTHER PERSON_____ X (SPECIFY) NO ONE . . . . . . Y	HEALTH PROFESSIONAL DOCTOR . . . . . . A NURSE/MIDWIFE . . . . . . B NON MEDICAL PERSON TRADITIONAL MIDWIFE . . . . . . C RELATIVE/FRIEND . . . . . . D OTHER PERSON_____ X (SPECIFY) NO ONE . . . . . . Y	HEALTH PROFESSIONAL DOCTOR . . . . . . A NURSE/MIDWIFE . . . . . . B NON MEDICAL PERSON TRADITIONAL MIDWIFE . . . . . . C RELATIVE/FRIEND . . . . . . D OTHER PERSON_____ X (SPECIFY) NO ONE . . . . . . Y	HEALTH PROFESSIONAL DOCTOR . . . . . . A NURSE/MIDWIFE . . . . . . B NON MEDICAL PERSON TRADITIONAL MIDWIFE . . . . . . C RELATIVE/FRIEND . . . . . . D OTHER PERSON_____ X (SPECIFY) NO ONE . . . . . . Y
314	At the time of the (birth of (NAME)/ ending of the pregnancy), did *you have* any of the following problems:	YES NO	YES NO	YES NO	YES NO
	Long labor, that is, did your regular contractions last more than 18 hours?	LONG LABOR 1 2	LONG LABOR 1 2	LONG LABOR 1 2	LONG LABOR 1 2
	Excessive bleeding that was so much that *you feared* it was life threatening?	BLEEDING 1 2	BLEEDING 1 2	BLEEDING 1 2	BLEEDING 1 2
	A high fever with bad smelling vaginal discharge?	FEVER/BAD SMELLING 1 2	FEVER/BAD SMELLING 1 2	FEVER/BAD SMELLING 1 2	FEVER/BAD SMELLING 1 2
	Convulsions not caused by fever?	CONVULSIONS 1 2	CONVULSIONS 1 2	CONVULSIONS 1 2	CONVULSIONS 1 2
	Early rupture of amniotic fluid sac?	EARLY RUPTURE OF AMNIOTIC FLUID SAC 1 2	EARLY RUPTURE OF AMNIOTIC FLUID SAC 1 2	EARLY RUPTURE OF AMNIOTIC FLUID SAC 1 2	EARLY RUPTURE OF AMNIOTIC FLUID SAC 1 2

315	Was the (birth of (NAME)/pregnancy termination) by caesarian section?	YES .... 1 NO .... 2 → 325	YES .... 1 NO .... 2 → 325	YES .... 1 NO .... 2 → 325	YES .... 1 NO .... 2 → 325
315A	How did you determine you were pregnant?	SAW A DOCTOR .... 1 CONDUCTED SELF PREGN TEST ... 2 DECIDED MYSELF BECAUSE OF MISSED PERIOD ...... 3 OTHER ______ 6 (SPECIFY)	SAW A DOCTOR .... 1 CONDUCTED SELF PREGN TEST ... 2 DECIDED MYSELF BECAUSE OF MISSED PERIOD ...... 3 OTHER ______ 6 (SPECIFY)	SAW A DOCTOR .... 1 CONDUCTED SELF PREGN TEST ... 2 DECIDED MYSELF BECAUSE OF MISSED PERIOD ...... 3 OTHER ______ 6 (SPECIFY)	SAW A DOCTOR .... 1 CONDUCTED SELF PREGN TEST ... 2 DECIDED MYSELF BECAUSE OF MISSED PERIOD ...... 3 OTHER ______ 6 (SPECIFY)
315B	Who suggested you to do abortion?	HEALTH PREFESSIONAL .... 1 HUSBAND .... 2 MOTHER/MOTHER-IN-LAW ...... 3 FRIENDS/RELATIVES .... 4 DECIDED HERSELF .... 5 OTHER ______ 6 (SPECIFY) DON'T KNOW 8	HEALTH PREFESSIONAL .... 1 HUSBAND .... 2 MOTHER/MOTHER-IN-LAW ...... 3 FRIENDS/RELATIVES .... 4 DECIDED HERSELF .... 5 OTHER ______ 6 (SPECIFY) DON'T KNOW 8	HEALTH PREFESSIONAL .... 1 HUSBAND .... 2 MOTHER/MOTHER-IN-LAW ...... 3 FRIENDS/RELATIVES .... 4 DECIDED HERSELF .... 5 OTHER ______ 6 (SPECIFY) DON'T KNOW 8	HEALTH PREFESSIONAL .... 1 HUSBAND .... 2 MOTHER/MOTHER-IN-LAW ...... 3 FRIENDS/RELATIVES .... 4 DECIDED HERSELF .... 5 OTHER ______ 6 (SPECIFY) DON'T KNOW 8
316	Where was the induced abortion performed?	PUBLIC SECTOR HOSPITAL .... 11 POLYCLINIC .... 12 AMBULATORY .... 13 MOBILE CLINIC .... 14 OTHER HEALTH CARE FACILITY ______ 16 (SPECIFY) PRIVATE SECTOR PRIVATE CLINIC .... 21 PRIVATE DOCTOR .... 22 OTHER PRIVATE HEALTH CARE FACILITY ______ 26 (SPECIFY) PRIVATE PERSON (NON MEDICAL) .. 31 OTHER ______ 96 (SPECIFY)	PUBLIC SECTOR HOSPITAL .... 11 POLYCLINIC .... 12 AMBULATORY .... 13 MOBILE CLINIC .... 14 OTHER HEALTH CARE FACILITY ______ 16 (SPECIFY) PRIVATE SECTOR PRIVATE CLINIC .... 21 PRIVATE DOCTOR .... 22 OTHER PRIVATE HEALTH CARE FACILITY ______ 26 (SPECIFY) PRIVATE PERSON (NON MEDICAL) .. 31 OTHER ______ 96 (SPECIFY)	PUBLIC SECTOR HOSPITAL .... 11 POLYCLINIC .... 12 AMBULATORY .... 13 MOBILE CLINIC .... 14 OTHER HEALTH CARE FACILITY ______ 16 (SPECIFY) PRIVATE SECTOR PRIVATE CLINIC .... 21 PRIVATE DOCTOR .... 22 OTHER PRIVATE HEALTH CARE FACILITY ______ 26 (SPECIFY) PRIVATE PERSON (NON MEDICAL) .. 31 OTHER ______ 96 (SPECIFY)	PUBLIC SECTOR HOSPITAL .... 11 POLYCLINIC .... 12 AMBULATORY .... 13 MOBILE CLINIC .... 14 OTHER HEALTH CARE FACILITY ______ 16 (SPECIFY) PRIVATE SECTOR PRIVATE CLINIC .... 21 PRIVATE DOCTOR .... 22 OTHER PRIVATE HEALTH CARE FACILITY ______ 26 (SPECIFY) PRIVATE PERSON (NON MEDICAL) .. 31 OTHER ______ 96 (SPECIFY)
317	Can you tell me what procedure was used to terminate the pregnancy?	D & C .... 1 ASPIRATION .... 2 CAESARIAN SECTION .... 3 TRADITIONAL METHOD .... 4 OTHER ______ 6 (SPECIFY) DON'T KNOW 8	D & C .... 1 ASPIRATION .... 2 CAESARIAN SECTION .... 3 TRADITIONAL METHOD .... 4 OTHER ______ 6 (SPECIFY) DON'T KNOW 8	D & C .... 1 ASPIRATION .... 2 CAESARIAN SECTION .... 3 TRADITIONAL METHOD .... 4 OTHER ______ 6 (SPECIFY) DON'T KNOW 8	D & C .... 1 ASPIRATION .... 2 CAESARIAN SECTION .... 3 TRADITIONAL METHOD .... 4 OTHER ______ 6 (SPECIFY) DON'T KNOW 8

		LAST PREGNANCY OUTCOME OR NAME ________	NEXT-TO-THE-LAST PREGNANCY OUTCOME OR NAME ________	NEXT-TO-NEXT-TO THE LAST PREGN. OUTCOME OR NAME ________	NEXT-TO-NEXT-TO-NEXT-TO LAST PREG. OUTCOME OR NAME ________
318	Who helped you to perform that procedure?	DOCTOR ... A NURSE/MIDWIFE ... B TRADITIONAL MIDWIFE ... C OTHER PERSON ________ X (SPECIFY) NO ONE ... Y	DOCTOR ... A NURSE/MIDWIFE ... B TRADITIONAL MIDWIFE ... C OTHER PERSON ________ X (SPECIFY) NO ONE ... Y	DOCTOR ... A NURSE/MIDWIFE ... B TRADITIONAL MIDWIFE ... C OTHER PERSON ________ X (SPECIFY) NO ONE ... Y	DOCTOR ... A NURSE/MIDWIFE ... B TRADITIONAL MIDWIFE ... C OTHER PERSON ________ X (SPECIFY) NO ONE ... Y
319	Sometimes, a woman has health problems after an induced abortion. Did you have any health problems afterwards?	YES ... 1 NO ... 2 DON'T KNOW ... 8 325 ←	YES ... 1 NO ... 2 DON'T KNOW ... 8 325 ←	YES ... 1 NO ... 2 DON'T KNOW ... 8 325 ←	YES ... 1 NO ... 2 DON'T KNOW ... 8 325 ←
320	What health problems did you have: sterility? infection? lack of menstruation? irregular bleeding? other?	PELVIC PAIN ... A STERILITY ... B INFECTION ... C LACK OF MENSTRUATION ... D IRREGULAR BLEEDING ... E OTHER ________ X (SPECIFY) DON'T KNOW ... Y	PELVIC PAIN ... A STERILITY ... B INFECTION ... C LACK OF MENSTRUATION ... D IRREGULAR BLEEDING ... E OTHER ________ X (SPECIFY) DON'T KNOW ... Y	PELVIC PAIN ... A STERILITY ... B INFECTION ... C LACK OF MENSTRUATION ... D IRREGULAR BLEEDING ... E OTHER ________ X (SPECIFY) DON'T KNOW ... Y	PELVIC PAIN ... A STERILITY ... B INFECTION ... C LACK OF MENSTRUATION ... D IRREGULAR BLEEDING ... E OTHER ________ X (SPECIFY) DON'T KNOW ... Y
321	Did you seek care because of these complications?	YES ... 1 NO ... 2 325 ←	YES ... 1 NO ... 2 325 ←	YES ... 1 NO ... 2 325 ←	YES ... 1 NO ... 2 325 ←

322	Where did you seek care?	PUBLIC SECTOR HOSPITAL . . . . A POLYCLINIC . . . . B AMBULATORY . . . . C MOBILE CLINIC . . . . D OTHER HEALTH CARE FACILITY ________ E (SPECIFY) PRIVATE SECTOR PRIVATE CLINIC . . . . F PRIVATE DOCTOR . . . . G OTHER PRIVATE HEALTH CARE FACILITY ________ H (SPECIFY) PRIVATE PERSON (NON MEDICAL). . I OTHER ________ K (SPECIFY)	PUBLIC SECTOR HOSPITAL . . . . A POLYCLINIC . . . . B AMBULATORY . . . . C MOBILE CLINIC . . . . D OTHER HEALTH CARE FACILITY ________ E (SPECIFY) PRIVATE SECTOR PRIVATE CLINIC . . . . F PRIVATE DOCTOR . . . . G OTHER PRIVATE HEALTH CARE FACILITY ________ H (SPECIFY) PRIVATE PERSON (NON MEDICAL). . I OTHER ________ K (SPECIFY)	PUBLIC SECTOR HOSPITAL . . . . A POLYCLINIC . . . . B AMBULATORY . . . . C MOBILE CLINIC . . . . D OTHER HEALTH CARE FACILITY ________ E (SPECIFY) PRIVATE SECTOR PRIVATE CLINIC . . . . F PRIVATE DOCTOR . . . . G OTHER PRIVATE HEALTH CARE FACILITY ________ H (SPECIFY) PRIVATE PERSON (NON MEDICAL). . I OTHER ________ K (SPECIFY)	PUBLIC SECTOR HOSPITAL . . . . A POLYCLINIC . . . . B AMBULATORY . . . . C MOBILE CLINIC . . . . D OTHER HEALTH CARE FACILITY ________ E (SPECIFY) PRIVATE SECTOR PRIVATE CLINIC . . . . F PRIVATE DOCTOR . . . . G OTHER PRIVATE HEALTH CARE FACILITY ________ H (SPECIFY) PRIVATE PERSON (NON MEDICAL). . I OTHER ________ K (SPECIFY)
323	Have you been hospitalized because of these problems?	YES . . . . 1 NO . . . . 2 → 325	YES . . . . 1 NO . . . . 2 → 325	YES . . . . 1 NO . . . . 2 → 325	YES . . . . 1 NO . . . . 2 → 325
324	How many days?	NUMBER . . . . [ ][ ] DON'T KNOW 98	NUMBER . . . . [ ][ ] DON'T KNOW 98	NUMBER . . . . [ ][ ] DON'T KNOW 98	NUMBER . . . . [ ][ ] DON'T KNOW 98
325		GO BACK TO Q. 305 IN NEXT COLUMN. IF NO MORE PREGNANCY, GO TO Q.401	GO BACK TO Q. 305 IN NEXT COLUMN. IF NO MORE PREGNANCY, GO TO Q.401	GO BACK TO Q. 305 IN NEXT COLUMN. IF NO MORE PREGNANCY, GO TO Q.401	GO BACK TO Q. 305 IN NEXT COLUMN. IF NO MORE PREGNANCY, GO TO Q.401

Section 4A. CHILD HEALTH AND NUTRITION PRACTICES

401	CHECK 306A: ONE OR MORE LIVE BIRTHS SINCE JANUARY 199- ☐ NO LIVE BIRTHS SINCE JANUARY 199- ☐ → (SKIP TO 458)		
402	CHECK 303 AND 306A: ENTER THE LINE NUMBER FOR EACH LIVE BIRTH. ASK THE QUESTIONS ABOUT EACH OF THESE BIRTHS BEGINNING WITH THE LAST BIRTH. *(IF THERE ARE MORE THAN 2 BIRTHS, USE ADDITIONAL QUESTIONNAIRE).* Now I would like to ask you some questions about your children born in the past three years. Let's talk about one child at a time.		
403	LINE NUMBER FROM 303	LAST BIRTH LINE NUMBER . . . . . ☐☐	NEXT-TO-LAST BIRTH LINE NUMBER . . . . . ☐☐
404	NAME FROM 304	NAME _____	NAME _____
404A	During your pregnancy with (NAME), did you have any of the following diseases?	YES / NO	YES / NO
	Anemia	1 2	1 2
	Heart or circulatory diseases	1 2	1 2
	Kidney diseases	1 2	1 2
	Liver or gastrointestinal diseases	1 2	1 2
	Lung diseases	1 2	1 2
	Hormonal diseases	1 2	1 2
404B	CHECK 404A: ONE OR MORE RESPONSES "YES"	YES . . . 1 / NO . . . 2 → (SKIP TO 405)	YES . . . 1 / NO . . . 2 → (SKIP TO 405)
404c	During your pregnancy with (NAME) did you visit a health care facility for preventive care because of this illness?	YES . . . 1 / NO . . . 2 → (SKIP TO 405)	YES . . . 1 / NO . . . 2 → (SKIP TO 405)

404D	What type of health care facility did you visit for preventive care?	POLYCLINIC . . . . . 1 WOMEN'S CONSULTING CTR . . . . . 2 HOSPITAL . . . . . 3 AMBULATORY . . . . . 4 MEDSANCHAST. . . . . 5 OTHER 6 (SPECIFY) DON'T KNOW 8	POLYCLINIC . . . . . 1 WOMEN'S CONSULTING CTR . . . . . 2 HOSPITAL . . . . . 3 AMBULATORY . . . . . 4 MEDSANCHAST. . . . . 5 OTHER 6 (SPECIFY) DON'T KNOW 8
405	When (NAME) was born, was he/she: very large, larger than average, average, smaller than average, or very small?	VERY LARGE . . . . . 1 LARGER THAN AVERAGE . . . . . 2 AVERAGE. . . . . 3 SMALL . . . . . 4 VERY SMALL . . . . . 5 DON'T KNOW. 8	VERY LARGE . . . . . 1 LARGER THAN AVERAGE . . . . . 2 AVERAGE. . . . . 3 SMALL . . . . . 4 VERY SMALL . . . . . 5 DON'T KNOW. 8
406	Was (NAME) weighed at birth?	YES . . . . . 1 NO . . . . . 2 (SKIP TO 408)	YES . . . . . 1 NO . . . . . 2 (SKIP TO 408)
407	How much did (he/she) weigh? RECORD WEIGHT FROM HEALTH CARD, IF AVAILABLE	GRAMS FROM CARD . . . . . 1 ☐☐☐☐ GRAMS FROM RECALL . . . . . 2 ☐☐☐☐ DON'T KNOW. 99998	GRAMS FROM CARD . . . . . 1 ☐☐☐☐ GRAMS FROM RECALL . . . . . 2 ☐☐☐☐ DON'T KNOW. 99998
408	Was the length of (NAME) measured at birth?	YES. . . . . 1 NO . . . . . 2 (SKIP TO 410)	YES. . . . . 1 NO . . . . . 2 (SKIP TO 410)
409	What was length of (NAME) at birth? RECORD LENGTH FROM HEALTH CARD, IF AVAILABLE	CENTIMETERS FROM CARD . . . . . 1 ☐☐ CENTIMETERS FROM RECALL. . . . . 2 ☐☐ DON'T KNOW 998	CENTIMETERS FROM CARD . . . . . 1 ☐☐ CENTIMETERS FROM RECALL. . . . . 2 ☐☐ DON'T KNOW 998

		LAST BIRTH NAME _____	NEXT-TO-LAST BIRTH NAME _____
410	Has your period returned since the birth of (NAME)?	YES . . . 1 (SKIP TO 412) NO . . . 2 (SKIP TO 413)	[redacted]
411	Did your period return between the birth of (NAME) and your next pregnancy?	[redacted]	YES . . . 1 NO . . . 2 (SKIP TO 415)
412	For how many months after the birth of (NAME) did you not have a period?	MONTHS . . . [ ][ ] DON'T KNOW . . . 98	MONTHS . . . [ ][ ] DON'T KNOW . . . 98
413	CHECK 227: IS RESPONDENT CURRENTLY PREGNANT?	NOT PREGNANT [ ] PREGNANT OR UNSURE [ ] (SKIP TO 415)	[redacted]
414	Have you resumed sexual realtions since the birth of (NAME)?	YES . . . 1 NO . . . 2 (SKIP TO 416)	[redacted]
415	For how many months after the birth of (NAME) did you not have sexual relations?	MONTHS . . . [ ][ ] DON'T KNOW . . . 98	MONTHS . . . [ ][ ] DON'T KNOW . . . 98
416	Did you ever breastfeed (NAME)?	YES . . . 1 NO . . . 2 (SKIP TO 422)	YES . . . 1 NO . . . 2 (SKIP TO 422)
417	How long after birth did you first put (NAME) to the breast? IF LESS THAN 1 HOUR, RECORD '00' HOURS. IF LESS THAN 24 HOURS, RECORD HOURS. OTHERWISE, RECORD DAYS.	IMMEDIATELY . . . 000 HOURS . . . 1 [ ][ ] DAYS . . . 2	IMMEDIATELY . . . 000 HOURS . . . 1 [ ][ ] DAYS . . . 2

418	CHECK 222: CHILD ALIVE?	ALIVE ☐ → NOT ALIVE ☐ (SKIP TO 420)	ALIVE ☐ → NOT ALIVE ☐ (SKIP TO 420)
419	Are you still breastfeeding (NAME)?	YES . . . 1 (SKIP TO 423) NO . . . 2	YES . . . 1 (SKIP TO 423) NO . . . 2
420	For how many months did you breastfeed (NAME)?	MONTHS . . . ☐☐ DON'T KNOW . . . 98	MONTHS . . . ☐☐ DON'T KNOW . . . 98
421	Why did you stop breastfeeding (NAME)?	MOTHER ILL/WEAK . . . 01 CHILD ILL/WEAK . . . 02 CHILD DIED . . . 03 NIPPLE PROBLEM . . . 04 NOT ENOUGH MILK . . . 05 MOTHER WORKING . . . 06 CHILD REFUSED . . . 07 WEANING AGE/AGE TO STOP . . . 08 BECAME PREGNANT . . . 09 STARTED USING CONTRACEPTION . . 10 OTHER _____ 96 (SPECIFY)	MOTHER ILL/WEAK . . . 01 CHILD ILL/WEAK . . . 02 CHILD DIED . . . 03 NIPPLE PROBLEM . . . 04 NOT ENOUGH MILK . . . 05 MOTHER WORKING . . . 06 CHILD REFUSED . . . 07 WEANING AGE/AGE TO STOP . . . 08 BECAME PREGNANT . . . 09 STARTED USING CONTRACEPTION . . 10 OTHER _____ 96 (SPECIFY)

		LAST BIRTH NAME _____	NEXT-TO-LAST BIRTH NAME _____
422	CHECK 418 CHILD ALIVE?	ALIVE ☐ → (SKIP TO 425) NOT ALIVE ☐ → (GO BACK TO 405 IN NEXT COLUMN OR, IF NO MORE BIRTHS, GO TO 433)	ALIVE ☐ → (SKIP TO 425) NOT ALIVE ☐ → (GO BACK TO 405 IN NEXT COLUMN OR, IF NO MORE BIRTHS, GO TO 433)
423	How many times did you breastfeed last night between sunset and sunrise? IF ANSWER IS NOT NUMERIC, PROBE FOR APPROXIMATE NUMBER.	NUMBER OF NIGHTTIME FEEDINGS ☐☐	NUMBER OF NIGHTTIME FEEDINGS ☐☐
424	How many times did you breastfeed yesterday during the daylight hours? IF ANSWER IS NOT NUMERIC, PROBE FOR APPROXIMATE NUMBER.	NUMBER OF DAYTIME FEEDINGS ☐☐	NUMBER OF DAYTIME FEEDINGS ☐☐
425	Did (NAME) drink anything from a bottle with a nipple yesterday or last night?	YES . . . 1 NO . . . 2 DON'T KNOW . . . 8	YES . . . 1 NO . . . 2 DON'T KNOW . . . 8

426	At any time yesterday or last night, was (NAME) given any of the following?	YES NO DK	YES NO DK
	Water (boiled and not boiled)?	WATER 1 2 8	WATER 1 2 8
	Sugar water?	SWEET WATER 1 2 8	SWEET WATER 1 2 8
	Juice?	JUICE. 1 2 8	JUICE. 1 2 8
	Tea?	TEA 1 2 8	TEA 1 2 8
	Baby formula?	BABY FORMULA 1 2 8	BABY FORMULA 1 2 8
	Milk products (fresh, powdered, tinned milk)?	MILK 1 2 8	MILK 1 2 8
	Fermented milk (kefir, airan, kumys, yogurt)?	FERMENTED MILK 1 2 8	FERMENTED MILK 1 2 8
	Any other liquids (soups, coca-cola, etc.)?	OTHER LIQUIDS 1 2 8	OTHER LIQUIDS 1 2 8
	Fruits and vegetables?	FRUITS AND VEGETABLES . . 1 2 8	FRUITS AND VEGETABLES . 1 2 8
	Any food made from wheat, rice, maize, such as bread, noodles, pasta, etc.?	PASTA AND FOOD MADE FROM GRAIN . . 1 2 8	PASTA AND FOOD MADE FROM GRAIN . 1 2 8
	Any food made from potatoes, carrots, or tuber?	POTATOE AND TUBER 1 2 8	POTATOE AND TUBER 1 2 8
	Eggs, fish, poultry?	EGG/FISH/POULTRY 1 2 8	EGG/FISH/POULTRY 1 2 8
	Meat (lamb, beef, ham, horse meat, etc.)?	MEAT 1 2 8	MEAT 1 2 8
	Sweets, chocolate, cookies, etc.?	SWEETS 1 2 8	SWEETS 1 2 8
	Any other solid or semi-solid foods?	OTHER SOLID OR SEMI-SOLID FOODS 1 2 8	OTHER SOLID OR SEMI-SOLID FOODS 1 2 8
427	CHECK 426: FOOD OR LIQUID GIVEN YESTERDAY?	"YES" TO ONE OR MORE ☐ "NO/DK" TO ALL ☐ (SKIP TO 431))	"YES" TO ONE OR MORE ☐ "NO/DK" TO ALL ☐ (SKIP TO 431))
430	(Aside from breastfeeding,) how many times did (NAME) eat yesterday, including both meals and snacks? IF 7 OR MORE TIMES, RECORD '7'	NUMBER OF TIMES . . . . . ☐ DON'T KNOW 8	NUMBER OF TIMES . . . . . ☐ DON'T KNOW 8

		LAST BIRTH NAME _____	NEXT-TO-LAST BIRTH NAME _____
431	On how many days during the last seven days was (NAME) given any of the following? Water? Milk and fermented milk products? Any other liquids? Fruits and vegetables? Any food made from wheat, rice, maize, such as bread, noodles, pasta, etc.? Any food made from potatoes, carrots, or tuber? Eggs, fish, poultry? Meat products.? Any other solid or semi-solid foods?	RECORD THE NUMBER OF DAYS WATER . . . . . [ ] MILK . . . . . [ ] *OTHER LIQUIDS* . . . . . [ ] FRUITS AND VEGETABLES. . . [ ] PASTA AND GRAIN . . . . . [ ] POTATOE AND OTHER TUBER. [ ] EGGS/FISH/POULTRY. . . . . [ ] MEAT. . . . . [ ] OTHER SOLID OR . . . . . [ ] SEMI-SOLID FOODS	RECORD THE NUMBER OF DAYS WATER . . . . . [ ] MILK . . . . . [ ] *OTHER LIQUIDS* . . . . . [ ] FRUITS AND VEGETABLES. . . [ ] PASTA AND GRAIN . . . . . [ ] POTATOE AND OTHER TUBER. [ ] EGGS/FISH/POULTRY. . . . . [ ] MEAT. . . . . [ ] OTHER SOLID OR . . . . . [ ] SEMI-SOLID FOODS
432		GO BACK TO 405 IN NEXT COLUMN; OR IF NO MORE BIRTHS, GO TO 433.	GO BACK TO 405 IN NEXT COLUMN; OR IF NO MORE BIRTHS, GO TO 433.

Section 4B. IMMUNIZATION AND HEALTH

433	CHECK 403, 404 AND 418: ENTER LINE NUMBER FOR EACH LIVE BIRTH SINCE JANUARY 199[illegible] IN THE TABLE. INDICATE WHETHER THE CHILD IS ALIVE OR NOT ALIVE. ASK THE QUESTIONS ABOUT EACH OF THESE BIRTHS BEGINNING WITH THE LAST BIRTH. (IF THERE ARE MORE THAN 2 BIRTHS, USE ADDITIONAL QUESTIONNAIRE).		
434	LINE NUMBER FROM 403	LAST BIRTH LINE NUMBER . . . . . [ ][ ]	NEXT-TO-LAST BIRTH LINE NUMBER. . . . . [ ][ ]
435	NAME FROM 404 SURVIVORSHIP STATUS FROM 418	NAME _____ ALIVE [ ] NOT ALIVE [ ] (GO TO Q 435 IN NEXT COLUMN. IF NO MORE BIRTHS, GO TO 458).	NAME _____ ALIVE [ ] NOT ALIVE [ ] (GO TO Q 435 IN NEXT COLUMN. IF NO MORE BIRTHS, GO TO 458).
436	Do you have a card where (NAME'S) vaccinations are written? IF YES: May I see it please?	YES, SEEN . . . . . 1 (SKIP TO 438) YES, NOT SEEN . . . . . 2 (SKIP TO 440) NO CARD 3	YES, SEEN . . . . . 1 (SKIP TO 438) YES, NOT SEEN . . . . . 2 (SKIP TO 440) NO CARD 3
437	Did you ever have a vaccination card for (NAME)?	YES . . . . . 1 (SKIP TO 440) NO. 2	YES . . . . . 1 (SKIP TO 440) NO. 2

438 (1) COPY VACCINATION DATES FOR EACH VACCINE FROM THE CARD
(2) WRITE '44' IN 'DAY' COLUMN IF CARD SHOWS THAT A VACCINATION WAS GIVEN, BUT NO DATE IS RECORDED.

		DAY	MONTH	YEAR	DAY	MONTH	YEAR
BCG (IMMUNIZATION AGAINST TUBERCULOSIS)	BCG						
MANTU PROBE (1 : 2000 DILUTION)	MANTU . . .						
IMMUNIZATION AGAINST POLIOMYELITIS:	OPV 0						
POLIO 0 (AT THE HOSPITAL)	OPV1						
POLIO 1	OPV2						
POLIO 2	OPV3						
POLIO 3	OPV4						
POLIO 4	OPV5						
POLIO 5							
IMMUNIZATION AGAINST DIPHTHERIA, PERTUSSIS, TETANUS (DPT); OR AGAINST DIPHTHERIA AND TETANUS (DT)	D1						
DPT/DT 1	D2						
DPT/DT 2	D3						
DPT/DT 3	D4						
DPT-DT 4							
IMMUNIZATION AGAINST MEASLES	MEASLES .						

439 Has (NAME) received any vaccinations that are not recorded on this card?

RECORD 'YES' ONLY IF RESPONDENT MENTIONS BCG, POLIO 1 - 5, DPT/DT 1 - 4, AND/OR MEASLES VACCINE(S).

YES 1	YES 1
(PROBE FOR VACCINATIONS, GO BACK TO 438 AND WRITE '66' IN THE CORRESPONDING DAY COLUMN)	(PROBE FOR VACCINATIONS, GO BACK TO 438 AND WRITE '66' IN THE CORRESPONDING DAY COLUMN)
NO 2	NO 2
DON'T KNOW 8	DON'T KNOW 8
(SKIP TO 442)	(SKIP TO 442)

		LAST BIRTH NAME _____	NEXT-TO-LAST BIRTH NAME _____
440	Did (NAME) ever receive any vaccinations to prevent him(her) from getting diseases?	YES . . . 1 NO . . . 2 (SKIP TO 442) ← DON'T KNOW . . . 8	YES . . . 1 NO . . . 2 (SKIP TO 442) ← DON'T KNOW . . . 8
441	Please tell me if (NAME) received any of the following vaccinations:		
441A	A BCG vaccination against tuberculosis, that is, an injection in the arm or shoulder that left a scar?	YES . . . 1 NO . . . 2 DON'T KNOW . . . 8	YES . . . 1 NO . . . 2 DON'T KNOW . . . 8
441B	Polio vaccine, that is drops in the mouth?	YES . . . 1 NO . . . 2 (SKIP TO 441E) ← DON'T KNOW . . . 8	YES . . . 1 NO . . . 2 (SKIP TO 441E) ← DON'T KNOW . . . 8
441C	How many times?	NUMBER OF TIMES . . . ☐	NUMBER OF TIMES . . . ☐
441D	When was the first polio vaccine given, just after birth or later?	JUST AFTER BIRTH . . . 1 LATER . . . 2 DON'T KNOW . . . 8	JUST AFTER BIRTH . . . 1 LATER . . . 2 DON'T KNOW . . . 8
441E	DPT/DP vaccination, that is, an injection usually given at the same time as polio drops?	YES . . . 1 NO . . . 2 (SKIP TO 441 G) ← DON'T KNOW . . . 8	YES . . . 1 NO . . . 2 (SKIP TO 441 G) ← DON'T KNOW . . . 8
441F	How many times?	NUMBER OF TIMES . . . ☐	NUMBER OF TIMES . . . ☐
441G	An injection to prevent measles?	YES . . . 1 NO . . . 2 DON'T KNOW . . . 8	YES . . . 1 NO . . . 2 DON'T KNOW . . . 8

442	Has (NAME) been ill with a fever at any time in the last 2 weeks?	YES . . . 1 NO . . . 2 DON'T KNOW . . . 8	YES . . . 1 NO . . . 2 DON'T KNOW . . . 8
443	Has (NAME) been ill with cough at any time in the last 2 weeks?	YES . . . 1 NO . . . 2 (SKIP TO 447) DON'T KNOW . . . 8	YES . . . 1 NO . . . 2 (SKIP TO 447) DON'T KNOW . . . 8
444	When (NAME) was ill with cough, did he/she breathe faster than usual with short, fast breaths?	YES . . . 1 NO . . . 2 DON'T KNOW . . . 8	YES . . . 1 NO . . . 2 DON'T KNOW . . . 8
445	Did you seek advice or treatment for the cough?	YES . . . 1 NO . . . 2 (SKIP TO 447)	YES . . . 1 NO . . . 2 (SKIP TO 447)
446	Where did you seek advice or treatment? Anywhere else? RECORD ALL MENTIONED..	PUBLIC SECTOR HOSPITAL . . . A POLYCLINIC . . . B AMBULATORY . . . C PHARMACY . . . D FAP . . . E OTHER PUBLIC HEALTH FACILITY _____ F (SPECIFY) PRIVATE HEALTH SECTOR PRIVATE CLINIC . . . G PRIVATE PHARMACY . . . H PRIVATE DOCTOR . . . I OTHER PRIVATE HEALTH FACILITY _____ J (SPECIFY) OTHER PRIVATE SHOP . . . K PRIVATE PERSON (NON MEDICAL) L OTHER_____ X (SPECIFY)	PUBLIC SECTOR HOSPITAL . . . A POLYCLINIC . . . B AMBULATORY . . . C PHARMACY . . . D FAP . . . E OTHER PUBLIC HEALTH FACILITY _____ F (SPECIFY) PRIVATE HEALTH SECTOR PRIVATE CLINIC . . . G PRIVATE PHARMACY . . . H PRIVATE DOCTOR . . . I OTHER PRIVATE HEALTH FACILITY _____ J (SPECIFY) OTHER PRIVATE SHOP . . . K PRIVATE PERSON (NON MEDICAL) L OTHER_____ X (SPECIFY)

		LAST BIRTH NAME _____	NEXT-TO-LAST BIRTH NAME _____
447	Has (NAME) had diarrhea in the last two weeks?	YES . . . 1 NO . . . 2 (SKIP TO 457) ← DON'T KNOW . . . 8	YES . . . 1 NO . . . 2 (SKIP TO 457) ← DON'T KNOW . . . 8
448	Was there any blood in the stools?	YES . . . 1 NO . . . 2 DON'T KNOW . . . 8	YES . . . 1 NO . . . 2 DON'T KNOW . . . 8
449	On the worst day of the diarrhea, how many bowel movements did (NAME) have?	NUMBER . . . ☐☐ DON'T KNOW . . . 98	NUMBER . . . ☐☐ DON'T KNOW . . . 98
450	Was he/she given the same amount to drink as before the diarrhea, or more, or less?	SAME . . . 1 MORE . . . 2 LESS . . . 3 DON'T KNOW . . . 8	SAME . . . 1 MORE . . . 2 LESS . . . 3 DON'T KNOW . . . 8
451	Was he/she given the same amount food to eat as before the diarrhea, or more, or less?	SAME . . . 1 MORE . . . 2 LESS . . . 3 DON'T KNOW . . . 8	SAME . . . 1 MORE . . . 2 LESS . . . 3 DON'T KNOW . . . 8
452	Was (NAME) given rehydron, fluid made from a special packet to drink?	YES . . . 1 NO . . . 2 DON'T KNOW . . . 8	YES . . . 1 NO . . . 2 DON'T KNOW . . . 8
453	Was anything (else) given to treat the diarrhea?	YES . . . 1 NO . . . 2 (SKIP TO 455) ← DON'T KNOW . . . 8	YES . . . 1 NO . . . 2 (SKIP TO 455) ← DON'T KNOW . . . 8
454	What was given to treat the diarrhea? Anything else? RECORD ALL MENTIONED	RECOMMENDED HOME FLUIDS . . . A PILLS OR SYRUP . . . B INJECTION . . . C (I.V.) INTRAVENOUS . . . D HOME REMEDIES/HERBS . . . E OTHER X _____ (SPECIFY)	RECOMMENDED HOME FLUIDS . . . A PILLS OR SYRUP . . . B INJECTION . . . C (I.V.) INTRAVENOUS . . . D HOME REMEDIES/HERBS . . . E OTHER X _____ (SPECIFY)

455	Did you seek advice or treatment for the diarrhea?	YES . . . 1 NO . . . 2 (SKIP TO 457) DON'T KNOW . . . 8	YES . . . 1 NO . . . 2 (SKIP TO 457) DON'T KNOW . . . 8
456	Where did you seek advice or treatment? Anywhere else? RECORD ALL MENTIONED.	PUBLIC SECTOR HOSPITAL . . . A POLYCLINIC . . . B AMBULATORY . . . C PHARMACY . . . D FAP . . . E OTHER PUBLIC HEALTH FACILITY _____ F (SPECIFY) PRIVATE HEALTH SECTOR PRIVATE CLINIC . . . G PRIVATE PHARMACY . . . H PRIVATE DOCTOR . . . I OTHER PRIVATE HEALTH FACILITY _____ J (SPECIFY) OTHER PRIVATE SHOP . . . K PRIVATE PERSON (NON MEDICAL) L OTHER _____ X (SPECIFY)	PUBLIC SECTOR HOSPITAL . . . A POLYCLINIC . . . B AMBULATORY . . . C PHARMACY . . . D FAP . . . E OTHER PUBLIC HEALTH FACILITY _____ F (SPECIFY) PRIVATE HEALTH SECTOR PRIVATE CLINIC . . . G PRIVATE PHARMACY . . . H PRIVATE DOCTOR . . . I OTHER PRIVATE HEALTH FACILITY _____ J (SPECIFY) OTHER PRIVATE SHOP . . . K PRIVATE PERSON (NON MEDICAL) L OTHER _____ X (SPECIFY)
457		GO BACK TO 435 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 458	GO BACK TO 435 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 458

No.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
458	When a child has diarrhea, should he/she be given less to drink than usual, about the same amount, or more than usual?	LESS TO DRINK . . . 1 ABOUT SAME AMOUNT TO DRINK . . . 2 MORE TO DRINK . . . 3 DON'T KNOW . . . 8	
459	When a child has diarrhea, should he/she be given less to eat than usual, about the same amount, or more than usual?	LESS TO EAT . . . 1 ABOUT SAME AMOUNT TO EAT . . . 2 MORE TO EAT . . . 3 DON'T KNOW . . . 8	
460	When a child is sick with diarrhea, what signs of illness would tell you that he or she should be taken to a health facility or health worker? RECORD ALL MENTIONED.	REPEATED WATERY STOOL . . . A ANY WATERY STOOL . . . B REPEATED VOMITING . . . C ANY VOMITING . . . D BLOOD IN STOOL . . . E HIGH BODY TEMPERATURE . . . F MARKED THIRST . . . G NOT EATING/NOT DRINKING WELL . . . H GETTING SICKER/VERY SICK . . . I NOT GETTING BETTER . . . J OTHER _____ (SPECIFY) . . . X DON'T KNOW . . . Z	
461	When a child is sick with a cough, what signs of illness would tell you that he or she should be taken to a health facility or health worker? RECORD ALL MENTIONED	FAST BREATHING . . . A DIFFICULT BREATHING . . . B NOISY BREATHING . . . C HIGH BODY TEMPERATURE . . . D UNABLE TO DRINK . . . E NOT EATING/NOT DRINKING WELL . . . F GETTING SICKER/VERY SICK . . . G NOT GETTING BETTER . . . H OTHER _____ (SPECIFY) . . . X DON'T KNOW . . . Z	
462	CHECK 452, ALL COLUMNS NO CHILD RECEIVED REHYDRON ☐ ANY CHILD RECEIVED REHYDRON ☐ → 501		
463	Have you ever heard of a special product called rehydron you can get for the treatment of diarrhea?	YES . . . 1 NO . . . 2	

Section 5. CONTRACEPTION

Now I would like to talk about contraception - the various ways or methods that a couple can use to delay or avoid a pregnancy.

CIRCLE CODE 1 IN 501 FOR EACH METHOD MENTIONED SPONTANEOUSLY.

THEN PROCEED DOWN COLUMN 502, READING THE NAME AND DESRCIPTION OF EACH METHOD NOT MENTIONED SPONTANEOUSLY. CIRCLE CODE 2 IF METHOD IS RECOGNIZED, AND CODE 3 IF NOT RECOGNIZED.

THEN, FOR EACH METHOD WITH CODE 1 OR 2 CIRCLED IN 501 OR 502,ASK 503.

501 Which ways or methods have you heard about?		502 Have you ever heard of (METHOD)?		503 Have you ever used (METHOD)?
	SPONTANEOUS	PROBED		
	YES	YES	NO	
01 PILL Women can take a pill every day.	1	2	3	YES ..... 1 NO 2
02 IUD Women can have a loop or coil placed inside them by a doctor.	1	2	3	YES ..... 1 NO 2
03 INJECTIONS Women can have an injection by a doctor or nurse which stops them from becoming pregnant for several months.	1	2	3	YES ..... 1 NO 2
05 DIAPHRAGM, FOAM, JELLY. Women can place a sponge, suppository, diaphragm, jelly inside themsives before intercourse.	1	2	3	YES ..... 1 NO 2

06	CONDOM. Men can use a rubber sheath during sexual intercourse.	1 2 3	YES ..... 1 NO 2
07	*FEMALE STERILIZATION. Women can have an* operation to avoid having any more children.	1 2 3	Have you ever had an operation to avoid having any more children? YES ..... 1 NO 2
09	CALENDAR METHOD. Every month that a women is sexually active she can avoid having sexual intercourse on the days of the month she is most likely to get pregnant.	1 2 3	YES ..... 1 NO 2
10	WITHDRAWAL. Men can be careful pull out before climax.	1 2 3	YES ..... 1 NO 2
11	Have you heard of any other ways or methods that women or men can use to avoid *pregnancy*?	1 3 _____ (SPECIFY) _____ (SPECIFY)	YES ..... 1 NO ..... 2 YES ..... 1 NO 2

504 CHECK 503

NOT A SINGLE "YES" (NEVER USED) ☐ ↓

AT LEAST ONE "YES" (EVER USED) ☐ → SKIP TO 509

No.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
505	Have you ever used anything or tried in any way to delay or avoid getting pregnant?	YES . . . . . 1 NO . . . . . 2 → 531	
507	What have you used or done? CORRECT 503 AND 504 (AND 502 IF NECESSARY)		
509	Now I would like to ask you about the first time that you did something or used a method to avoid getting pregnant. How many living children did you have at that time, if any? IF NONE, RECORD '00'	NUMBER OF CHILDREN	
510	When you first time began to use contraception, did you want to have another child but at a later time, or did you not want to have another child at all?	WANTED CHILD LATER . . . . . 1 DID NOT WANT ANOTHER CHILD . . . . . 2 OTHER 6 (SPECIFY)	
511	CHECK 503 WOMAN NOT STERILIZED ☐ WOMAN STERILIZED ☐ → 514A		
512	CHECK 227 NOT PREGNANT OR UNSURE ☐ PREGNANT ☐ → 532		
513	Are you currently doing something or using any method to delay or avoid getting pregnant?	YES . . . . . 1 NO . . . . . 2 → 531	

514 Which method are you using?

514A CIRCLE '07 FOR FEMALE STERILIZATION.

- PILLS . . . 01
- IUD . . . 02
- INJECTIONS . . . 03
- DIAPHRAGM/FOAM/JELLY . . . 05
- CONDOM . . . 06 → 526
- FEMALE STERILIZATION . . . 07 → 518
- CALENDAR METHOD . . . 09 → 523
- WITHDRAWAL . . . 10
- OTHER _____ 96 → 526
  (SPECIFY)

515 May I see the package of pills you are now using?

RECORD NAME OF BRAND IF PACKAGE IS SEEN

- PACKAGE SEEN . . . 1 → 517
- BRAND NAME _____ [ ][ ]
- PACKAGE NOT SEEN . . . 2

516 Do you know the brand name of the pills you are now using?

RECORD NAME OF BRAND.

- BRAND NAME _____ [ ][ ]
- DON'T KNOW . . . 98

517 How much does one packet of pills cost you?

- COST . . . [ ][ ][ ][ ]
- FREE . . . 9998
- DON'T KNOW . . . 9998 → 526

518 Where did the sterilization take place?

IF SOURCE IS HOSPITAL, HEALTH CENTER, OR CLINIC, WRITE THE NAME OF OF THE PLACE.
PROBE TO IDENTIFY THE TYPE OF SOURCE AND CIRCLE THE APPROPRIATE CODE.

_____
(NAME OF PLACE)

PUBLIC SECTOR
- HOSPITAL . . . 1
- POLYCLINIC . . . 2
- WOMEN'S CENTER . . . 3
- MOBILE CLINIC . . . 4

OTHER HEALTH FACILITY
- _____ 6
  (SPECIFY)
- DON'T KNOW . . . 8

No.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
521	In what month and year was the sterilization performed?	MONTH. . . . . ☐☐ YEAR . . . . . ☐☐☐☐	→ 527
523	How do you determine which days of your monthly cycle not to have sexual relations	BASED ON CALENDAR . . . . . 01 BASED ON BODY TEMPERATURE. . . . . 02 BASED ON CERVICAL MUCUS (BILLING METHOD) . . . . . 03 BASED ON RECTAL TEMPERATURE. . . . . 04 NO SPECIFIC SYSTEM . . . . . 05 OTHER _____ 96 (SPECIFY)	
526	For how many months have you been using (METHOD) continuously? IF LESS THAN 1 MONTH, RECORD '00'	MONTHS. . . . . ☐☐ 8 YEARS OR LONGER 96	
527	CHECK 514 CIRCLE METHOD CODE:	PILLS . . . . . 01 IUD . . . . . 02 INJECTIONS . . . . . 03 DIAPHRAGM/FOAM/JELLY . . . . . 05 CONDOM . . . . . 06 FEMALE STERILIZATION . . . . . 07 → 529A CALENDAR METHOD . . . . . 09 WITHDRAWAL . . . . . 10 → 532 OTHER _____ 96 (SPECIFY)	

527A	Who recommended you to use this method of contraception?	DOCTOR FROM THE HOSPITAL . . . . . 01 DOCTOR FROM WOMEN'S CENTER . . . . . 02 OTHER HEALTH PROFESSIONAL . . . . . 03 PHARMACIST . . . . . 04 FRIENDS/RELATIVES . . . . . 05 DECIDED HERSELF . . . . . 06 OTHER _____ 96 SPECIFY	
528	Where did you obtain (METHOD) the last time? IF SOURCE IS HOSPITAL, HEALTH CENTER, OR CLINIC, WRITE THE NAME OF OF THE PLACE. PROBE TO IDENTIFY THE TYPE OF SOURCE AND CIRCLE THE APPROPRIATE CODE. _____ (NAME OF PLACE)	PUBLIC SECTOR HOSPITAL . . . . . 11 POLYCLINIC . . . . . 12 FAMILY PLANNING CLINIC . . . . . 13 PHARMACY . . . . . 14 COMMUNITY HEALTH WORKER . . . . . 15 OTHER PUBLIC HEALTH FACILITY _____ 16 (SPECIFY) PRIVATE MEDICAL SECTOR PRIVATE HOSPITAL/CLINIC . . . . . 21 PRIVATE PHARMACY . . . . . 22 PRIVATE DOCTOR . . . . . 23 MOBILE CLINIC . . . . . 24 PRIVATE HEALTH WORKER . . . . . 25 OTHER PRIVATE HEALTH FACILITY _____ 26 (SPECIFY) OTHER SOURCE SHOP . . . . . 31 RELIGIOUS ORGANIZATION . . . . . 32 FRIENDS/RELATIVES . . . . . 33 OTHER _____ 36 (SPECIFY)	
529	Do you know another place where you could have obtained (METHOD) the last time?	YES . . . . . 1 NO . . . . . 2 → 534	
529A	At the time of the sterilization operation, did you know another place where you could have received the operation?		

No.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
530	People select the place where they obtain contraceptives for various reasons. What was the main reason you went to (NAME OF PLACE IN Q.528 OR Q.518) instead of the other place you know about? RECORD RESPONSE AND CIRCLE CODE _____	*ACCESS-RELATED REASONS* CLOSER TO HOME ..... 11 CLOSER TO WORK ..... 12 AVAILABILITY OF TRANSPORT ..... 13 SERVICE-RELATED REASONS STAFF MORE COMPETENT/FRIENDLY ..... 21 CLEANER FACILITY ..... 22 OFFERS MORE PRIVACY ..... 23 SHORTER WAITING TIME ..... 24 LONGER HOURS OF OPERATION ..... 25 USE OTHER SERVICES AT THE FACILITY ..... 26 LOWER COST/CHEAPER ..... 31 WANTED ANONYMITY ..... 41 OTHER _____ 96 (SPECIFY) DON'T KNOW 98	→ 534
531	What is the main reason you are not using a method of contraception to avoid pregnancy?	NOT MARRIED ..... 11 FERTILITY-RELATED REASONS NOT HAVING SEX ..... 21 INFREQUENT SEX ..... 22 MENOPAUSAL/HYSTERECTOMY ..... 23 SUBFECUND/INFECUND ..... 24 POSTPARTUM/BREASTFEEDING ..... 25 WANTS (MORE)CHILDREN ..... 26 PREGNANT ..... 27 OPPOSITION TO USE RESPONDENT OPPOSED ..... 31 HUSBAND OPPOSED ..... 32 OTHERS OPPOSED ..... 33 RELIGIOUS PROHIBITION ..... 34 LACK OF KNOWLEDGE KNOWS NO METHOD ..... 41 *KNOWS NO SOURCE* ..... 42 METHOD RELATED REASONS HEALTH CONCERNS ..... 51 FEAR OF SIDE EFFECTS ..... 52 LACK OF ACCESS/TOO FAR ..... 53 COST TOO MUCH ..... 54 INCONVENIENT TO USE ..... 55 INTERFERES WITH BODY'S NORMAL PROCESSES ..... 56 OTHER _____ 96 (SPECIFY) DON'T KNOW 98	

532	Do you know of a place where you can obtain a method of contraception?	YES . . . 1 NO . . . 2 → 534	
533	*Where is that?* IF SOURCE IS HOSPITAL, HEALTH CENTER, OR CLINIC, WRITE THE NAME OF OF THE PLACE. PROBE TO IDENTIFY THE TYPE OF SOURCE AND CIRCLE THE APPROPRIATE CODE. _____ (NAME OF PLACE)	PUBLIC SECTOR HOSPITAL . . . 11 POLYCLINIC . . . 12 FAMILY PLANNING CLINIC . . . 13 PHARMACY . . . 14 COMMUNITY HEALTH WORKER . . . 15 OTHER PUBLIC HEALTH FACILITY _____ 16 (SPECIFY) PRIVATE MEDICAL SECTOR PRIVATE HOSPITAL/CLINIC . . . 21 *PRIVATE PHARMACY* . . . 22 PRIVATE DOCTOR . . . 23 MOBILE CLINIC . . . 24 PRIVATE HEALTH WORKER . . . 25 OTHER PRIVATE HEALTH FACILITY _____ 26 (SPECIFY) OTHER SOURCE *SHOP* . . . 31 *RELIGIOUS ORGANIZATION* . . . 32 FRIENDS/RELATIVES . . . 33 OTHER 36 _____ (SPECIFY)	
534	Were you visited by a health worker who discussed the use of contraception during the last 12 months?	YES . . . 1 NO . . . 2	
535	Have you visited a health facility for any reason in the last 12 months?	YES . . . 1 NO . . . 2 → 537	
536	Did any staff member at the health facility speak to you about contraception?	YES . . . 1 NO . . . 2	
537	Do you think that breast feeding can affect a woman's chance of becoming pregnant?	YES . . . 1 NO . . . 2 DON'T KNOW . . . 8 → 543	
538	Do you think that a woman's chance of becoming pregnant is increased or decreased by breastfeeding?	INCREASED . . . 1 → 543 DECREASED . . . 2 DEPENDS . . . 3 DON'T KNOW . . . 8	

No.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
539	CHECK 208 ONE OR MORE BIRTHS ☐ — NO BIRTHS ☐		→ 543
540	Have you ever relied on breastfeeding as a method of avoiding pregnancy?	YES . . . 1 NO . . . 2	→ 543
541	CHECK 227 AND 514 NOT PREGNANT OR UNSURE AND NOT STERILIZED ☐ — EITHER PREGNANT OR STERILIZED ☐		→ 543
542	Are you currently relying on breastfeeding to avoid getting pregnant?	YES . . . 1 NO . . . 2	
543	(SHOW LOGO 1) Have you ever seen this symbol?	YES . . . 1 NO . . . 2	→ 546
544	Where have you seen it? Anywhere else?	PHARMACY . . . 1 WOMEN'S CENTER . . . 2 POLYCLINIC . . . 3 TELEVISION . . . 4 OTHER _____ (SPECIFY) 6	
545	What does this symbol mean?	CONTRACEPTIVES . . . 1 DRUG . . . 2 OTHER _____ (SPECIFY) 6 DON'T KNOW . . . 8	

543	(SHOW LOGO 2) Have you ever seen this symbol?	YES . . . . . 1 NO . . . . . 2 → 549
544	Where have you seen it? Anywhere else?	PHARMACY . . . . . 1 WOMEN'S CENTER . . . . . 2 POLYCLINIC . . . . . 3 TELEVISION . . . . . 4 OTHER _____ (SPECIFY) 6
545	What does this symbol mean?	CONTRACEPTIVES . . . . . 1 DRUG . . . . . 2 OTHER _____ (SPECIFY) 6 DON'T KNOW 8

549 Now I would like to read you some statements about oral contraeptives (pills) nd injectable contraceptives. For each statement, please tell me whether you strongly agree, agree somewhat, disagree somewhat or strongly disagree.

STATEMENT	STRONGLY AGREE	AGREE SOMEWHA	DISAGREE SOMEWHAT	STRONGLY DISAGREE	DON'T KNOW
a. Taking oral contraceptives (pills) usually does not harm a woman's health	1	2	3	4	8
b. If a woman experiences nausea when she starts taking oral contraceptives, she should not stop taking them immediately.	1	2	3	4	8
c. Women who use injectable contraceptives cannot get pregnant again after they stop the injection	1	2	3	4	8
d. Women who use injectable contraceptives often stop mestruating while they are taking them.	1	2	3	4	8

Section 6. MARRIAGE

No.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
601	PRESENCE OF OTHERS AT THIS POINT.	YES / NO CHILDREN UNDER 10 . . . . . 1 2 HUSBAND/PARTNER . . . . . 1 2 OTHER MALES . . . . . 1 2 OTHER FEMALES 1 2	
602	Are you currently married or living with a man?	CURRENTLY MARRIED . . . . . 1 LIVING WITH A MAN . . . . . 2 NOT IN UNION 3	→ 607
603	Do you currently have a regular sexual partner, an occasional sexual partner, or no sexual partner at all?	REGULAR SEXUAL PARTNER . . . . . 1 OCCASIONAL SEXUAL PARTNER . . . . . 2 NO SEXUAL PARTNER 3	
604	Have you ever been married or lived with a man?	FORMERLY MARRIED . . . . . 1 LIVED WITH A MAN . . . . . 2 NO 3	→ 611 → 615
606	What is your marital status now: are you widowed, divorced, or separated?	WIDOWED . . . . . 1 DIVORCED . . . . . 2 SEPARATED 3	→ 611
607	Is your husband/partner living with you now or is he staying elsewhere?	LIVES WITH HER . . . . . 1 STAYING ELSEWHERE 2	
611	Have you been married or lived with a man only once, or more than once?	ONCE . . . . . 1 MORE THAN ONCE 2	

No.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
612	CHECK 611 MARRIED/LIVED WITH A MAN ONLY ONCE ☐ In what month and year did you start living with your husband/partner? MARRIED/LIVED WITH A MAN MORE THAN ONCE ☐ Now we will talk about your first husband/ partner. In what month and year did you start living with him?	MONTH ☐☐ DON'T KNOW MONTH 98 YEAR ☐☐ DON'T KNOW YEAR 98	→ 615
613	How old were you when you started living with him?	AGE ☐☐	
615	Now I need to ask you some questions about sexual activity in order to gain a better understanding of some issues of contraception. When was the last time you had sexual intercourse (if ever)?	NEVER 000 → 712 DAYS AGO 1 ☐☐ WEEKS AGO 2 ☐☐ MONTHS AGO 3 ☐☐ YEARS AGO 4 ☐☐ BEFORE LAST BIRTH 996	
619	How old were you when you first had sexual intercourse?	AGE ☐☐ FIRST TIME WHEN MARRIED 98	

Section 7. FERTILITY PREFERENCES

No.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
701	CHECK 514 WOMAN NOT STERILIZED ☐ WOMAN STERILIZED ☐		→ 712
702	CHECK 227 NOT PREGNANT OR UNSURE ☐ Now I have some questions about the future. Would you like to have (a/another) child or would you prefer not to have any (more) children? PREGNANT ☐ Now I have some questions about the future. After the child you are expecting, would like to have another child or would you prefer not to have more children?	HAVE (A/ANOTHER) CHILD . . . 1 NO MORE/NONE . . . 2 SAYS SHE CAN'T GET PREGNANT . . . 3 → 706 UNDECIDED/DON'T KNOW . . . 8 → 704	
703	CHECK 227 NOT PREGNANT OR UNSURE ☐ How long would you like to wait from now before the birth of (a/another) child? PREGNANT ☐ How long would you like to wait after the birth of the child you are expecting before the birth of another child?	MONTHS . . . 1 ☐☐ YEARS . . . 2 ☐☐ SOON/NOW . . . 993 SAYS SHE CAN'T GET PREGNANT . . . 994 → 706 AFTER MARRIAGE . . . 995 OTHER _____ 996 (SPECIFY) DON'T KNOW . . . 998	

No.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
704	CHECK 227: NOT PREGNANT OR UNSURE ☐ PREGNANT ☐		→ 707
705	If you became pregnant in the next few weeks, would you be happy, unhappy, or would it not matter very much?	HAPPY . . . 1 UNHAPPY . . . 2 WOULD NOT MATTER . . . 3	
706	CHECK 513: USING A METHOD? NOT ASKED ☐ NOT CURRENTLY USING ☐ CURRENTLY USING ☐		→ 712
707	Do you think you will use a method to delay or avoid pregnancy within the next 12 months?	YES . . . 1 NO . . . 2 DON'T KNOW . . . 8	1 → 709
708	Do you think you will use a method at any time in the future?	YES . . . 1 NO . . . 2 DON'T KNOW . . . 8	8 → 710

709	Which method would you prefer to use?	PILLS . . . . . 01 IUD . . . . . 02 INJECTIONS . . . . . 03 DIAPHRAGM/FOAM/JELLY . . . . . 05 CONDOM . . . . . 06 FEMALE STERILIZATION . . . . . 07 CALENDAR METHOD . . . . . 09 WITHDRAWAL . . . . . 10 OTHER _____ 96 (SPECIFY) UNSURE 98	→ 712
710	What is the main reason that you think you will never use a method?	NOT MARRIED . . . . . 11 FERTILITY-RELATED REASONS INFREQUENT SEX . . . . . 22 MENOPAUSAL/HYSTERECTOMY . . . . . 23 SUBFECUND/INFECUND . . . . . 24 WANTS (MORE)CHILDREN . . . . . 26 OPPOSITION TO USE RESPONDENT OPPOSED . . . . . 31 HUSBAND OPPOSED . . . . . 32 OTHERS OPPOSED . . . . . 33 RELIGIOUS PROHIBITION . . . . . 34 LACK OF KNOWLEDGE KNOWS NO METHOD . . . . . 41 KNOWS NO SOURCE . . . . . 42 METHOD RELATED REASONS HEALTH CONCERNS . . . . . 51 FEAR OF SIDE EFFECTS . . . . . 52 LACK OF ACCESS/TOO FAR . . . . . 53 COST TOO MUCH . . . . . 54 INCONVENIENT TO USE . . . . . 55 INTERFERES WITH BODY'S NORMAL PROCESSES . . . . . 56 OTHER _____ 96 (SPECIFY) DON'T KNOW 98	→ 712

No.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
711	Would you ever use a method if you were married?	YES . . . . . 1 NO . . . . . 2 DON'T KNOW 8	
712	CHECK 222 HAS LIVING CHILDREN ☐ → If you could go back to the time you did not have any children and could choose exactly the number of children to have in your whole life, how many would that be? NO LIVING CHILDREN ☐ → If you could choose exactly the number of children to have in your life, how many would that be? PROBE FOR A NUMERIC RESPONSE.	NUMBER . . . . . ☐☐ OTHER _____ 96 (SPECIFY)	→ 714
713	How many of these children would you like to be boys, how many would you like to be girls and for how many would it not matter?	BOYS NUMBER . . . . . ☐☐ OTHER _____ 96 (SPECIFY) GIRLS NUMBER . . . . . ☐☐ OTHER _____ 96 (SPECIFY) EITHER NUMBER . . . . . ☐☐ OTHER _____ 96 (SPECIFY)	

714 Would you say that you approve or disapprove of couples using a method to avoid getting pregnant?

- APPROVE . . . 1
- DISAPPROVE . . . 2
- NO OPINION . . . 3

715 Is it acceptable or not acceptable to you for information on contraception to be provided:
On the radio?
On the television?

	ACCEP-TABLE	NOT ACCEP-TABLE	DK
RADIO	1	2	8
TELEVISION	1	2	8

716 In the last few months have you heard about contraception:
On the radio?
On the television?
In a newspaper or magazine?
From a poster?
From leaflets or brochures?

	YES	NO
RADIO	1	2
TELEVISION	1	2
NEWSPAPER OR MAGAZINE	1	2
POSTER	1	2
LEAFLETTERS OR BROCHURES	1	2

718 In the last few months have you discussed contraception with your friends, neighbors, or relatives?

- YES . . . 1
- NO . . . 2 → 720

719 With whom?

Anyone else?

RECORD ALL MENTIONED

- HUSBAND/PARTNER . . . A
- MOTHER . . . B
- FATHER . . . C
- SISTER(S) . . . D
- BROTHER(S) . . . E
- DAUGHTER . . . F
- MOTHER-IN-LAW . . . G
- FRIENDS/NEIGHBORS . . . H
- OTHER _____ (SPECIFY) . . . X

No.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
720	CHECK 602 CURRENTLY MARRIED ☐ LIVING WITH A MAN ☐ NOT IN UNION ☐ → 801		
721	Spouses/partners do not always agree on everything. Now I want to ask you about your husband's/partner's views on contraception. *Do you think that your husband/partner approves or disapproves of couples using a method to avoid pregnancy?*	APPROVES . . . 1 DISAPPROVES . . . 2 DON'T KNOW . . . 8	
722	How often have you talked to your husband/partner about contraception in the past year?	NEVER . . . 1 ONCE OR TWICE . . . 2 MORE OFTEN . . . 3	
723	Do you think your husband/partner wants the same number of children that you want, or does he want more or fewer than you want?	SAME NUMBER . . . 1 MORE CHILDREN . . . 2 FEWER CHILDREN . . . 3 DON'T KNOW . . . 8	

Section 8. HUSBAND'S BACKGROUND AND WOMAN'S WORK

No.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
801	CHECK 602 AND 604 CURRENTLY MARRIED/ LIVING WITH A MAN ☐ FORMERLY MARRIED/ LIVED WITH A MAN ☐ NEVER MARRIED AND NEVER IN UNION ☐		→ 803 → 809
802	How old was your husband/partner on his last birthday?	AGE ☐☐	
803	Did your (last) husband/partner ever attend school, technikum, or institute?	YES 1 NO 2	→ 806
804	What was the highest level of school he attended?	PRIMARY/SECONDARY 1 SECONDARY-SPECIAL 2 HIGHER 3 DON'T KNOW 8	→ 806
805	How many years/classes/courses he completed at that level?	YEARS ☐☐ DON'T KNOW 98	
806	What is (was) your (last)husband/partner's occupation? That is, what kind of work does (did) he mainly do?	_____ ☐☐ _____	
807	CHECK 806 WORKS (WORKED) IN AGRICULTURE ☐ DOES(DID) NOT WORK IN AGRICULTURE ☐		→ 809
808	(Does/did) your husband/partner work mainly on the state land or on his own land, or on family land, or (does/did) he rent land?	STATE LAND 1 OWN LAND 2 FAMILY LAND 3 RENTED LAND 4	

No.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
809	Aside from your own housework, are you currently working? IF NOT: Are you on maternity leave?	YES . . . 1 NO . . . 2 MATERNITY LEAVE . . . 3	→812 →812
810	As you know, some women take up jobs for which they are paid in cash or kind. Others sell things, have a small busiess or work on the family farm or in the family business. Are you currently doing any of these things or any other work?	YES . . . 1 NO . . . 2	→812
811	Have you done any work in the last 12 months?	YES . . . 1 NO . . . 2	→826
812	What is your occupation, that is, what kind of work do you mainly do?	_____ ☐☐ _____ _____	
813	CHECK 812 WORKS IN AGRICULTURE ☐ DOES NOT WORK IN AGRICULTURE ☐		→815
814	Do you work mainly on the state land or on your own land, or on family land, or do you rent land?	STATE LAND . . . 1 OWN LAND . . . 2 FAMILY LAND . . . 3 RENTED LAND . . . 4	

815	Are you public servant, or do you work on state enterprise, a prvate firm or enterprise owned by yourself, your husband, member of your family, or by someone else, or are you self-employed?	GOVERNMENT/STATE ENTERPRISE . . . 1 FAMILY/OWN BUSINESS . . . 2 PRIVATE FIRM/PERSON . . . 3 SELF-EMPLOYED . . . 4	
816	Do you usually work throughout the year, or do you work seasonally, or only once in a while (episodically)?	THROUGHOUT THE YEAR . . . 1 → 818 SEASONALLY . . . 2 ONCE IN A WHILE (EPISODICALLY) . . . 3 → 819	
817	During the last 12 months, how many months did you work?	NUMBER OF MONTHS . . . [ ][ ]	
818	(In the months you worked,) How many days a week did you usually work?	NUMBER OF DAYS . . . [ ] → 820	
819	During the last 12 months, approximately how many days did you work?	NUMBER OF DAYS . . . [ ][ ][ ]	
820	Do you earn cash for your work? PROBE: DO YOU MAKE MONEY FOR WORKING?	YES . . . 1 NO . . . 2 → 823	

No.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
822	CHECK 602 CURRENTLY MARRIED/ LIVING WITH A MAN ☐ Who mainly decides how the money you earn will be used: you, your husband/partner, you and your husband/partner jointly, someone else,or you and someone else jointly? NOT MARRIED, NOT LIVING WITH A MAN ☐ Who mainly decides how the money you earn will be used: you, someone else, or you and someone else jointly?	RESPONDENT DECIDES . . . 1 HUSBAND/PARTNER DECIDES . . . 2 JOINTLY WITH HUSBAND/PARTNER . . . 3 SOMEONE ELSE DECIDES . . . 4 JOINTLY WITH SOMEONE ELSE . . . 5	
823	Do you usually work at home or away from home?	HOME . . . 1 AWAY . . . 2	
824	CHECK 223: IS THERE A CHILD WHO IS AGE 5 OR LESS? YES ☐ NO ☐ → 826		
824A	Does (NAME OF YOUNGEST CHILD) live with you?	YES . . . 1 NO . . . 2 → 826	
825	Who usually takes care of (NAME OF YOUNGEST CHILD AT HOME) while you are working?	RESPONDENT . . . 01 HUSBAND/PARTNER . . . 02 OLDER FEMALE CHILD . . . 03 OLDER MALE CHILD . . . 04 OTHER RELATIVES . . . 05 NEIGHBORS . . . 06 FRIENDS . . . 07 BABY SITTER . . . 08 CHILD IS IN CHILDCARE . . . 10 HAS NOT WORKED SINCE LAST BIRTH . . . 95 OTHER _____ 96 (SPECIFY)	
826	RECORD THE TIME	HOUR . . . ☐☐ MINUTES . . . ☐☐	

Section 9. HEIGHT AND WEIGHT

IN 901 AND 902 RECORD HEIGHT AND WEIGHT OF THE RESPONDENT.

901	RESPONDENT'S HEIGHT (IN CENTIMETERS)	☐☐☐.☐	
902	RESPONDENT'S WEIGHT (IN KILOGRAMS)	☐☐☐.☐	
903	RESULT	MEASURED . . . . . 1 NOT MEASURED . . . . . 2 REFUSED . . . . . 3 OTHER _____ 6 (SPECIFY)	

904 CHECK 435

ONE OR MORE LIVING CHILDREN BORN SINCE JANUARY 1993 ☐

NO LIVING CHILDREN BORN SINCE JANUARY 1993 ☐ → 1001

IN 905 RECORD THE LINE NUMBER FOR EACH CHILD BORN SINCE JANUARY 1993 AND STILL ALIVE. IN 906 AND 907 RECORD THE NAME AND BIRTH DATE OF THE LIVING CHILDREN. IN 909 AND 911 RECORD HEIGHT AND WEIGHT OF THE LIVING CHILDREN.
IF THERE ARE MORE THAN TWO LIVING CHILDREN BORN SINCE JANUARY 1993 USE ADDITIONAL FORMS.

		1 YOUNGEST LIVING CHILD	2 NEXT-TO-YOUNGEST LIVING CHILD
905	LINE NUMBER FROM 434	☐☐	☐☐
906	NAME FROM 435	(NAME) _____	(NAME) _____
907	DATE OF BIRTH FROM 215, AND ASK FOR DAY OF BIRTH	DAY. . . . . ☐☐ MONTH. . . . . ☐☐ YEAR. . . . . ☐☐	DAY. . . . . ☐☐ MONTH. . . . . ☐☐ YEAR. . . . . ☐☐

908	BCG SCAR ON TOP OF SHOULDER	NO SCAR . . . . . 1 SCAR 1 - 4 mm . . . . . 2 SCAR 5 mm AND MORE 3	NO SCAR . . . . . 1 SCAR 1 - 4 mm . . . . . 2 SCAR 5 mm AND MORE 3
909	HEIGHT (IN CENTIMETERS)	☐☐☐.☐	☐☐☐.☐
910	WAS LENGTH/HEIGHT OF CHILD MEASURED LYING DOWN OR STANDING UP?	LYING . . . . . 1 STANDING 2	LYING . . . . . 1 STANDING 2
911	WEIGHT (IN KILOGRAMS)	☐☐.☐	☐☐.☐
912	DATE WEIGHED AND MEASURED	DAY . . . . . ☐☐ MONTH . . . . . ☐☐ YEAR . . . . . ☐☐	DAY . . . . . ☐☐ MONTH . . . . . ☐☐ YEAR . . . . . ☐☐
913	RESULT	MEASURED . . . . . 1 CHILD IS SICK . . . . . 2 CHILD NOT PRESENT . . . . . 3 CHILD REFUSED . . . . . 4 MOTHER REFUSED . . . . . 5 OTHER _____ 6 (SPECIFY)	MEASURED . . . . . 1 CHILD IS SICK . . . . . 2 CHILD NOT PRESENT . . . . . 3 CHILD REFUSED . . . . . 4 MOTHER REFUSED . . . . . 5 OTHER _____ 6 (SPECIFY)

914 NAME OF MEASURER: _____ ☐☐ NAME OF ASSISTANT: _____ ☐☐

LETTERHEAD OF THE INSTITUTE OF OBSTATRICS AND GYNECOLOGY

Dear Respondent:

The Institute Obstatrics and Gynecology is conducting Demographic and Health Survey in Uzbekistan. As part of this program we study the prevalence of anemia among the women and their children. We ask you to participate in this program, which will assist the Ministry of Health of Uzbekistan to develop the specific measures to prevent and treat anemia.

Anemia is a disease, which is characterized by a low count of red blood cells. It results from poor nutrition and can be especially damaging to the health of pregnant and breastfeeding women.

Today, it is possible to rapidly (within a few minutes) diagnose this disease. A low level of hemoglobin (less than 11g/dL) can be determined by the Hemocue machine on the basis of a single drop of blood.

If you decide to participate in this program, we will ask you to provide a drop of blood from your finger for the analysis. Also, if you have a child of age 3 or less, please let our nurse to obtain drop of blood from him. The procedure will be done by sterile instruments. The blood will be analyzed using the new sophisticated American equipment, Hemocue. The result of analysis will be available to you right after the blood is taken and assessed by Hemocue. We will also keep the results confidential.

If you decide to participate in this program, please sign at the bottom of this form that you agree to provide a drop of blood and allow us to obtain drop of blood from your child.

If you decide not to participate, it is your right, and we will respect your choice.

I am_____
Last name, First Name, Middle Name

agree to donate a drop of blood for the purpose of anemia diagnosis. I also allow a drop of blood to be taken from my child (children) for the purposes of anemia diagnosis.

Signature

Date "_____"_____1995

Section 10. HEMOGLOBIN MEASUREMENT IN THE BLOOD

ALL INTERVIEWED WOMEN ARE ELIGIBLE FOR HEMOGLOBIN MEASUREMENT. IN 1001 RECORD RESPONDENT'S HEMOGLOBIN LEVEL

1001	RESPONDENT'S HEMOGLOBIN LEVEL (G/DL)	☐☐.☐	
1002	RESULT	MEASURED ..... 1 NOT MEASURED ..... 2 REFUSED ..... 3 OTHER _____ 6 (SPECIFY)	
1003	CHECK 435 ONE OR MORE LIVING CHILDREN BORN SINCE JANUARY 1993 ☐ NO LIVING CHILDREN BORN SINCE JANUARY 1993 ☐ → 1009		

IN 1004 RECORD THE LINE NUMBER FOR EACH CHILD BORN SINCE JANUARY 1993 AND STILL ALIVE. IN 1005 RECORD THE NAMES OF THE LIVING CHILDREN. IN 1006 RECORD THE HEMOGLOBIN LEVEL IN THE BLOOD OF THE LIVING CHILDREN.
IF THERE ARE MORE THAN TWO LIVING CHILDREN BORN SINCE JANUARY 1993 USE ADDITIONAL FORMS.

		[1] YOUNGEST LIVING CHILD	[2] NEXT-TO-YOUNGEST LIVING CHILD
1004	LINE NUMBER FROM 434	☐☐	☐☐
1005	NAME FROM 435	(NAME) _____	(NAME) _____
1006	HEMOGLOBIN LEVEL IN THE BLOOD (G/DL)	☐☐.☐	☐☐.☐

1007	RESULT	MEASURED ..... 1 CHILD IS SICK ..... 2 CHILD NOT PRESENT ..... 3 CHILD REF USED ..... 4 MOTHER REFUSED ..... 5 OTHER _____ 6 (SPECIFY)	MEASURED ..... 1 CHILD IS SICK ..... 2 CHILD NOT PRESENT ..... 3 CHILD REF USED ..... 4 MOTHER REFUSED ..... 5 OTHER _____ 6 (SPECIFY)
1008	NAME OF MEASURER _____ ☐☐	NAME OF ASSISTANT _____ ☐☐	
1009	CHECK 1001 AND 1006 NO VALUES BELOW 7 G/DL ☐	ONE OR MORE VALUE BELOW 7 G/DL ☐ → CONSENT FOR M NO 2	

252

RECORD THE RESULTS OF HEMOGLOBIN MEASUREMENT, TEAR OFF HERE AND PRESENT THIS PORTION TO THE RESPONDENT

INSTITUTE OF OBSTETRICS AND GYNECOLOGY

RESULTS OF HEMOGLOBIN MEASUREMENT IN THE BLOOD

Date _____ _____ 1996

Name	Respondent	Last child	Next-to-youngest child
Hemoglobin level in the blood (G/DL)	☐☐.☐ You have	☐☐.☐ Your child has	☐☐.☐ Your child has
WHO CLASSIFICATION OF ANEMIA			
Normal level — Hb level above 11 G/DL	Normal level	Normal level	Normal level
Mild anemia — Hb (10-11G/DL)	Mild anemia	Mild anemia	Mild anemia
Moderate anemia — Hb (7-10 G/DL)	Moderate anemia	Moderate anemia	Moderate anemia
Severe anemia — Hb (less than 7 G/DL)	Severe anemia	Severe anemia	Severe anemia

In case of severe anemia (Hb level less than 7 G/DL), we recommend you to immediately contact your doctor.

If you have any question about hemoglobin measurement procedure, please call us at (3712)637830, or write to: Institute of Obstetrics and Gynecology, Ministry of Health of Uzbekistan, 132A Abdullaev Ave, Tashkent, Uzbekistan

CONSENT FORM No 2

Dear Respondent:

We detected a low level of hemoglobin in your (your child's) blood. This indicates that you (your child) have developed severe anemia, which is serious health problem. We would like to inform the doctor at health care facility in your area about your condition. This will assist you to obtain appropriate further diagnosis and treatment of your (your child's) condition.

If you agree with this please sign at the bottom of this form.

Thank you for your cooperation.

I
am_____
Last name, First Name, Middle Name

agree that the information about the level of hemoglobin in my (my child's) blood will be disclosed to the doctor at the local health care facility.

Signature

Date "_____"_____1995

480008 Республика Казахстан, г. Алматы, ул. Клочкова 66. Тел. (3272)429-203, факс. (3272)420-720
Расчетный счет 000608602 в Алматинском облуправлении Национального банка (Казахстан), код 190501109, МФО 61803

COMMENTS

Comments about Respondent: _____

_____

_____

Comments on Specific Questions: _____

_____

Any Other Comments: _____

_____

_____

SUPERVISOR'S OBSERVATIONS

_____

_____

_____

_____

Name of Supervisor: _____ Date _____

EDITOR'S OBSERVATIONS

_____

_____

_____

_____

Name of Editor _____ Date _____