

RESEARCH PROTOCOL

Protocol No.: 2000-034

FOR OFFICE USE ONLY

RRC Approval: Yes/ No Date:

ERC Approval: Yes/No Date:

AEEC Approval: Yes/No Date:

Project Title: Adolescents' reproductive health in rural Bangladesh: the impact of experiences in childhood

Theme: (Check all that apply)

- | | |
|---|--|
| ☒ Nutrition | ☐ Environmental Health |
| ☐ Emerging and Re-emerging Infectious Diseases | ☐ Health Services |
| ☐ Population Dynamics | ☐ Child Health |
| ☒ Reproductive Health | ☐ Clinical Case Management |
| ☐ Vaccine evaluation | ☐ Social and Behavioural Sciences |

Key words: Reproductive health, Adolescents, Follow-up, Life-course, nutritional status, reproductive knowledge, perception, attitudes

Principal Investigator: Alinda Bosch

Division: SBSP

Phone: #31-70-3565263

Address: Netherlands Interdisciplinary demographic institute (Nidi), the Hague .PO Box 11650

Email: bosch@nidi.nl

Co-Principal Investigator(s): Lutfa Begum

Co-Investigator(s): Dr. Inge Hutter, PRG-Nidi

Supervision: Dr. Jeroen van Ginneken, Nidi

Promotion: Prof. dr. H. Thero J. Willekens, PRG

Co-supervisor: Dr. Abbas Bhuiya, ICDDR,B

Student Investigator/Intern: -

Collaborating Institute(s): - Population Research Centre (PRC) Groningen
P.O. Box 800, 9700 AV Groningen, The Netherlands
- Nidi, Lange Houtstraat 19, 2511 CU The Hague

Population: Inclusion of special groups (Check all that apply):

- | | |
|---|--|
| Gender | ☐ Pregnant Women |
| ☒ Male | ☐ Fetuses |
| ☒ Females | ☐ Prisoners |
| Age | ☐ Destitutes |
| ☐ 0 - 5 years | ☐ Service providers |
| ☐ 5 - 9 years | ☐ Cognitively Impaired |
| ☒ 10 - 19 years (20-24 yrs) | ☐ CSW |
| ☐ 20 + | ☒ Others (specify <u>Adolescents</u>) |
| ☐ > 65 | ☐ Animal |

Project / study Site (Check all the apply):

- | | |
|---|--|
| ☐ Dhaka Hospital | ☐ Mirsarai |
| ☐ Matlab Hospital | ☐ Patya |
| ☒ Matlab DSS area | ☐ Other areas in Bangladesh _____ |
| ☐ Matlab non-DSS area | ☐ Outside Bangladesh _____ |
| ☐ Mirzapur | name of country: _____ |
| ☐ Dhaka Community | ☐ Multi centre trial |
| ☐ Chakaria | (Name other countries involved) |
| ☐ Abhoynagar | |

**ICDDR,B LIBRARY
DHAKA 1212**

Type of Study (Check all that apply):

- | | |
|---|---|
| ☐ Case Control study | ☐ Cross sectional survey |
| ☐ Community based trial / intervention | ☒ Longitudinal Study (cohort or follow-up) |
| ☐ Program Project (Umbrella) | ☐ Record Review |
| ☒ Secondary Data Analysis | ☐ Prophylactic trial |
| ☐ Clinical Trial (Hospital/Clinic) | ☐ Surveillance / monitoring |
| ☐ Family follow-up study | ☒ Others (survey + a few indepth interview) |

Targeted Population (Check all that apply):

- | | |
|---|--------------------------------------|
| ☒ No ethnic selection (Bangladeshi) | ☐ Expatriates |
| ☐ Bangalee | ☐ Immigrants |
| ☐ Tribal groups | ☐ Refugee |

Consent Process (Check all that apply):

- | | |
|--|--|
| ☐ Written | ☒ Bengali language |
| ☒ Oral | ☐ English language |
| ☐ None | |

Proposed Sample size:

Total sample size: 2700 at the most ☐

Sub-group Bagmati: 700 under- ☐ Study of P'souza and Bhagya:
lives, possibly to be expanded ☐ 2000 underlives
with data from a ☐

Determination of Risk: Does the Research Involve (Check all that apply):

- | | |
|---|--|
| ☐ Human exposure to radioactive agents? | ☐ Human exposure to infectious agents? |
| ☐ Fetal tissue or abortus? | ☐ Investigational new drug |
| ☐ Investigational new device?
(specify _____) | ☒ Existing data available via public archives/source |
| ☐ Existing data available from Co-investigator | ☐ Pathological or diagnostic clinical specimen only |
| | ☐ Observation of public behaviour |
| | ☐ New treatment regime |

Yes/No

- ☒ ☒ Is the information recorded in such a manner that subjects can be identified from information provided directly or through identifiers linked to the subjects?
- ☐ ☒ Does the research deal with sensitive aspects of the subject's behaviour; sexual behaviour, alcohol use or illegal conduct such as drug use?

Could the information recorded about the individual if it became known outside of the research:

- ☐ ☒ a. place the subject at risk of criminal or civil liability?
- ☐ ☒ b. damage the subject's financial standing, reputation or employability; social rejection, lead to stigma, divorce etc.

Do you consider this research (Check one):

- ☐ greater than minimal risk
- ☒ no risk
- ☒ no more than minimal risk
- ☐ only part of the diagnostic test

only anthropometric measurements will be taken

Minimal Risk is "a risk where the probability and magnitude of harm or discomfort anticipated in the proposed research are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical, psychological examinations or tests. For example, the risk of drawing a small amount of blood from a healthy individual for research purposes is no greater than the risk of doing so as a part of routine physical examination".

RECEIVED 1 00CT 2004

Yes/No

☒ ☐ Is the proposal funded?

If yes, sponsor Name: _____

- Netherlands Foundation for the Advancement of Tropical Research (WOTRO)
- Healthy reproduction: Research for action (HEKA)

Yes/No

☐ ☐ Is the proposal being submitted for funding? **No**

If yes, name of funding agency: (1) _____

(2) _____

Do any of the participating investigators and/or their immediate families have an equity relationship (e.g. stockholder) with the sponsor of the project or manufacturer and/or owner of the test product or device to be studied or serve as a consultant to any of the above?

IF YES, submit a written statement of disclosure to the Director.

Dates of Proposed Period of Support

(Day, Month, Year - DD/MM/YY)

Beginning date 1 January 2000

End date 31 December 2002

Cost Required for the Budget Period (\$)

No costs required from SCOPAB

a. 1st Year 2nd Year 3rd Year Other years

b. Direct Cost : _____ Total Cost : _____

Approval of the Project by the Division Director of the Applicant

The above-mentioned project has been discussed and reviewed at the Division level as well by the external reviewers. The protocol has been revised according to the reviewer's comments and is approved.

Name of the Division Director

Signature

Date of Approval

Certification by the Principal Investigator

I certify that the statements herein are true, complete and accurate to the best of my knowledge. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. I agree to accept responsibility for the scientific conduct of the project and to provide the required progress reports if a grant is awarded as a result of this application.

Signature of PI

Date: 20 November 2000

Name of Contact Person (if applicable)



CENTRE FOR HEALTH AND POPULATION RESEARCH

Mail : ICDDR,B, GPO Box 128, Dhaka-1000, Bangladesh

Phone : 8811751-60, Telex : 642486 ICDD BJ

Fax : 880-2-8823116, 8826050, 8811568, 8811686, Cable : Cholera Dhaka

20 November 2000

To : David A. Sack, M.D.
Chairman, Research Review Committee (RRC)

From : Ms. Lutfa Begum & Ms. Alinda Bosch
Public Health Sciences Division

Sub : Modified copies of protocol #2000-033 and protocol #2000-034

Dear Dr. Sack,

We would like to thank you for your observations following your review on 13 November 2000 of protocol # 2000-033 entitled "Adolescents' reproductive health in rural Bangladesh: Socio-cultural and gender aspect" and protocol # 2000-034 entitled "Adolescents' reproductive health in rural Bangladesh: the impact of experiences in childhood". With full respect of the Committee's observations and comments on both protocols, please find below the following information for consideration.

- (a) We have consulted Dr. Quamrun Nahar of the Operational Research Project (ORP) in order to modify our questionnaire in such a way that it allows for scientific comparison of both our analysis results later on. Also Mr. Masud Reza, one of the members of the ORP research group, was consulted about their project. Dr. Quamrun Nahar gave us valuable advice regarding the interview guidelines for the in-depth interview. In addition, she gave us various publications on recently carried out adolescents' reproductive health studies. All studies have been reviewed and are taken into account in the protocols (see of Mrs. Begum pages 12-24; and see protocol of Mrs. Bosch pages 4-7).
- (b) Regarding the operational definition we would like to note that the outcome variables of adolescents' reproductive health, as included in this study, are:
- nutritional status (indicated by anthropometric measurements as weight, height and mid-upper arm circumference) for both boys and girls;
 - the timing of sexual maturity, in particular menarche (for girls) and the onset of bodily changes (lowering of voice) for boys. For female adolescents, also the timing of other reproductive and family-life events such as the first birth (which allows for studying the spacing time between these two events) are taken into account; and
 - reproductive knowledge, perceptions and attitudes for both boys and girls (i.e. knowledge on contraceptives and the (detrimental) effects of early pregnancy in adolescence; perceptions on the onset and consequences of reproductive impairments; and attitudes on the aforementioned variables).

For your convenience also a scheme is included showing the intergenerational cycle of growth failure from baby-girl to adolescent mother. Indicators of general health (acute and chronic morbidity; see questionnaire) are taken into account as confounding variables as they may impact e.g. the reproductive health variables (for instance the onset of menarche may be delayed when the young adolescent girl recently experienced severe general illness) and are not included in the scheme (see protocol of Mrs. Begum, page 25; and see protocol of Mrs. Bosch page 7).

(c) See point (a)

(d) In order to ascertain the age-profile of the study population an explorative analysis has been carried out on the basis of the corresponding DSS data-files. The proportion of married adolescents appears to be too small indeed (less than 5 per cent). An alternative baseline study is however at hand (the study of Dr. Souza and Dr. Bhuiya that was carried out among 2013 under-fives in 1981). This study has been reviewed and proved suitable for this study on adolescents' reproductive health (see protocol of Mrs. Bosch page 14). As advised by the Committee we will include the adolescent (≤ 19 years) individuals from this study and add them to the baseline study of Dr. Baqui in order to ascertain a sufficient number of cases married. Linkage of the two baseline studies is feasible because both studies are comparable in terms of nutritional, demographic and socio-economic information.

(e) The outcome of the protocols are now more clearly mentioned (see protocol of Mrs. Begum, page 10; and see protocol of Mrs. Bosch, page 8).

(f) The date and number of the subjects of Dr. Baqui's protocol have been revised (see protocol of Mrs. Bosch page 14).

(g) The number and timing of visits of CHWs at Matlab has been justified in the protocol (see protocol of Mrs. Bosch page 13).

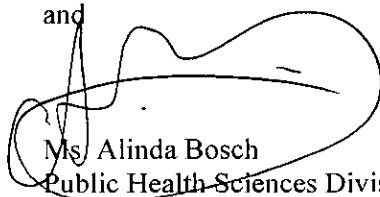
We thank you again for the Committee's valuable advice.



Ms. Lutfia Begum

Public Health Sciences Division

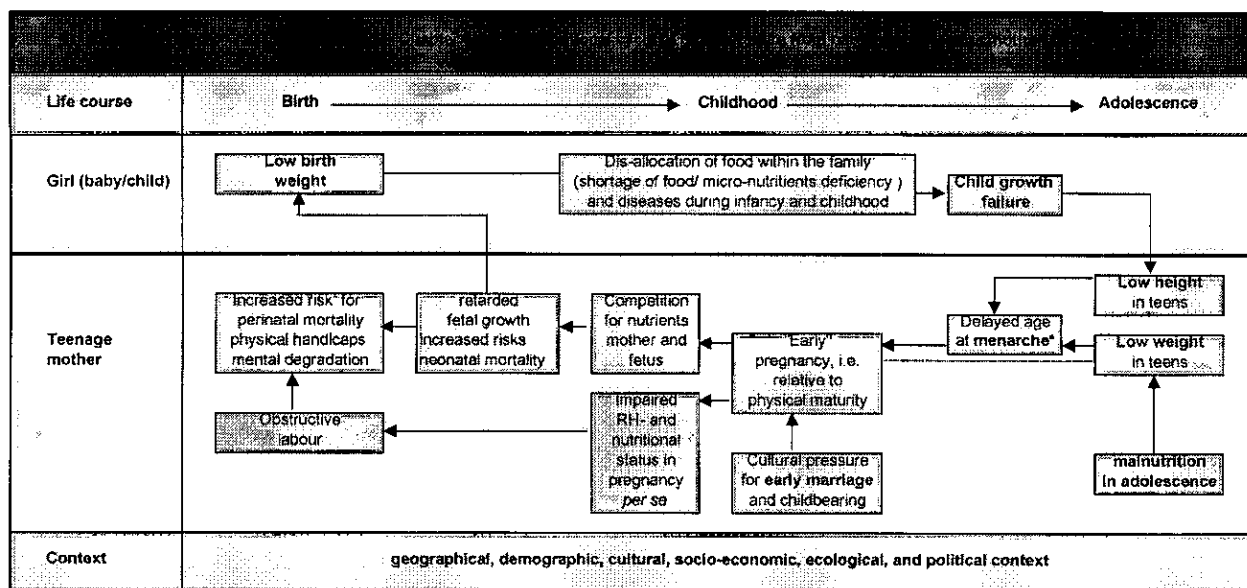
and



Ms. Alinda Bosch

Public Health Sciences Division

Attached: Modified RRC forms of protocol #2000-033 and #2000-034, respectively



Scheme explicating the intergenerational cycle of growth failure for girls (and boys up to being stunted in adolescence).

Principal Investigator: Bosch, Alinda

International Centre for Diarrhoeal Disease Research, Bangladesh

FOR OFFICE USE ONLY

Protocol No: _____ Date: _____

RESEARCH PROTOCOL

RRC Approval: Yes/ No Date:

ERC Approval: Yes/No Date:

1. Title of Project

Adolescents' reproductive health in rural Bangladesh: the impact of experiences in childhood

2a. Name of the Principal Investigator(s) (Last, Middle, First). 2b. Position / Title 2c. Qualifications

- 2a. Bosch, Alinda
- 2b. Researcher NIDI, Population and Development division and researcher within HERA-group (HERA is a co-operation between PRC Groningen and NIDI The Hague on Reproductive Health);
- 2c. MSc. Non-Western Demography (University of Groningen).

3. Name of the Division/ Branch / Program of ICDDR,B under which the study will be carried out.

Public Health Sciences Division. We would like to suggest to include the project in the Social & Behavioural Sciences Programme (SBSP) and Health and Demographic Surveillance Programme

4. Contact Address of the Principal Investigator:

Netherlands Interdisciplinary Demographic Institute (NIDI)
Lange Houtstraat 19, P.O. Box 11650, 2502 AR The Hague
Fax No: 31 70 3647187
E-mail: bosch@nidi.nl Phone / Ext: 31 70 3565200 / 3565263

5. Use of Human Subjects 5a. Use of Live Animal 5b. If Yes, Specify Animal Species

Yes No

6. Dates of Project 1-Jan-2000 to 31-Dec-2002 (see time schedule, Annex I)

7. Cost Required for the Budget Period: No costs are required from ICDDR,B as the project is funded by WOTRO (Netherlands Foundation for the Advancement of Tropical Research) and HERA (See letter of WOTRO about approval, Annex II)

8. Approval of the Project by the Division Director of the Applicant

Please see also
Earlier correspondence between Prof. D. Habte and Prof. Willekens; Prof. Fuchs- Dr.Hutter –Prof. Persson (Annex III)
External Reviews by WOTRO and correspondence between WOTRO - Dr. Hutter and Prof. Person (Annex IV)

The above-mentioned project has been discussed and reviewed at the Division level as well by the external reviewers.
The protocol has been revised according to the reviewer's comments and is approved.

Name of the Division Director Signature Date of Approval

9. Certification by the Principal Investigator

I certify that the statements herein are true, complete and accurate to the best of my knowledge. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. I agree to accept responsibility for the scientific conduct of the project and to provide the re-

10. Signature of PI


Date: 20-11-2000

quired progress reports if a grant is awarded as a result of this application.

Table of Contents

	Page Numbers
Face Page	
Project Summary	
Description of the Research Project	
Hypothesis to be tested	
Specific Aims	
Background of the Project Including Preliminary Observations	
Research Design and Methods	
Facilities Available	
Data Analysis	
Ethical Assurance for Protection of Human Rights	
Use of Animals	
Literature Cited	
Dissemination and Use of Findings	
Collaborative Arrangements	
Biography of the Investigators	
Detailed Budget	
Budget Justifications	
Other Support	
Ethical Assurance : Protection of Human Rights	
Appendix	
Consent Forms in English	
Consent Forms in Bangla	

☐

 Check here if appendix is included

- | | |
|-----------|---|
| Annex I | Time schedule of project |
| Annex II | Letter from WOTRO about (financial) approval |
| Annex III | Earlier correspondence between ICDDR,B – PRC Groningen – NIDI Den Haag |
| Annex IV | Earlier correspondence about WOTRO’s external reviewers and reviews |
| Annex V | Biographies of the investigators and HERA-persons involved in supervision |

Principal Investigator: Bosch, Alinda

PROJECT SUMMARY:

In accordance with the change of paradigm from numbers to individuals at the ICPD in Cairo 1994, the current project views reproductive health from a so-called *process-context approach*. That is, individual reproductive health (RH) behavior at a given moment in time is seen as the outcome of a *process* involving a series of individual decisions and actions taking place within the socioeconomic, demographic, ecological, cultural and political *context*. Moreover, reproductive health is viewed from a dynamic perspective: in a *life course* and *historical perspective*. The project has been developed by HERA (HEalthy reproduction: Research for Action, a co-operation between PRC Groningen and NIDI, The Hague in the field of reproductive health research) and ICDDR,B.

Within this general framework, reproductive health of a special group is studied, i.e. adolescents, a group generally identified as between the age of 10 to 19 years. Male and female Bangladeshi adolescents, irrespective of their marital status or their reproductive career, will be included in this study. Adolescents' reproductive health is studied in relation to various contemporary factors, with special emphasis on gender differences. It is during adolescence that gender roles are internalized and perpetuated and that a start is made with the reproductive career. Moreover, living conditions, events and patterns of behavior in the past are taken into account. The research stems from the assumption that adolescents' current reproductive health status is not only determined by current conditions but is also affected by the nutritional and health status during their childhood, as well as by circumstances at that time. General question of research is therefore:

What is the reproductive health status of male and female adolescents in Matlab, Bangladesh, and by what factors, featuring in their context and during their life course, is this status determined?

Following the *life course perspective* within the *process-context approach* ideally requires the analysis of *longitudinal* data, which necessitates the collection of information of one person for least two moments in time. In the 1980s ICDDR,B collected information on under-fives in Matlab in studies conducted by Dr. Baqui and Dr. D'Souza and Dr. Bhuiya, respectively. These data will be linked to data collected in a survey to be carried out among the same individuals - in their adolescence - in the year 2001. By following up a group of under-fives, through a survey almost 15 years later, a unique opportunity is established to study adolescents' reproductive health in view of *context* and *life course* as well. An additional aim of the project is to translate the results of the research into a health education campaign in co-operation with a local NGO in order to improve the reproductive health status of the adolescents involved and the generations that follow them.

It should be noted that the project has been developed in combination with another, complementary, project entitled "*Adolescents' reproductive health in rural Bangladesh: Socio-cultural and gender aspects*" (*see Research Protocol by Mrs. Lutfu Begum*). This other project focuses specifically on gender issues in relation to reproductive health and is based on the application of qualitative research methods. The survey on reproductive health status of adolescents will be conducted in cooperation with the Bangladeshi researcher.

The qualitative project started in September 1999 and will close four years later, whereas the current project will run for three years, from January 2000 to December 2002. Both projects are being carried out in close co-operation.

Principal Investigator Mrs. Alinda Bosch (MSc)

Project Name Adolescents' reproductive health in rural Bangladesh: the impact of experiences in childhood

Total Budget Research costs: 104.750 Dutch Florins (completely funded by WOTRO and HERA). Salary also paid by WOTRO

Beginning Date 1 Jan. 2000 **Ending Date** 31 Dec. 2002

KEY PERSONNEL

Name	Professional Discipline	Role in the Project
1. Mrs. Alinda Bosch (MSc)	Non-western Demographer, NIDI	Principle Investigator
2. Mrs. Lutfu Begum (MSc)	Home economist, ICDDR,B / PRC	Principle Investigator complementary project
3. Dr. Inge Hutter	Associate Prof. Anthropology + Demography	Supervisor
4. Dr. Jeroen van Ginneken	Head Population and Development NIDI	Co-supervisor
5. Dr. Abbas Bhuiya	Head SBSP, PHSD, ICDDR,B	Co-supervisor
6. Prof. Dr. Frans Willekens	Professor in Demography PRC Groningen	Promotor

Interviewers: To be recruited at ICDDR,B
See also Annex V

DESCRIPTION OF THE RESEARCH PROJECT

Hypothesis to be tested:

A. Scientific basis

Reproductive health studies generally refer to one or more of the following topics: age at menarche, pregnancy history and childbirth, methods used for fertility regulation, abortion, incidence of reproductive tract infections (RTI) and sexually transmitted diseases (STDs, including AIDS), infertility, safe motherhood, and sexual health. In order to understand processes that underlie reproductive health, these topics are related to one or more:

- *micro-level factors*: e.g. age, sex, nutritional status, marital status, education, income and health-related behaviours (see e.g. Blanchet 1987; Fieldhouse 1995; Hutter 1996b; Hutter 1994; White 1992);
- *meso-level factors*: the context of family, family-in-law, peers and friends (see e.g. White 1992); and/or
- *macro-level factors*: e.g. the medical-health environment (health care), infrastructure, prevailing social, religious and gender norms (*purdah*), and the economic environment (employment opportunities), and quantity and quality of food (ecological environment, incidence of floods) (see e.g. Caselli *et al.* 1990).

In this study, adolescents' reproductive health is viewed within the so-called 'reproductive life course' which is - analogue to Runyan's definition of the general life course (1984) - defined as "*The sequence of those life events, from birth until death, that either constitute reproductive health or that are related to the chain of person states and encountered situations that influence individual reproductive health outcomes, its timing or sequence*". Adoption of the life course perspective implies that reproductive health outcomes are viewed in a broader perspective -by taking also conditions and circumstances in childhood into account- than only relating them to the reproductive career, which, from a biological point of view, starts with menarche.

Such an approach is based on the following arguments. In most studies on (reproductive) health, the focus is cross-sectional, i.e. groups are compared in terms of their current health and exposure status. A disadvantage of such an approach is that the health and exposure status are assessed simultaneously, while the origins of diseases and impaired health often go back to months or even years before (Caselli *et al.* 1990; Barker 1992; Elo and Preston 1992; Mosley and Gray 1993; UNFPA 1998). The study of the long-term consequences of health defects and chronic malnutrition in the early stages of life have mainly been the domain of epidemiologists. The Barker group in Britain (Barker 1992), for instance, investigated the foetal and infant origins of several adult diseases, such as Ischemic heart disease, stroke and chronic bronchitis. Recently, UNFPA (1998, p. 52) concluded that "malnutrition of the mother during gestation and of the infant once born creates a predisposition to a number of chronic diseases in adulthood".

In general, not much information exists on the factors that can be associated with an increased risk of serious (reproductive) morbidity and mortality of current *adolescents* in Bangladesh and which have their antecedents in childhood or during gestation. A brief literature review of the available studies on past and present factors determining RH of adolescents in Bangladesh is presented below. Reviewing these various factors on the micro-macro continuum, three categories of important indicators and risk-factors of RH have been identified: 1) physical growth and development, 2) cognitive development, and 3) contextual factors.

1) Physical growth and development

The general health and nutritional status of Bangladeshi adolescents is believed to be poor, particularly for female adolescents. A recently carried out study of Akter *et al.* (1999) was aimed at assessing nutritional status of female adolescents in Bangladesh and to review attitudes and relating practises of both the adolescent herself and her mother that influence this nutritional status. An additional aim was to determine the risk-factors for malnutrition in adolescent girls. A total of 1214 adolescent girls was sampled out of a 10512 population residing in 1923 households. The fieldwork took place between February-April 1994. The main outcome variables were anthropometric measurements (weight, height - height for age, BMI - and MUAC) and blood samples. In addition information was collected about: age and educational status, general health status, daily activity pattern, practice and perceptions on rest and recreation, dietary and feeding practices within

the family, reproductive characteristics (age at menarche, source of information) and marital and pregnancy status, perceptions on nutrition during lactation, and future aims.

The study showed that various variables can be associated with the anthropometric measurements: they found e.g. that adolescents that live in high SES households have a significantly better nutritional status than those in low SES households, and, linked to this: a positive association between food expenditures and nutritional status. Also a relationship between overall health status and nutritional status is in line with other studies. In addition, reproductive health outcomes such as the timing of menarche are associated with bodily characteristics, i.e. at the group-level a higher mean height, weight and MUAC is associated with an earlier onset of menarche (before 13 years of age). The study has also found significant relationships between using an unsafe (i.e. less hygienic) latrine and thinness. Similarly, positive associations were found between thinness and 'not being immunized', 'lack of education (both of the adolescent and of the mother/ female guardians as well)', 'keeping food restrictions', and 'illness in last month', respectively.

A serious drawback of the study is however that some statistical associations are miss-interpreted as causal relationships simply because no longitudinal data were at hand. In the study of Akter *et al.* (1999) stunting (height for age) is e.g. ascribed to type of latrine used, going outside the house, pregnancy history, and dietary intake in past 24 hours. A person's height, however, is the outcome of genetic factors and health and nutritional conditions earlier in life. Once in adolescence contemporary conditions may hamper or facilitate growth but never to such an extent that they can cause stunting. Only a pregnancy at a very early stage in adolescence may cause a growth delay, which results in being stunted later in adolescence. All other factors may indirectly (latrine used, going outside the house) or directly (24-hour dietary recall) influence other indicators of nutritional status (weight and MUAC) assuming that these factors are indicative for the recent past of the adolescent girl. Akter *et al.* (1999) recommend among others that anthropometric measurements should be incorporated into existing surveillance systems. In due time this would indeed allow for studying the determinants of stunting as this requires the analysis of individual-level longitudinal data.

The proposed study on adolescents' reproductive health in rural Bangladesh whereby explicitly the impact of experiences in childhood are taken into account aims among others at studying life-course factors that influence stunting. The analysis of data collected by ICDDR,B offers unique possibilities to study the life-long determinants of nutritional status in childhood.

That the poor status of adolescents may partly be explained by conditions pertaining to their childhood is also suggested in a study of Riley (1994) who revealed that "adolescent *growth spurt* is considerably delayed, extended and less intense in Bangladeshi females, compared to a sample of British girls" and that "age at menarche is delayed by about three years in Bangladesh (15.8 year in Matlab) compared to Western populations (12.5 years)" due to chronic malnutrition in childhood. In Matlab, age at menarche increased from 12.9 years in 1961 to 17.4 years in 1977, the latter figure being directly associated with severe conditions during the 1971 war and the 1974 famine (Chowdhury *et al.* 1977, in: Becker 1993).

Menarche, as well as *marriage*, is an important reproductive event, taking place within the period of adolescence. Although Bangladeshi girls marry at an average age of 18 (and boys at the age of 25; Mostafa *et al.* 1996), research by NIPORT (1994) revealed that one in three 15 to 19 year-old girls in the country is already a mother or expecting her first baby. Despite legal restrictions on age at marriage, there is "a strong social pressure for young women to marry as soon after menarche as possible" (Riley 1994, p. 93). Early marriage "ensures that the girl does not stray sexually" (Mukhopadhyay and Savithri 1998, p. 28). Related to this is the custom of dowry (payment by the bride's family), common among virtually all groups in Bangladesh. Not only has the amount payable risen dramatically (White 1992, p. 102) it also increases by age. As the years tick by, it will be more difficult for parents to arrange a marriage-match at the lowest costs (Ibid.). After marriage, having a child within a few years is considered most important for newly-weds as the proven fertility assures the status of the woman. Consequently, contraceptive use among married adolescents is low (Islam and Mahmud 1995). Other studies revealed that childlessness in the first three years after marriage puts considerable pressure on the marriage and increases even the risks of divorce (White 1992; Nahar and Van Ginneken 1997).

As a result of marrying soon after menarche and the social pressure to prove her fertility, many Bangladeshi girls become pregnant while they have not yet reached *full maturity*. *Immaturity of young mothers* may affect the pregnancy outcome through two mechanisms: firstly, "the growth needs of the mother and the ones of the foetus may create a competition for nutrients" and secondly, "the relative immaturity of the young mother *per se* (i.e. smaller body size, lower weight, less well-developed reproductive organs) may place them and their infants at higher risks of poor birth outcomes" (Riley 1994, pp. 90-93).

In addition, pregnancy in adolescent girls may interfere with the completion of the growth of their pelvis. Riley found that in some girls linear growth continues past the age of 20, while “growth of the pelvis (...) continues for some time after linear growth is completed”. A study of Ross (1996 *et al.* p. 10) revealed that among the rural poor in Bangladesh, 75 percent of all women are less than 147 centimetres in height as a result of stunting.

Giving birth while the pelvis is too narrow to permit easy passage of the infant is likely to result in obstructive labour and the development of fistulae. This does not only lead to higher health risks for the infant, but increases also the risks during *childbirth* for the woman herself (Riley 1994). In the whole Matlab area, mortality from direct obstetric causes was 29 percent among 14-24 year old women, during the period 1976-1989 (Fauveau 1994, p. 113). “Girls under the age of 15 are 5-7 times more likely to die in pregnancy and childbirth than 20-24 year old women” (Starrs 1987, p. 15).

Under normal conditions, the adolescent growth spurt in boys starts at age 12 or 13, peaks at 14 and is completed at the age of 19 years. From a study of Barker (1992), conducted in England and Wales, it is known that children, who faced malnutrition in childhood, have higher risks for suffering of *chronic bronchitis* later in life (Barker *et al.* 1991). Also *accidents and diseases* experienced during childhood, e.g. *infectious diseases* such as *measles* and *chronic diarrhoea*, and *jaundice* and *chickenpox*, may lead to higher risks for an impaired health status later in life.

2) Cognitive development

It is during adolescence that children *learn and internalise* behavioural patterns that will stay with them for the rest of their lives, including the reproductive period. However, taking into account the *gender roles* in Bangladeshi society, one has to conclude that Bangladeshi girls face *discrimination* from birth onwards and “by the time she reaches puberty a Bangladeshi woman has already experienced a life-time of discrimination compared to males” (Ross 1996b, p.5).

The lesser value of the girl starts at birth, when she is often less welcomed than her baby-brother (Blanchet 1996). Fertility behaviour is directly linked to son-preference in Bangladesh. “Perceptions of the male as bread-winner and sole source of support for parents in old age in a society where post-marital residence is largely patrilocal makes it important for couples to have at least one son” (Mukhopadhyay and Savithri 1998, p. 30). Examples of *gender-specific love and care* during childhood can be found in many domains of life: e.g. in *nutritional status and distribution of food and tasks within the family* (Chen *et al.* 1981; D’Souza and Chen 1980; Razzaque 1989) but also in the *allocation of love* and in *health seeking behaviour for children* (Ross 1996b). Similar findings are described for India (Miller 1981; 1989). There are indications that discrimination of girls is higher in families with more than two girls compared to families with one or no girl at all (Blanchet 1987; 1996; Ross 1996b, p. 5).

The *meaning* of adolescence is also different and shorter for girls compared to boys (Aziz and Maloney 1985; Blanchet 1996). The female role is focussed solely on their future roles as wives, daughters-in-law and mothers. During childhood and adolescence they learn “how to do what will please the family” (*i.e. the future family-in-law*), and “providing her worth through obedience, hard work, good temper and modest behaviour” (White 1992, p. 97). According to Blanchet (1996, pp. 131-132) in the Bengali culture, motherhood “is more than a role, it is a religion, the ultimate purpose of womanhood”.

Whereas girls grow up in order to become good wives and mothers, *boys’ duties* during adolescence are often “limited to preliminary training for *their role as provider* and as the *primary participants* in their families’ contact with the larger society” (UNFPA 1998, p. 24).

In the studies of Nahar *et al.* (1999) and Barkat (2000) in particular the needs as expressed by the adolescents themselves are studied. The extensive study of Nahar *et al.* (1999), in which about 4000 adolescents were enrolled and whereby both quantitative as well as qualitative research methods have been applied, can be considered to be a major contribution into the insights and knowledge on the socialisation processes as taking place in adolescence within the Bangladeshi cultural setting. Their study revealed among others that both sexes view the ideal age at marriage as 18 and 21 years for both girls and boys, respectively. The study revealed also a great need for knowledge on e.g. menstruation (expressed by girls), reproductive functioning and diseases of the reproductive organs (by both sexes). Although their knowledge about contraceptives was fairly good, improvements in this field are welcomed. The study outlined furthermore the great need to improve the accessibility to reproductive health care facilities for adolescents. Similarly, the study of Barkat (2000) that included a sample of 1600 adolescents (1320 unmarried, 280 married) living in 12 project sites (drawn out of a total of 71) showed a lack of awareness among adolescents on the following topics: causes of menstruation, consequences of not maintaining menstrual hygiene, menstruation management, consequences of unprotected sexual act, Gonorrhoea, Syphilis, method of transmission of HIV/AIDS, use of condom for prevention of STD/HIV/AIDS, menstrual regulation, causes of STDs, and availability of treatment facilities for STDs. Also parents showed a lack of knowledge on several of these items. Their

recommendations as well point to the importance of learning about the consequences of early marriage and human reproduction in general.

Unfortunately, neither the study of Nahar *et al.* (1999) nor the study of Barkat (2000) included any information on the nutritional status of adolescents, let alone on the childhood determinants of this status. The current study can therefore be considered to be a valuable contribution to these two studies. Additionally, as the study of Nahar *et al.* (1999) was conducted in both rural (Naopara union of Abhayanagar thana and Bagherpara thana of Jessore district, and Jorarganj union of Mirsarai thana of Chittagong district) and urban areas (the Lalbagh and Rayerbazar areas of Dhaka city), whereas the proposed study will be conducted in rural Matlab comparisons could be made of various reproductive health indicators (reproductive knowledge, perceptions and attitudes) by local area. For this reason the questionnaires of the proposed study will be modified according to the study-questionnaires of Nahar *et al.* (1999) on the aforementioned topics.

3) Contextual factors: developments in Matlab

The higher the socio-economic status (income) of the family, now as well as during the childhood of the adolescent, the more possibilities to remain in good health, to buy food, and to seek medical help when needed. A result of poverty impinging on health, is the “increased work burden on all members of the family, and especially the women and children” (Mukhopadhyay and Savithri 1998, p. 26). Whereas girls contribute to childcare, food preparation and other household tasks, sons work for wages from young age (Mukhopadhyay and Savithri 1998, p. 26). Work and poverty limit therefore directly *access to education* for the child. It is expected that educated adolescents may start their reproductive career later (as they marry later) than their non or lower-educated counterparts (Karra *et al.* 1997). It is questionable though whether educated adolescents are also better informed about reproductive health issues, as this is not considered to be an appropriate subject to teach in schools.

Apart from micro socio-economic conditions, macro-level factors such as e.g. medical-health infrastructure and the ecological environment (floods, famines) need to be taken into consideration as well. Reproductive health is directly related to the availability of *health care clinics*. However, *purdah* often forms a burden to visit them freely, as it is socially unacceptable for women to be physically examined by a male doctor (Ross 1996b, pp. 29-30) and “she may not be allowed to move alone in public places” (Mukhopadhyay and Savithri 1998, p. 32).

Definition and operationalisation of adolescents’ reproductive health

At the 1994 ICPD, reproductive health was referred to as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and to its functions and processes” (ICPD 1994, paragraph 7.2). In the proposed project, RH-status is operationalised as:

- nutritional status (indicated by anthropometric measurements as weight, height and mid-upper arm circumference) for both boys and girls;
- The timing of sexual maturity, in particular menarche (for girls) and the onset of bodily change (lowering of voice) for boys. For female adolescents, also the timing of other reproductive and family-life events such as the first birth (which allows for studying the spacing time between these two events) are taken into account; and
- Reproductive knowledge, perceptions and attitudes for both boys and girls (i.e. knowledge on contraceptives and the (detrimental) consequences of early pregnancy in adolescence; perceptions on the onset and consequences of reproductive impairments; and attitudes on the aforementioned variables).

These variables will be studied in relation to other (present and past) physical and social, as well as environmental and socio-economic explanatory variables. Indicators of general health (acute and chronic morbidity; see questionnaire) are taken into account as confounding variables as they may impact e.g. the reproductive health variables (for instance the onset of menarche may be delayed when the young adolescent girl recently experience severe general illness).

B. Hypotheses

The overall hypothesis underlying the project is ‘whether and to what extent is adolescents’ reproductive health associated with contemporary and childhood conditions and circumstances?’. In the attached scheme the linkages between childhood conditions and reproductive health later in life is illustrated. On the basis of the literature review above the following specific hypotheses can be formulated:

- *Current RH-status, indicated by current nutritional status and events in the reproductive career, is affected by nutritional status in childhood. More specifically, malnutrition during childhood results in lower current nutritional status (lower height and weight); and for girls also in a higher age at menarche.*

- *In addition, current RH-status, indicated by reproductive knowledge, perceptions and attitudes, is determined by factors from the past and present socio-cultural and socioeconomic context.*
- *Moreover, differences in the current RH-status are expected to be found between female and male adolescents, in particular with regard to:*
 - *their current nutritional and morbidity status;*
 - *their reproductive career, especially regarding family formation;*
 - *current health-related behaviors and attitudes; all as embedded within*
 - *the present socioeconomic, demographic, ecological, cultural and political context.*
- *Also, these current gender-differences are associated with:*
 - *conditions earlier during the life course, especially during childhood, hereby taking into account;*
 - *differences in nutritional status and morbidity (childhood diseases) then; all as embedded in;*
 - *the socioeconomic, demographic, ecological, cultural and political circumstances at that time.*

The outcome of the study is foremost the assessment of adolescent's reproductive health status, and secondly the relative contribution of current and childhood conditions on this status. Also various intervening and determining contextual factors, from the past and present will be taken into account. The *longitudinal* study will thus give further insight into:

- a) the reproductive health status of males and female adolescents in rural Bangladesh; and in
- b) *life course* risk factors, i.e. the long-lasting effects of nutritional and health status, as well as of demographic, socio-cultural and socioeconomic conditions during infancy on the (reproductive) health status in adolescence.

As also the *meaning* of adolescence, indicated by reproductive knowledge, attitudes and perceptions, is studied, the project depicts a more holistic image of the period of adolescence. We expect to contribute to a further development of the concept of reproductive health in adolescence, and in particular the reproductive health status of young men.

Finally it should be noted that the project involves more than filling the information gap where adolescents' reproductive health is concerned. It is expected that the aforementioned results of the research project will forward recommendations in order to meet the adolescents' needs. It strives to provide guidelines for the development of services and education in the field of general, sexual and reproductive health for adolescents and the generations that follow them.

Specific Aims:

The overall aim of the project is to study adolescents' reproductive health in Matlab, a rural area in Bangladesh. More specifically, the reproductive health status of male and female adolescents, aged 10 to 19, will be studied:

- in relation to contemporary factors and conditions,
- by taking into account circumstances and experiences in the past, and
- with particular reference to the period during childhood.

Special attention will be devoted to different groups of adolescents, i.e. female versus male, 'younger' versus 'older', married versus non-married adolescents, and adolescents with versus adolescents without children, all in relation to reproductive health outcomes. It is expected that depending on age and moreover the stage of (physical and cognitive) development the adolescent is in, different requirements in terms of information and health care are needed. An adolescent who is about to experience menarche or in the middle of maturity processes is likely to have different needs compared to the young woman who has already married and just about to give birth to her first child. In addition, societal expectations are quite different for boys and girls. Consequently, the gender aspect can not be overlooked when conducting research on adolescents' reproductive health. Finally, the research is aimed at gaining insight into the role of contextual circumstances.

Apart from the scientific aims, the project also depicts to address practical needs of adolescents. An additional aim of the project is therefore:

- to translate the results of the research into a health education campaign in co-operation with a local NGO in order to improve the reproductive health status of the adolescents involved and the generations that follow them.

Background of the Project including Preliminary Observations

Background of the project

The International Conference on Population and Development (ICPD) in Cairo, in September 1994 announced a significant change of paradigm in the topic of population and development. Rather than focusing on numbers of people and demographic targets, development goals - among which a fast reduction in population growth - are assumed to be achieved only if policies and activities emphasise *the rights, needs and ambitions of individual men and women*. Reaffirming the vision agreed upon in the Alma-Ata Declaration in 1978, at the 1994 ICPD, reproductive health was referred to as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and to its functions and processes” (ICPD 1994, paragraph 7.2). Regarding reproduction, the ICPD action program points to everyone’s right to decide freely and responsibly whether to have children, when to have them and how many to have. The program seeks to expand the options and to broaden the package of services and IEC-activities (Information, Education and Communication activities) in the field of reproductive health. Special attention is paid to adolescents’ reproductive health, a topic still high on the research and policy agenda of the ICPD+5 conference in The Hague, in February 1999 (WHO 1999, pp. 11-12).

In September 1996, the Population Research Centre (PRC) of the University of Groningen and the Netherlands Interdisciplinary Demographic Institute (NIDI) in The Hague decided to join forces in a research program on reproductive health, called “HEalthy reproduction: Research for Action” (HERA). The program unites several research projects from both institutes (Hutter 1998a). In accordance to the ICPD action program, many of these projects explicitly include an action component. In co-operation with local NGOs (Non Governmental Organisations) research results are translated into culturally acceptable (educational or health) campaigns in order to address the needs of the populations involved.

Given the complex nature of the concept of reproductive health – encompassing physical and cognitive developmental characteristics – and the multitude of factors (from the present and the past) influencing it, projects in the HERA research program study reproductive health from a so-called *process-context approach*. Entailing such a multi-disciplinary approach to the study of reproductive health ideally requires that influences from the multi-level (macro-, meso- and micro-level) and multi-dimensional (institutional, situational, and time) *context*, and, particularly experiences encountered earlier during the *life course* ought to be taken into account.

Within the general framework on reproductive health, this research project is devoted to the reproductive health of adolescents in Bangladesh. Adolescence (sometimes also called youth or puberty) is the transition stage between childhood and adulthood, and generally identified as the period between the ages 10 to 19. As in many other developing countries, both in numerical as well as in proportional terms this group gains in importance. According to the Bangladesh Demographic and Health Survey 1996/1997, almost 25 per cent of the Bangladeshi population was aged between 10 and 19 years, which equals to about 30 million 10-to-19-year-olds (Mitra *et al.* 1997, p. 7).

History of the project

HERA works together with several research organizations and NGOs in developing countries, especially in India (PRC Dharwad; IIPS Mumbai; PRC Trivandrum; FPAI Mumbai).

The present research proposal has been developed in cooperation with ICDDR,B (Dr. J.K.S. van Ginneken, former head of Health and Demographic Surveillance Programme of ICDDR,B and Dr. Abbas Bhuiya). The approach adopted by ICDDR,B, based on years of experience in reproductive health research in the area of Matlab, is very similar to HERA’s approach: “increasing recognition (...) of the need to understand the socioeconomic and cultural factors that influence improvements in health-related behaviors and status (...)” and “such a holistic perspective necessitates a multi-disciplinary approach (...)” in order to have “the capacity to more fully integrate the social and behavioral sciences with biomedicine (...)” (Ross 1996a, p. 3).

Following a first meeting between HERA (Dr. Eelens) and ICDDR,B (Dr. van Ginneken) in Dhaka in October 1996, a plan for co-operation was established soon thereafter. During a second visit to ICDDR,B of Dr. Hutter (HERA) a number of topics in reproductive health, relevant for all three research institutes, were identified. This was followed by a three-month *feasibility study* conducted by Dr. van Ginneken, Alinda Bosch (HERA) and Dr. Hutter (reported on by Bosch and Hutter 1998). Based on the

experiences and insights gained in the feasibility study, the communal decision was taken to develop a reproductive health study on this special group: adolescents. Two proposals have been developed subsequently, in cooperation with Dr. Abbas Bhuiya: one for a Dutch researcher (Alinda Bosch) and one for a Bangladeshi researcher (Lutfa Begum). Funding for the Bangladeshi researcher was found in the beginning of 1999, for the Dutch researcher at the end of 1999. Both researchers (salaries) and research costs are funded by WOTRO (Netherlands Foundation for the Advancement of Tropical Research). HERA itself pays some additional costs, which are not covered by WOTRO, such as a laptop-computer for the Bangladesh researcher, living costs for the Dutch researcher while she stays in Bangladesh.

Mrs. Lutfa Begum started to work on the project in September 1999, following courses in The Netherlands at PRC Groningen and developing the first -theoretical and background- chapters for the dissertation. Mrs. Alinda Bosch started in January this year.

Scientific significance and innovative aspects

Three aspects refer to the scientific significance and innovative character of the research project: (1) the project focuses on a specific group, i.e. adolescents; (2) a specific theoretical approach to RH-behaviour is applied: the so-called *process-context approach* and a *life course perspective*, implying analysis of longitudinal data; and (3) research is followed by action.

1. Adolescents

In 1997, more than half the world's population was under the age of 25, with adolescents already numbering over one billion. This number is expected to increase by 22 percent worldwide, to 1.25 billion in 2010 and 1.3 billion in 2020 (UNFPA 1997, p. 2). Births among adolescent women account for a little over 10 percent of all births worldwide. As a result of the increase of the adolescent population, this proportion will only increase (UNFPA 1997).

Worldwide, adolescents have long been largely neglected in both health and family planning programmes, as they were not considered to be sexual entities until marriage. This lack of attention was in stark contrast with the importance of adolescence, as it is during this particular period that most children achieve physical and emotional maturity. A period which includes many - often complex - processes, such as the onset of menarche, developing close friendships, dealing with peer pressure, struggling with identity, becoming aware of one's sexuality, developing ideals, and adopting and taking examples from role models. As stated by Islam and Mahmud (1995, p. 22) "the adolescent phase of human life is often termed as a very 'demographic dense' phase because more demographic actions occur during these years than at any other stage of life". This certainly applies to a developing country like Bangladesh.

Adolescence is nowadays recognized as an important, specific stage in life, characterized by "gradual yet dramatic transitions, socially, physically as well as psychologically" (UNFPA 1997, p. 3). It is during adolescence that girls and boys learn and internalize behavioral patterns that will stay with them for the rest of their lives, including the reproductive period.

2. Application of the process-context approach and the life course perspective to the study of reproductive health

The concept of reproductive health is central to the Action Programme of Cairo. Zurayck (1994) defines reproductive health as "the ability of women to pass through the reproductive years and beyond with reproductive choice, dignity and successful childbearing and to be free of gynaecological disease and risk". It entails people having "the ability to reproduce, that women can go through pregnancy and childbirth safely, and that reproduction is carried out to a successful outcome, i.e. infants survive and grow up healthy. It implies further that people are able to regulate their fertility without risks to their health and that they are safe in having sex" (WHO 1992, p. 3).

The RH-framework thus goes beyond the narrow confines of family planning to encompass all aspects of sexuality and RH-needs during the various stages of women's lives (Sai and Nassim 1989). Not only does the concept of reproductive health mark the shift to women's health in its own right, rather than as an instrument to improve child survival (Dixon-Mueller 1993), it is also a step towards a more holistic approach (Obermeyer 1995). Reproductive health is determined by social and economic status, lifestyle, quality and accessibility of health services and women's status, but "more than anything else, by the freedom to make choices" (UNFPA 1995, p. 33). In other words, reproductive health focuses on the needs and ambitions of *individuals*, on reproductive choice, i.e. individual reproductive behaviour as it is embedded in the socio-economic, demographic, ecological, cultural and political *context*.

The *process-context approach*, closely linked to the definition of reproductive health as mentioned above, is a theoretical approach adopted by HERA and worked out in detail by Willekens (1990; 1992) and De Bruijn (1992; 1993; 1999) and Hutter and Willekens (1998). The framework relates to earlier and recent studies in social demography by, among others, McNicoll (1985; 1989; 1994) and Greenhalgh (1989; 1994; 1995). The approach is in line with the perspective of new institutional economics of

North (1994) and Denzau and North (1994), while studies by D'Andrade (1984; 1995) and D'Andrade and Strauss (1992) contributed from a cognitive-anthropological point of view.

In short, within the *process-context* approach, individual RH-behaviour at a given moment in time is seen as:

- **the outcome of a *process* that involves a series of *individual* decisions and actions, over the life time, which take place,**
- **in the socio-economic, demographic, ecological, cultural and political *context*.**

In addition, the *process-context* approach views reproductive health as not only being determined by contemporary factors but also by living conditions, events and patterns of behaviour in the past. In each successive stage of life, conditions are built upon conditions in previous stages. Health is considered to be the outcome of genetic heritage, the conditions of gestation and the life history since birth (Caselli *et al.* 1990, p. 3). With his or her 'bio-demographic characteristics', the actor forms 'part of a context with which he or she interacts', now as well as in the past (Caselli *et al.* 1990, p. 5). We thus view reproductive health from a dynamic perspective:

- **in a *life course perspective*, within the reproductive career and the reproductive events playing a central role, and**
- **throughout *time*, i.e. in a historical context with the replacement of generations as a major mechanism of change.**

3. Adolescents' reproductive health: the need for research followed by action

HERA and ICDDR,B believe that research should not only lead to knowledge, but that knowledge should also be used to improve people's health: research results should go 'back' to the people concerned. Consequently, research results will be disseminated among the Bangladeshi adolescents (see also part on dissemination and use of findings).

Research Design and Methods

Research questions

The general question of research is: “What is the reproductive health status of male and female adolescents in Matlab and by what factors, from the present and the past, is this status determined?”. More specifically, and hereby building further on the definition of (adolescents’) reproductive health as adopted in Cairo, the research is directed by the following five research questions:

1. What is the reproductive health status of female and male adolescents in Matlab, Bangladesh, in terms of physical health, emotional wellbeing and informed and free choice?
2. What role do factors from the geographical, demographic, cultural, socioeconomic, ecological, and political *context* play in this respect?
3. What was the nutritional and health status of these adolescents during their childhood?
4. How did factors from the geographical, demographic, cultural, socioeconomic, ecological, and political *context* influence this condition at that time? and
5. How can childhood conditions and circumstances, in particular the nutritional and health status during the first years of their lives, be related to the current reproductive health status of female and male adolescents?

Whereas the first research question is aimed at a quantitative assessment of the reproductive health status of adolescents (‘what’), the second research question is focussed on the determinants underlying this status (‘why’), which may either be quantitative or qualitative in nature, e.g. the number of health care facilities per inhabitant in a region versus the culturally inherited norms and values regarding marriage, family formation, childbirth etc.

When viewed from a life course perspective, it is acknowledged that determinants are operating at various moments in time: the effects of current conditions and circumstances should be distinguished from long-lasting consequences of events that took place or statuses that were occupied earlier in life. The latter, the assessment of the nutritional and health status in childhood is central to research question 3 (‘what’), whereas the study to its determinants is addressed in research question 4 (‘why’). Finally, in research question 5, the impact of physical, cognitive and contextual developments on reproductive health outcomes in adolescence are assessed all together. By subsequently answering each of these five research questions, we expect to be able to entangle the multitude of factors constituting adolescents’ reproductive health and to assess the relative contribution of its current and childhood determinants.

Research design

In order to study reproductive health of adolescents in relation to their health status during childhood we need to use individual-level longitudinal data. The central question in every longitudinal study is: “What has happened with an individual over time?”, which implies the need for collecting information of one person for least two moments in time. The core questions of our research can only be addressed by following up an existing baseline study. By using at least two individual-level data sets that can be linked to each other one large longitudinal data-set can be created that will serve the purpose of our project.

In order to be able to evaluate the impact of various intervening and determining factors from the geographical, demographic, cultural, socioeconomic, ecological, and political *context*, the research project as a whole necessitates a multilevel approach of data collection. Data will be collected on the individual (micro), the household (meso) as well as the community (macro) level. In addition, extra background information is collected via indepth-interviewing of a few selected adolescents.

In sum, the longitudinal study will consists of the following activities:

1. Analysis of data pertaining to the childhood of the adolescents (see research question 3 and 4);
2. Analysis of data pertaining to their current conditions, i.e. during adolescence (see research questions 1 and 2);
3. Linkage of all data-sets (research question 5); and
4. Case study analyses of biographies of a few selected adolescents.

We relate the topic of research design and methods of the project to the next topic:

Data Collection and Analysis

Fieldwork will be carried out in Matlab. Field instructions, data-entry and data editing will be done at the Matlab Field Station. Base research-station will be (depending on phase the project is in) respectively ICDDR,B (Dhaka), NIDI (The Hague), or PRC (Groningen). Use will be made of the transport facilities of ICDDR,B (speedboat). Also local transport (by road) will be used.

The plan for analyzing the data consists of 4 steps that are described below. It should be noted that the data will be stored and analyzed in SPSS. Methods suitable for 'life history analysis' will be applied: logit model and logistic regression analysis. In addition, 'Anthropac' or 'EZTEXT' software may be used for analysis of qualitative data. Data will be analyzed by Mrs. Bosch and Mrs. Begum only under supervision of ICDDR,B and HERA professionals that are involved in the project(s) (see list of key personnel).

1. Data pertaining to the childhood of adolescents: secondary data

By the absence of a national vital registration system, demographic information on the population of Bangladesh has historically come from two primary sources, i.e. surveys and sample vital registration surveillance systems. National censuses have been held in 1974, 1981 and 1991.

For more than thirty years, since 1966, data have been collected by ICDDR,B in the fieldwork area Matlab. Each individual living in the Matlab area has a permanent registration number, i.e. the Registration IDentification number (RID). As the RID-number is used in almost all studies that are conducted in Matlab, it can be used to identify present adolescents and to link them to data collected during their childhood. This ability to link high-quality information on a large population over time makes the Matlab data unique: the complete demographic life history of every individual born in the research area has been recorded. Although data have been collected for more than three decades, these longitudinal data have been analyzed only to a limited extent.

At present, a population of approximately 210,000 is under observation in 147 villages in Matlab, Bangladesh. In this Demographic Surveillance System (DSS), Community Health Workers (CHWs) collect data on all vital events (birth, death, marriage and migration) as well as on the occupations and education of all individuals. CHWs, formed by a team of local women who have been trained and are paid by the Centre, visit each household **once per month**. The head of the household defines who he (a female being head of the household is rare) considers to be a member of the household and the CHW registers every demographic event in a notebook and reports these once per month to the Health Assistant (HA). Except for one, all HAs are male, while the CHWs are all female. The HA completes every event form and submits the data for entry in the Matlab Field Research Station. Finally, the entered data are transferred to the DSS-department at ICDDR,B in Dhaka (Ross 1996a, p. 22).

Data on socio-economic items have been collected in Censuses (1974, 1984 and 1991 and Socio-Economic Surveys (SES).

Although hardly documented or tested, the quality of survey data in Matlab is considered to be good, although its selectivity may be considered a limitation. Most important is that the Matlab field workers live in the area in which they work and most have been working there for years. They have developed a close rapport with the people in their areas which enables them to obtain more reliable answers on questions regarding age, reproduction, etc. than would otherwise be possible. The intensive maternal and child health and family planning projects, however, make that inhabitants of Matlab have relatively more access to health care and are more exposed to Western cultures, compared to other rural parts of Bangladesh. For these reasons it is hardly possible to guarantee some extent of representativeness of research based on Matlab data. However, representativeness can not be offered in this study due to the limited number of respondents in the longitudinal study.

The DSS does not contain information on health and nutrition of under-five's. However, this information can be found in some of the databases of so-called Special Studies, which are non-regular studies carried out for specific purposes. In order to obtain information about the health and nutritional status of present adolescents during their childhood, several databases of Special Studies have been explored during a feasibility study conducted from March-June 1997 at ICDDR,B in Dhaka and Matlab (Bosch and Hutter 1998).

Baqui study

On the basis of this review, a Special Study of Baqui entitled "*Epidemiology of persistent diarrhoea in Bangladeshi children*", conducted among under-five's in Matlab in the period January 1988 to December 1989, was selected for the project. The objective of Baqui's study was to describe and quantify the problem of persistent diarrhoea in under-five children in rural Bangladesh and to identify some of its most important risk factors. A number of results of this project have been published in several leading journals (Baqui 1990; Baqui *et al.* 1992a; 1992b; 1993a; 1993b).

We selected Baqui's study on the following two criteria: (1) as the study was conducted in 1988-1989, the subjects will be aged 12-18 years in 2001; and (2) the collected information provides enough possibilities to assess the health status of children in relation to other physical and demographic, as well as socio-cultural and socio-economic factors. A total of 705 children have been enrolled in this study. Due to migration and mortality not all of these children will currently be alive and still living in Matlab. We therefore expect to be able to follow up about 500 of these children. From a statistical point of view, this number is sufficient as in most cases we expect to make use of continuous variables allowing for calculation of means or medians. For some analyses we will have to use prevalence data (expressed as percentages). As the values used will generally fall within the 10-90 per cent-range, problems of statistical significance are avoided.

The following types of data are included in Baqui's study:

- **Physical and demographic data:** e.g. nutritional indicators (BMI, arm circumference), morbidity and vaccinations;
- **Socio-cultural data:** e.g. family-composition and religion;
- **Socio-economic data:** e.g. income, education and living-conditions.

D'Souza and Bhuiya study

In addition, the databases, the database of the "Pilot study on socioeconomic status and its association with nutrition and morbidity" of D'Souza and Bhuiya, conducted in Matlab between April and July 1981, was selected as a potential baseline study (see also D'Souza and Bhuiya 1982). Stored on two diskettes, this data set contains the following information on respectively 2013 under-five children and their mothers, 1400 in total: "socio-economic status, mother's sickness in the last week e.g. (respiratory ulcer, worms, typhoid, cholera, diarrhoea, TB, asthma, pneumonia, etc.), pregnancy, breastfeeding, mothers anthropometric (height, weight, arm circumference, skinfold), child's sickness (measles, pneumonia, whooping cough, TB, diarrhoea, ear infection, scabies, jaundice, night blindness), age, breastfeeding or not, child anthropometry (height, weight, arm circumference, skinfold), percentage of standard ht/age, wt/ht, wt/age, arm circumference/age" (ICDDR,B 1987, p. 8).

These under-fives will be 20-25 years in 2001. Each diskette contained five (ASCII) files, corresponding with the five villages where the study was conducted. In order to be able to compare data between the villages, all data of the children are stored on one file and the same is done for all data of their mothers. Data of a few demographic indicators, health and socio-economic status (of the mother) have been retrieved and analysed in SPSS. These data have been tested and proved suitable for the longitudinal study on adolescents' reproductive health.

In addition, it is planned to explore other Matlab data sets (e.g. DSS, SES and Census data) for analysis of additional *life course* information. DSS and RKS may for instance provide vital statistics about the adolescent's brothers and sisters (have they survived, and if not: what caused their death?) and his or her parents (are they still alive? And if not, when have they died and due to what cause?). Have there been any changes in socioeconomic status of the household (crises, moments of prosperity?). In addition, from RKS data, extra information may be retrieved about the mothers' pregnancy history. Furthermore, it can be noted that detailed maps for the area can be made in a Geographic Information System (GIS).

As mentioned before, we expect that about 200 of the 705 under-fives that were included in Baqui's study will be lost for analysis due to mortality and migration. In Matlab, however, events of death and causes of death have been registered over a period of more than 30 years. Consequently, children who died are easy to trace by their Registration Identification number (RID). By cross-checking the various data-sets of ICDDR,B, the unique possibility is created to select only those households for interviewing of which it is known in advance that the adolescent-respondent has not passed away since childhood. An additional analysis (mortality by cause of death) will be carried out on the basis of existing data sets on children that did pass away.

2. Data pertaining to the current conditions of adolescents: survey

We intended to re-interview the approximate 500 children from Baqui's study in 2001 (identifying being possible with the RID-number). This means that we use a fixed cohort design (Kleinbaum *et al.* 1982). A pilot-survey will be carried out in order to pre-test the quality of the questionnaire. The actual survey will be conducted among the selected adolescents. Data to be collected among current adolescents are among others:

- **Physical and demographic data:** marital status, nutritional status (assessed by body mass index, weight and height, and mid-upper arm circumference), morbidity, vaccinations, and (if applicable) fertility history and events in the reproductive career;
- **Socio-cultural data:** e.g. RH-knowledge, lifestyle factors (e.g. feeding patterns), health-seeking behaviour, and perceptions, expectations and intentions with regard to their reproductive and marital career;

Principal Investigator: Bosch, Alinda

-
- **Socio-economic data:** e.g. income, educational level of the adolescent as well as his/her mother (or parents).

3. Linkage of data sets

The data sets of the respective studies and data-sources (described in 1) will be linked to the data collected in the survey (described in 2).

4. Case study analyses of biographies

In order to gain more insight into the life histories of adolescents and the roles of significant others, but also in knowledge, attitudes and perceptions of the adolescents themselves, we will select about 10 adolescents (with different back-ground characteristics) for in-depth interviewing. Information collected in these case studies will enable us among others to better interpret the results of the quantitative longitudinal analysis within the Bangladeshi *context*.

Facilities Available

Fieldwork will be carried out in Matlab. Field instructions, data-entry and data editing will be done in Matlab Field Station. Base research-station will be (depending on phase of the project) respectively ICDDR,B (Dhaka), NIDI (The Hague), or PRC (Groningen). Use will be made of the transport facilities of ICDDR,B (speedboat). Also, local transport (by road) will be used.

Ethical Assurance for Protection of Human Rights

In the field, first informed consent for the interviews will be asked from the adolescents involved. In contrast to adults, for whom we assume that they are capable of providing informed consent, unless there is evidence to the contrary, for children and adolescents, it is not capacity that is the issue, but autonomy. We assume that adolescents of eighteen years and older are capable of providing informed consent. However, because of the confidential information on reproductive events, we will also try to acquire parental consent before starting the interview. Such a consent is especially important when confidential information is collected or when anonymity must be guaranteed, as is the case in this research. Parental consent must be acquired surely in case the adolescent has not reached the age of eighteen yet.

The objectives of the study as well as the procedures of the interview will be explained by the Bangladeshi research-assistant/interviewer. A copy of *"The Explanation of the Study"* and *"Your Rights as a Research Participant"*, both in Bangla, will be handed over to each research subject (see Appendix). After having assured that the subject understands the purpose of the interview as well as his or her rights, the research-assistant will ask the subject to indicate his or her consent by signing.

The information collected in the questionnaires will be accessible only to the members of the research-team, including the field-assistants and the data-entry personnel. Everybody involved will be instructed not to discuss any content of the interviews nor display any results to anybody besides the Principal Investigators. During as well as after the fieldwork, questionnaires will be secured by storing them in a locked room or drawer. Questionnaires will not be released to other individuals or researchers and they will be treated as confidential documents. Because of this, names and/or ICDDR,B Registration ID numbers will be used on the questionnaire, while the data set without the subjects' names will be used for the analysis. To ensure confidentiality of the subjects, results of this study will be published in such a way that it will not be possible to identify them. Neither names nor ID numbers will be used in the publications.

Use of Animals

No animals will be used

Literature Cited

- Akter, H.H., Krim, F., Chowdhury, M.E. Elahi K. and M. Hafizur Rahman (1999). *A study to identify the risk factors affecting nutritional status of adolescent girls in Bangladesh*. Executive summary: study findings presented during the National Nutrition Week 24 April 1999; Sasakawa Auditorium, ICDDR,B. BIRPERHT (Bangladesh Institute of Research for Promotion of Essential & Reproductive Health and Technologies).

- Aziz, K.M.A. and C. Malony (1985). *Life stages, gender and fertility in Bangladesh*. International Centre for Diarrhoeal Disease Research, Dhaka. Chapter 1: *Stages of life*, pp. 7-28 and Chapter 9: *Fertility control and stages of life*, pp. 157-180.
- Baldry, T. MP (1995). *Children by choice: responding to the needs of young people*. Speech to international student house, 23 February 1995. Overseas Development Administration.
- Bangladesh Health and Population Sector Program (HPSP) (1999). Unpublished report.
- Baqui, A.H. (1990). *Epidemiology of persistent diarrhoea in Bangladeshi children*. Baltimore, M.D. the Johns Hopkins University. PhD thesis.
- Baqui, A.H., Black, R.E., Sack, R.B., Chowdhury, H.R., Yunus, M., and A.K. Siddique (1993a). *Malnutrition, cell-mediated immune deficiency, and diarrhoea: a community-based longitudinal study in rural Bangladeshi children*. In: American Journal of Epidemiology 137 (3). pp. 355-365.
- Baqui, A.H., Black, R.E., Sack, R.B., Chowdhury, H.R., Yunus, M., and A.K. Siddique (1993b). *Cell-mediated immune deficiency and malnutrition are independent risk factors for persistent diarrhoea in Bangladeshi children*. In: American Journal of Clinical Nutrition 58(4). pp. 543-548.
- Baqui, A.H., Black, R.E., Sack, R.B., Yunus, M., Siddique, A.K., and H.R. Chowdhury (1992a). *Epidemiological and clinical characteristics of acute and persistent diarrhoea in Bangladeshi children*. In: Acta Paediatrica 81(supplement 381). pp. 15-21.
- Baqui, A.H., Sack, R.B., Black, Haider, K., Hossain, A., and A.R.M.A. Alim (1992b). *Enteropathogens associated with acute and persistent diarrhoea in Bangladeshi children less than 5 years of age*. In: Journal of Infectious Diseases 166(4). pp. 792-806.
- Barkat, A., Haque Khan, S., Majid, M., and N. Sabina (2000). *Adolescent Sexual and Reproductive health in Bangladesh: a needs assessment*. International Planned Parenthood Federation; Family Planning Association of Bangladesh.
- Barker, D.J.P. (eds.) (1992). *Foetal and infant origins of adult disease*. Papers written by The Medical Research Council Environmental Epidemiology Unit, University of Southampton. British Medical Journal. Tavistock Square, London WC1H 9JR.
- Barker, D.J.P., Godfrey, K.M., Fall, C., Osmond, C., Winter, P.D. and S.O. Shaheen (1991). *Relation of birth weight and childhood respiratory infection to adult lung function and death from chronic obstructive airways disease*. Biomedical Journal; Volume 303. pp. 671-705.
- Becker, S. (1993). *The Determinants of Adolescent Fertility with Special Reference to Biological Variables*. Chapter 3, pp. 21-49. In: Gray, R., Leridon, H. and A. Spira (eds.). *Biomedical and Demographic Determinants of Reproduction*. Clarendon Press. Oxford.
- Blanchet, T. (1987). *Meanings and rituals of birth in rural Bangladesh*. University Press Limited. Dhaka, Bangladesh. pp. 69-123.
- Blanchet, T. (1996). *Lost innocence, stolen childhoods*. University Press. Dhaka, Bangladesh.
- Bongaarts, J. and R.G. Potter (1983). *Fertility, biology and behaviour. An analysis of the proximate determinants*. Studies in Population. Academic Press. New York.
- Bosch, A.M. and I. Hutter (1998). *Reproductive life of adolescents in rural Bangladesh, viewed from a life course perspective. Results of a feasibility study in Bangladesh*. Unpublished HERA report.
- Bruijn de, B.J. (1992). *The concept of rationality in social sciences*. PHOD-paper, no. 9. Amsterdam.
- Bruijn de, B.J. (1993). *Interdisciplinary backgrounds of fertility theory*. PHOD-paper, no. 16. Amsterdam.
- Bruijn de, B.J. (1999). *Contribution to a theory of choice for population studies and population policy*. PhD dissertation. University of Groningen, the Netherlands.
- Caselli, G. et al. (1990). *A matter of life and death: methodologies for the life history analysis of adult mortality*. Institut de Démographie, Université Catholique de Louvain. Louvain-la-Neuve. Working Paper, no. 151.
- Chen, L.C., Huq, E. and S. D'Souza (1981). *Sex bias in the family allocation of food and health care in rural Bangladesh*. In: Population and Development Review; Volume 7. pp. 55-70.
- Chowdhury et al. (1977). In: Becker (1993) *The Determinants of Adolescent Fertility with Special Reference to Biological Variables*. Chapter 3, pp. 21-49. In: Gray, R., Leridon, H. and A. Spira (eds.). *Biomedical and Demographic Determinants of Reproduction*. Clarendon Press. Oxford.
- D'Andrade, R.G. (1984). *Cultural meaning systems*. In: Sheder, R.A. and R.A. Levine (eds.). *Culture theory. Essays on mind, self and emotion*. Cambridge University Press. Cambridge. pp. 88-119.
- D'Andrade, R.G. (1995). *The Development of Cognitive Anthropology*. Cambridge University Press. Cambridge.
- D'Andrade, R.G. and C. Strauss (eds.) (1992). *Human motives and cultural models*. Cambridge University Press. Cambridge.

- D'Souza and Bhuiya (1982). *Socioeconomic mortality differentials in a rural area of Bangladesh*. In: Population and Development Review; Volume 8 (4). pp. 753-769.
- D'Souza, S. and L.C. Chen (1980). *Sex differentials in mortality in rural Bangladesh*. In: Population and Development Review; Volume 6. pp. 257-270.
- Denzau, A.T. and D.C. North (1994). *Shared mental models: ideologies and institutions*. Kyklos; Volume 47, no. 1. pp. 3-31.
- Dixon-Mueller, R. (1993). *Population policy and women's rights*. London, Praeger.
- Elo, I.T. and S.H. Preston (1992). *Effects of early life conditions on adult mortality: A review*. Population Index 58(2). pp. 186-212.
- Fauveau, V. (eds.) (1994). *Matlab: Women, children and health*. ICDDR,B Special Publication, no. 35, Dhaka.
- Fieldhouse, P. (1995). From chapter 2: *Hot and cold*. pp. 50-54. In: Fieldhouse, P. (1995). *Food and Nutrition: Customs and Culture*. 2nd edition, Kent: Croom Helm.
- Greenhalgh, S. (1989). *New directions in fertility research: anthropological perspectives*. International Population Conference, IUSSP. New Delhi; Volume 3. pp. 437-449.
- Greenhalgh, S. (1994). *Anthropological contributions to fertility theory: Population Council*. Working Papers no. 64. New York.
- Greenhalgh, S. (1995). *Situating fertility: anthropology and demography ingenuity*. Cambridge University Press. Cambridge.
- Hutter, I. (1994). *Being pregnant in rural South India: nutrition of women and well-being of children*. Thesis Publishers, Amsterdam.
- Hutter, I. (1996b). Reduction of food intake during pregnancy in rural South India. Tropical Medicine and International Health 1 (3). pp. 399-405.
- Hutter, I. (1998a). *Research programme on reproductive health (HERA)*. CDS Research Strategy Paper, Centre for Development Studies, University of Groningen.
- Hutter, I. (1998b). "*Avalu hotte illi adaale ('She is with a stomach')*". Kannada version of dissertation. Manohara Grantha Mala Publishing Company, Dharwad.
- Hutter, I. and F.J. Willekens (1998). Reproductive health: a process-context perspective. Theory and method. Draft of March 1998.
- ICDDR,B (1987). *Brief description of Archive data*. Prepared by: data archiving unit. ICDDR,B., Dhaka.
- International Conference on Population and Development (ICPD) (1994). Action Plan, section 7.2
- Islam, M.M. and M. Mahmud (1995). *Contraception among adolescents in Bangladesh*. In: Asia-Pacific Population Journal; Volume 10, no. 1. pp. 21-38.
- Kabir, S. (1997). Short term consultancy to give suggestions on the reproductive health program of ICDDR,B.
- Karra, M.V., Stark, N.N. and J. Wolf (1997). *Male involvement in Family Planning: A case study spanning five generations of a South Indian family*. In: Studies in Family Planning; Volume 28, no. 1. pp. 24-34.
- Kleinbaum, D.G., Kupper, L.L. and H. Morgenstern (1982). *Epidemiologic Research: Principles and quantitative methods*. Van Nostrand Reinhold. New York.
- McNicoll, G. (1985). *The nature of institutional and community effects on demographic behaviour: a discussion*. In: Casterline, J.B. (eds.). The collection and analysis of community data. International Statistical Institute. Voorburg. pp. 177-184.
- McNicoll, G. (1989). *Concepts and framework needed for a better understanding of socio-demographic processes*. International Population Conference, IUSSP, New Delhi. Volume 3. pp. 423-436.
- Miller, M.B. (1981). *The endangered sex. Neglect of female children in rural North India*. Cornell University Press. Ithaca. New York.
- Miller, M.B. (1989). *Son Preference: The household and public health programs in North India*. In: Krishnaray, M. and K. Chanada. *Gender and the household domain: social and cultural dimensions*. Sage Publications. New Delhi. pp. 191-208.
- Mitra, S.N., Al-Sabir, A., Cross, A.R., and K. Jamil (1997). Bangladesh Demographic and Health Survey 1996-1997. National Institute of Population Research and Training (NIPORT), Ministry of Health and Family Welfare, Dhaka, Bangladesh, Mitra and Associates, Dhaka, Bangladesh, and DHS, Macro International Inc., Calverton, Maryland, USA.
- Mosely, W.H. and L.C. Chen (1984). *An analytic framework for the study of child survival in developing countries*. In: Mosely, W.H. and L.C. Chen (eds.). *Child survival: strategies for research*. In: Population and Development Review; A Supplement to Volume 10. pp. 25-45.
- Mosley, W. H. and R. Gray (1993). *Childhood precursors of adult morbidity and mortality in developing countries: Implications for health programmes*. In: Gribbel and Preston (1993).

- Mostafa, G., Ahmed, K., Kashem Shaikh, M.A., Ginneken van, J.K. and A.M. Sarder (1996). *Demographic Surveillance System - Matlab*. Volume 27: Registration of demographic events - 1995. Scientific Report, no. 79. ICDDR,B. Dhaka, Bangladesh.
- Mukhopadhyay, S. and R. Savithri (1998). *Poverty, gender and reproductive choice: An analysis of linkages*. Institute of Social Studies Trust. University Press Limited. Dhaka, Bangladesh. pp. 23-43.
- Nahar, L. and J.K. van Ginneken (1997). *Childlessness as a risk factor of divorce within three years of marriage among the young women in Matlab, Bangladesh*. Unpublished report.
- Nahar, Q., Tunón, C., Houvras, I., Gazi, R., Reza, M., Huq, N.L., and Barkat-e-Khuda (1999). *Reproductive health needs of Adolescents in Bangladesh: A study report*. Working Paper no. 161. ICDDR,B.
- National Institute of Population Research and Training (NIPORT) (1994). *Bangladesh demographic and health survey 1993-1994*. Dhaka, Bangladesh.
- North, D.C. (1994). *Economic performance through time*. American Economic Review; Volume 84, no. 3. pp. 359-368.
- Obermeyer, C.M. (1995). *IUSSP Activities. Committee on Reproductive Health*. In: IUSSP Newsletter, no. 54, January. pp. 10-19.
- Razzaque, A. (1989). *Effects of 1974-1975 famine on differential mortality in rural Bangladesh*. In: Krishnan, T. (eds.). *Statistics in medicine: proceedings of the Third Annual Conference of the Indian Society for Medical Statistics*. Calcutta, 3-5 December 1985. Bombay: Himalaya Publishing House. pp. 142-154.
- Riley, A.P. (1994). *Determinants of adolescent fertility and its consequences for maternal health, with special reference to rural Bangladesh*. In: Annals New York Academy of Sciences. February 18; 709. pp. 86-100.
- Robinson (1992). In: Barker, D.J.P. (eds.) (1992). *Foetal and infant origins of adult disease*. Papers written by The Medical Research Council Environmental Epidemiology Unit, University of Southampton. British Medical Journal. Tavistock Square, London WC1H 9JR.
- Ross, D.A. (1996a). *The future of the Matlab health and Research Centre: Report of a consultancy for the Community Health Division, ICDDR,B*.
- Ross, J.L. (1996b). *The program response of the social and behavioural sciences to the ICDP-POA: A proposed protocol, 1996-2001*. Centre for Health and Population Research. International Centre for Diarrhoeal Disease Research, Bangladesh.
- Ross, J.L., Chowdhury, S.N.M. and T. Mirza (1996). *Health, gender and sexuality*. Bangladesh Country Report. ICDDR,B Special Publication, no. 50.
- Runyan, W.M. (1984). *Life Histories and Psychobiography: Exploration in Theory and Method*. Oxford University Press, New York.
- Sai, F. and J. Nasim (1989). *The need for a reproductive health approach*. In: International Journal of Gynaecology and Obstetrics. A Supplement to Volume 3. pp. 103-113.
- Starrs, A. (1987). *Preventing the tragedy of maternal deaths*. Report on the International Safe Motherhood Conference. Nairobi, Kenya.
- United Nations Population Fund (UNFPA) (1995). *World Population Report*. New York.
- United Nations Population Fund (UNFPA) (1997). *UNFPA and Adolescents*.
- United Nations Population Fund (UNFPA) (1998). *The sexual and reproductive health of adolescents: a review of UNFPA assistance*. Technical report, number 43.
- White, S. (1992). *Arguing with the crocodile. Gender and class in Bangladesh*. University Press. Dhaka, Bangladesh.
- Willekens, F.J. (1990). *Beweging in de demografie*. ("Movement in demography"). (Oratie, in Dutch). State University of Groningen. The Netherlands.
- Willekens, F.J. (1992). *Models of man in demography*. In: Becker, H.A. (ed.). *Dynamics of cohort and generation research*. Proceedings of a symposium held on 12,13 and 14 December 1991 at the University of Utrecht, The Netherlands. Thesis Publishers. Amsterdam. pp. 253-281.
- World Health Organisation (WHO) (1992). *Reproductive health: a key to a brighter future*. Biennial Report 1990-1991.
- World Health Organisation (WHO) (1995). *The world health report: Bridging the gaps*. World Health Organisation, Geneva.
- World Health Organisation (WHO) (1999). *Programming for adolescent health and development*. Report of a WHO/UNFPA/UNICEF study-group on programming on adolescent health. WHO Technical report series.
- Zurayck, H. (1994). *Population and Health*. International Conference on Population and Development, ICPD 1994. IUSSP. Liege.

Dissemination and Use of Findings

Usefulness of expected results for adolescents involved and the generations that follow them

In many countries, descriptions of adolescents' general and reproductive health, their use of health services and their sexual and reproductive knowledge, practices and intentions, have virtually been absent. As pointed out by Ross (1996b, p. 8): "the familiar child-survival and reproductive health 'models' generally fail to take into consideration individuals over 5 and under 15 years of age; and even among older adolescents being married is one of the requisite to receiving attention". Consequently, information, education and care regarding sexuality and contraceptive use were often restricted from young, unmarried people.

This lack of attention was in stark contrast with the importance of adolescence, as it is during this particular period that most children achieve physical and emotional maturity. A period which includes many - often complex - processes, such as the onset of menarche, developing close friendships, dealing with peer pressure, struggling with identity, becoming aware of one's sexuality, developing ideals, and adopting and taking examples from role models. A study by the International Planned Parenthood Federation (IPPF) in 1995 found that - apparently irrespective of the social and cultural diversity - adolescents start sexual activity at about the same age both in developed and developing countries (in: UNFPA 1997, p. 3).

Adolescence is nowadays recognized as an important, specific stage in life, characterized by "gradual yet dramatic transitions, socially, physically as well as psychologically" (UNFPA 1997, p. 3). In general, adolescence is defined as the period between 10 and 19 years of age. It is during adolescence that girls and boys learn and internalize behavioral patterns that will stay with them for the rest of their lives, including the reproductive period. In Bangladesh, adolescence seems to be shorter for girls than for boys, and to start earlier. Bangladeshi girls are expected to learn the female role even before the end of childhood (up to the age of 10 years). Ross (1996b, p. 5) concludes that "(...) it is during childhood and adolescence that gender roles are internalised and perpetuated. By the time she reaches puberty a Bangladeshi woman has already experienced a life-time of discrimination compared to males".

Especially after the ICPD-Conference, international attention for this specific group has increased. Getting attention, however, is not the same as actually being included in research and policy making. Many adolescents in Bangladesh still lack access to RH services and information and sexual education. As stated recently by Kabir (1997, p. 6) "it appears that the deplorable status of women within the family, community and the nation has not been taken into sufficient consideration" and the reproductive health of adolescents is sadly neglected. In addition, the role of male adolescents with regard to family formation and reproductive health matters is being neglected in research and policy. It is therefore emphasised by researchers and policy makers to include also the 'male' perspective into RH-research, which should go beyond emphasising 'male involvement' but should also address the RH-rights of men themselves.

It is concluded by Baldry (1995, p. 4) that there is a strong need for more information on adolescents' reproductive health - males and females included - in order to develop policies and strategies to implement programmes that fit with prevailing religious, cultural and community norms and values. It is above all "the basic human right of every individual, woman, man or adolescent, to make an informed choice and decision about her or his own fertility" (Kabir 1997, p. 6).

In addition, as outlined in the United Nations Convention on the Rights of the Child and reaffirmed at the World Conference on Human Rights, "children up to the age of 18 have rights, rights to reproductive health education, information and care" (UNFPA 1997, p. 1). The WHO (1995, p.13) concludes that "the behaviour patterns established in adolescence, highly influenced by the adult world, are of the immense importance to an individual's life span and to public health as a whole" and "even in the most desperate circumstances may young people demonstrate resilience, courage and idealism which the world cannot afford to lose".

Very recently, a review of the Bangladesh Health and Population Sector Program (HPSP) - a project to restructure the health sector led by the World Bank and assisted by a consortium of donors, the so-called Developmental Partners - concluded "that there has been very little progress in improving women's health, in particular reproductive health". Another salient finding is "the continuing extremely high prevalence of malnutrition under women and children" (unpublished report HPSP 1999, p. 4).

In view of these conclusions, the present research project aims to fill this gap by gathering information on the reproductive health of Bangladeshi adolescents, irrespective of their marital status, reproductive career or sex: unmarried as well as married adolescent girls and boys, and related to this, adolescents with and without children, will be included in this study. Following the *process-context approach* and adopting the *life course perspective*, adolescents' reproductive health will be studied in relation to present conditions, such as their nutritional status and bio-demographic characteristics, situated in the current socioeconomic, ecological, cultural and political context of rural Bangladesh, as well as to circumstances and experiences in the past, with particular reference to the period during childhood. Data collected by the ICDDR,B offer a unique opportunity to conduct such a *longitudinal* study.

HERA and ICDDR,B believe that research should not only lead to knowledge, but that knowledge should also be used to improve people's health. In other words: research results should go 'back' to the people concerned. Consequently, research results will be disseminated among the Bangladeshi adolescents (see below).

Research for Action

Referring to the recommendations agreed upon at Cairo, the World Health Organisation (WHO 1999, pp. 22-23) calls for translation of words into action. Furthermore, the WHO states that "more intellectual work is urgently needed to clarify the conceptual framework for reproductive health" and "as part of this intellectual work, we need to be clearer about what it means to define interventions *comprehensively* and to carry them out in an integrated manner". Finally, the WHO points out that "more attention needs to be paid to education and training" as "the curricula of academic institutions, such as medical, nursing, midwifery and public health schools have not caught up with the concept of sexual and reproductive health, as a condition, as an approach or in terms of comprehensive approaches to services".

The results of the proposed research relate in two ways to all three of the aforementioned statements of the WHO. Firstly, by carrying out scientific research on adolescents' reproductive health, the results of the proposed research will contribute to the development and application of the conceptual framework and definition of reproductive health in general and within the Bangladeshi culture in particular. The traditional conceptual frameworks on the study of reproductive health are generally based on two demographic models, i.e. *fertility-models* (e.g. Bongaarts and Potter 1983) and *mortality-models* (e.g. Mosely and Chen 1984) that include together most reproductive events. The proposed research, however, builds further upon these traditional conceptual frameworks, by viewing reproductive health from the *process-context approach* and by taking into account *the life course perspective*.

Secondly, in line with the first and third statement of the WHO, one of HERA's and ICDDR,B's objectives is that scientific research results should be utilised to improve the health status of people. The translation of research into action implies, for instance, the *development of educational material* and the organisation of a *health educational campaign*. Since health education as such is beyond the scope of researchers, we will cooperate with a local NGO.

In order to meet adolescents' needs, expectation and aspirations, the proposed project in combination with the project of Mrs. Lutfa Begum will yield recommendations for developing Information Education and Communication (IEC) activities.

This educational campaign is planned to be carried out mainly by the local NGO. Although the campaign can only start after the scientific work of both researchers is finished - as it is based on both research results - NGO-members will be involved during the project, to make sure that all relevant information is indeed collected, and to make the future translation of scientific results into action successful

In earlier research of HERA, the PhD research of Hutter (1994) - on nutrition and health of pregnant women in rural South India - was translated into the local language (Hutter 1998a; 1998b) with funding from the Ministry of Foreign Affairs of The Netherlands. This translation formed the basis for health education material which was developed in co-operation with the local NGO "the India Development Service" (IDS). The result consisted of ten series of flash cards and two puppet shows that are currently widely used by health workers in the research villages. This health educational campaign lasts for two years and will be evaluated afterwards. The evaluation will form a feedback to theory, methods and scientific approach adopted in the research project. The educational material is also used by IDS in training activities for other NGOs working in the field of health and nutrition of women.

Another research project of HERA, on reproductive health and child spacing behaviour in rural South India, adopts the same approach: results of the research are to be used in an educational campaign to be carried out by the local NGO "the Family Planning Association of India" (FPAI), Dharwad branch. The proposal of this campaign has been developed by three parties (i.e. FPAI, the Institute of Economic Research Dharwad, and the PRC-Groningen). Members of FPAI were already involved during the research project itself in order to provide feedback to the researchers. IDPAD (Indo-Dutch Programme on Alternatives in Development) and the Bernard van Leer Foundation provided the funding for this campaign. The present project will also adopt this successful approach: on the basis of the results of research, an educational campaign for adolescents will be developed, in co-operation with a local NGO. ICDDR,B works already closely together with the NGO Bangladesh Rural Advancement Committee (BRAC).

Scientific capacity building

The researcher will be guided by a team of senior researchers from HERA and ICDDR,B. In addition, the researcher will cooperate with Mrs. Lutfa Begum, who started with her project 'Adolescents' reproductive health in rural Bangladesh: viewed

Principal Investigator: Bosch, Alinda

within the socio-cultural context' in September 1999 by following training and courses in the MSc/PhD program of the PRC-Groningen. It is believed by ICDDR,B as well as by HERA that co-operation between both researchers provides a significant added value to both projects. PRC-Groningen has extensive experiences with training of MSc. and PhD students from developing countries, most of them being included in so-called 'sandwich' programmes. Present and former MSc and PhD students related to PRC Groningen are from Ethiopia, India, Mexico, China, Indonesia and Bangladesh. Currently, three researchers affiliated with ICDDR,B are participating in the Ph.D. program of PRC.

Proposed dissemination of research results, both in scientific as well as in policy circles:

The publications of the research project will consist of:

- A dissertation;
- Interim reports;
- Articles in international journals;
- Recommendations for a health education campaign;
- National reports (Bangladesh) for policy makers.

Collaborative Arrangements

The research project is part of the joint research programme on Reproductive Health of HERA and ICDDR,B. In November 1996, a co-operation was established between ICDDR,B and HERA, involving an agreement to work together in the field of reproductive health (see Annex III, letter of ICDDR,B's former Director, Dr. D. Habte to HERA). The present research project is carried out by a Dutch investigator (Mrs. Alinda Bosch), working closely together with a Bangladeshi researcher (Mrs. Lutfa Begum). Both are guided and supervised by Bangladeshi and Dutch experts (see also section 'Key personnel' and the Annex V).

In the HERA research programme, also the Faculty of Medical Sciences, Department of Obstetrics and Gynaecology, Groningen University, participates.

HERA has contacts/is collaborating with:

- Medical Anthropology Unit of the University of Amsterdam, The Netherlands;
- Royal Institute of Tropical Research (KIT), Amsterdam, The Netherlands;
- Institute of Social Sciences (ISS), The Hague, The Netherlands;
- London School for Hygiene and Tropical Medicine, Great Britain;
- ICDDR,B (among others in three Ph.D.-projects of respectively Mrs. Begum, Mrs. M. Khatun and Mr. A.A. Mamun);
- Population Research Centre and Karnatak University, Dharwad, India;
- Population Research Centre, University of Kerala, Trivandrum, India;
- International Institute for Population Studies (IIPS), Bombay, India;
- India Development Service (IDS), Dharwad, India;
- Family Planning Associations of India in Mumbai and Dharwad, India.

Biography of the Investigators (See Annex V on biographies of researchers and supervisors involved in the project)

Name	Position	Date of Birth
Alinda Bosch	Researcher Population and Development Division, NIDI	3 January 1971

Academic Qualifications

Principal Investigator: Bosch, Alinda

Institution and Location	Degree	Year	Field of Study
University of Groningen;	M.Sc. in Non-Western Demography;	June 1995;	Fertility, Reproductive health
University of Cambridge;	Grade C in the Examination for the Certificate of Proficiency in English, Local Examinations Syndicate;	June 1998	

Research and Professional Experience

Current position since March 1996: research associate, NIDI: conducting research in field of reproductive health, international migration, and mortality.

Research experience abroad:

- From August-September 1998: monitoring and evaluation consultant for Femconsult. Involved with data processing and analysis, report writing, and development of questionnaire for project "Integrated Food Assisted Development Program, subject 1 (IFADEP-1), Dhaka, Bangladesh.
- In May 1998: backstopping at IFORD (Institute de Formation et de Recherche Démographiques) in Yaoundé, Cameroon for project "Rural development and fertility changes in Côte d'Ivoire".
- From March-June 1997: guest-Researcher (part-time) in a project on infertility at ICDDR,B. Also involved in the development of research proposal on "adolescents' reproductive health in rural Bangladesh" and carrying out (part-time) a three-month feasibility study for this project at ICDDR,B.

Previous position (May 1995- February 1996): Research-assistant, NIDI: Conducting research in the field of fertility and agrarian development, international migration, and nuptiality.

Before (September 1990-June 1995): Student Non-Western Demography Groningen University

- From February-July 1994: Fellowship student at the Central Bureau of Statistics Willemstad, Curacao, the Netherlands Antilles. Conducting a fertility analysis of the population of all five islands of the Netherlands Antilles, based on data from censuses and birth registrations. Report in Dutch was nominated and rewarded with the "ABC-Advice Award 1995".

APPENDIX

International Centre for Diarrhoeal Disease Research, Bangladesh Voluntary Consent Form

Title of the Research Project: Adolescents' reproductive health in rural Bangladesh: the impact of experiences in childhood

Principal Investigator: Mrs. Alinda Bosch

Explanation of the project (Read out loud) to individuals involved

Title: Adolescents' reproductive health in rural Bangladesh: the impact of experiences in childhood

Persons in charge: Alinda Bosch, ICDDR,B and Mrs. Lutfa Begum, ICCDR,B / PRC Groningen

This study in which you will be participating is part of a research project, which studies the reproductive health status of adolescents by taking physical and social maturity processes as well as socio-cultural and socioeconomic conditions into account. By conducting this research we hope to gain more insight in the determinants of adolescents' reproductive health and to facilitate further research as well as action in this field.

If you agree to participate in this research, you will be asked to answer questions with regard to your health status, your socioeconomic and marital status and - if applicable your - fertility history, and your knowledge, perceptions and expectations with regard to reproductive matters. In order to have an idea of your physical health status, we will take anthropometric measures (i.e. weight, height, and mid-upper arm circumference). Moreover, we will ask you question about male and female diseases, illness due to pregnancy or childbirth, and your nutritional behaviors and other lifestyles that may affect your health status. By comparing your current health status with your health status during childhood and by looking at current contextual factors, more insight is gained into the factors that determine reproductive health. Your participation in this research will take a total of 1 to 2 hours.

Rights as a Research Participant (Read out loud):

As a participant you may ask any question about the research project and the procedures. Questions will be answered as long as they do not refer to information about other participants.

Your participation in this research is confidential and all information should be keep secret. Publications based on the research will not include any names, ID-numbers or any other information, which may reveal your identity.

Your participation to this research is voluntary, which implies that you are free to stop participating in the research at any time or to refuse to answer any specific question.

Participant:

1. I agree to participate in a scientific research project entitled "Adolescents' reproductive health in rural Bangladesh: the impact of experiences in childhood".
2. I understand the information given to me and I have received answers to any questions I may have had about the research project or the procedures.
3. I understand and agree upon the conditions of this study as read out to me.
4. To the best of my knowledge and belief, I have no physical or mental illness or difficulties that would increase my risk because of participation in this study.
5. I understand that I will receive no compensation for my participation.
6. I understand that my participation in this research is voluntary and that I may withdraw form this study at any time by notifying the person in charge.
7. I understand that I will receive a signed copy of this document.

Principal Investigator: Bosch, Alinda

Explanation of the project (Read out loud) to individuals involved, continued

Researcher / interviewer:

I certify that the informed consent procedure has been followed and that I have answered any questions from the participant above as fully as possible.

SignatureDate.....

Note: this informed consent form will be translated into Bangla by an interpreter of ICDDR,B.

Signature of Investigator/ or agents _____

Signature of Subject/ Guardian _____

Date:

Date:

Principal Investigator: Bosch, Alinda

Detailed Budget for New Proposal

See section 'Other Support' as project is funded completely by external sources.

Project Title:

Name of PI:

Protocol Number:

Name of Division:

Funding Source:

Amount Funded (direct):

Total:

Overhead (%)

Starting Date:

Closing Date:

Strategic Plan Priority Code(s):

Sl. No	Account Description	Salary Support			US \$ Amount Requested		
	Personnel	Position	Effort%	Salary	1st Yr	2 nd Yr	3 rd Yr
	Sub Total						
	Consultants						
	Local Travel						
	International Travel						
	Sub Total						
Supplies and Materials (Description of Items)							

Principal Investigator: Bosch, Alinda

	Sub Totals			

	Other Contractual Services			
	Repair and Maintenance			
	Rent, Communications, Utilities			
	Training Workshop, Seminars			
	Printing and Publication			
	Staff Development			
	Sub Total			

	Interdepartmental Services	1st Yr	2nd Yr	3rd Yr
	Computer Charges			
	Pathological Tests			
	Microbiological tests			
	Biochemistry Tests			
	X-Rays			
	Patients Study			
	Research Animals			
	Biochemistry and Nutrition			
	Transport			
	Xerox, Mimeographs etc.			
	Sub Totals			
	Other Operating Costs			
	Capital Expenditure			

TOTAL DIRECT COST

Budget Justifications

Other Support

The project costs, including salary costs of Mrs. Alinda Bosch and the research costs are funded by WOTRO (Netherlands Foundation for the Advancement of Tropical Research) and HERA (co-operation PRC Groningen and NIDI The Hague).

See also Annex II and the research proposal to WOTRO.

Check List

After completing the protocol, please check that the following selected items have been included.

- 1. Face Sheet Included ☐
- 2. Approval of the Division Director on Face Sheet ☐
- 3. Certification and Signature of PI on Face Sheet, #9 and #10 ☐
- 4. Table on Contents ☐
- 5. Project Summary ☐
- 6. Literature Cited ☐
- 7. Biography of Investigators ☐
- 8. Ethical Assurance ☐
- 9. Consent Forms ☐
- 10. Detailed Budget ☐

Annex I Time schedule of project: January 2000-December 2002

Already done

1997 - 1999	Feasibility study in Bangladesh Working paper (Bosch and Hutter 1999) Development of research proposal
January - June 2000 (5 months)	Literature study, specification of hypotheses, and further operationalisation of variables, writing first chapters of dissertation.

Planning from June 2000 onwards

June - July 2000 (2 months)	Secondary data analysis
August - October 2000 (3 months)	Developing questionnaires and data-entry program
November - December 2000 (2 months)	Preparation of the fieldwork & training of interviewers Carrying out pilot-survey
January - June 2001 (6 months)	Fieldwork: survey, including data entry and editing
July - December 2001 (6 months)	Start analysis survey data Linkage of (survey and secondary) data-sets Writing chapter dissertation: methodology
January - December 2002 (12 months)	Continuation of analysis of linked data sets Writing and finalizing dissertation

After completion of project (funding sought for)

Research for action (3 months, researchers and NGO):

1. Preparation campaign
2. Translation of results into action
3. Health education campaign: NGO

Principal Investigator: Bosch, Alinda

ANNEX II Letter from WOTRO about (financial) approval

Following two pages written by WOTRO funding the project of Mrs. Alinda Bosch.

Unfortunately, in Dutch.

If more information is required, please let us know.

ANNEX III Earlier correspondence between ICDDR,B – PRC Groningen – NIDI Den Haag

Annex IV Correspondence about WOTRO's external reviewers and reviews

Principal Investigator: Bosch, Alinda

The remarks of the external reviewers have been answered by us, and where relevant have been included in the proposal as now formulated for the RRC of Bangladesh.

Following, the pages with our comments on the remarks of the reviewers

**Researcher HERA (during the project),
NIDI, Researcher Population and Development**

1. Conducting feasibility study and writing background report and proposal
2. Responsible for study of secondary literature, analysis of secondary data.
3. Conducting fieldwork.
4. Co-operation with Bangladeshi investigator
5. Writing dissertation
6. Preparation of scientific papers (working papers and papers to be submitted to refereed journals).
7. Involvement translation of research results into action (investigators and NGO).

Mrs. Alinda Bosch has been working since 1995 at the Netherlands Interdisciplinary Demographic Institute (NIDI), The Hague. She worked in joined projects on fertility, international migration, mortality and reproductive health. She received her M.Sc. in non-western Demography (Groningen University) in 1995. During her study she conducted research on fertility at the five islands of the Netherlands Antilles at the Central Bureau of Statistics, Curaçao, for six months. The report was nominated and rewarded with the "ABC-Advisory Award 1995".

ICDDR,B, Investigator (during the project)

1. Responsible for study of secondary literature, analysis of secondary data.
2. Conducting fieldwork.
3. Co-operation with Dutch investigator.
4. Writing dissertation.
5. Preparation of scientific papers (working papers and papers to be submitted to refereed journals).
6. Involvement in translation of research results into action (investigators and NGO).

Mrs. Lutfa Begum is currently a research fellow of the SBSP, PHSD in ICDDR,B and PRC Groningen. Before she was a field research officer of the Health and Population Extension Division and former CHD of ICDDR,B. She holds a M.Sc. in Home Economics from the University of Dhaka and has followed specialized training in epidemiological methods, public health, computer skills, qualitative study methods and the syndromatic management of STDs. She has experience with various interview techniques (among which in-depth interviews, focus group discussions and quantitative data collection), data analysis and report writing. She also worked as a Field Emergency Officer for the United Nations World Food Programme in Bangladesh during the period of October 1998 to June 1999.

Project Coordinator and supervisor (The Netherlands)
Coordinator of HERA
Associate Professor at PRC, University of Groningen / researcher NIDI

1. Responsible for overall project co-ordination, budget control and monitoring of progress.
2. Responsible for embedding the project in the general HERA research program on reproductive health: research, theory, methods, co-operation, dissemination of research.
3. General guidance and supervision of both investigators, and more specifically in the field of reproductive health, anthropological demography, fieldwork, qualitative research methods.
4. Reporting on developments elsewhere (reproductive health, theory, methods).
5. Preparation of scientific papers (working papers and papers to be submitted to refereed journals).
6. Involvement in translation of research results into action (investigators and NGO).

Mrs. Inge Hutter received her MA in Cultural Anthropology (Utrecht University) and MSc in non-western Demography (Groningen University) in 1988. During these studies she conducted research on fertility in Cameroon, including a fieldwork of 7

Principal Investigator: Bosch, Alinda

months, and worked as an anthropologist in a health project of CARE Cameroon. In 1994 the University of Groningen awarded her a Ph.D. with honours in demography. Her Ph.D. research focused on nutrition and health of pregnant women in rural South India, including a fieldwork period of 20 months in Karnataka, India. She currently works at the Population Research Centre, University of Groningen, as an associate professor, focusing especially on reproductive health and child spacing in rural Karnataka (including several fieldwork periods). Since September 1996, she works one day a week at NIDI, The Hague and coordinates the joint research program on reproductive health of HERA.

Dr. Jeroen van Ginneken **Project Co-supervisor, NIDI**

Tasks

1. Co-supervisor of project;
2. Guidance and supervision of both investigators in the field of medical demography, epidemiology, data analysis, fieldwork.
3. Preparation of scientific papers (working papers and papers to be submitted to refereed journals).

Background

Mr. Jeroen van Ginneken is currently Head of the Population and Development Division of NIDI. He holds a MA in Sociology from the University of Nijmegen, The Netherlands, and a Ph.D. in Demography / Epidemiology from the Department of Sociology of the State University of New York at Buffalo. From 1990 to 1995, Mr. van Ginneken worked as a scientist at the Netherlands Interdisciplinary Demographic Institute in The Hague. From 1995 to 1999, he was head of the Health and DSS program of the Community Health Division of ICDDR,B.

Earlier, he worked as a scientist at respectively, The Netherlands Institute of Preventive Health Care, TNO, Leiden, The Netherlands Central Bureau of Statistics (Department of Health Statistics), Voorburg; The World Health Organization (Special Program of Research in Human Reproduction), Geneva; as a Head at the Department of Epidemiology, Medical Research Centre, Nairobi (Part of Tropical Institute, Amsterdam), Project leader, joint project Machakos; and as a Senior Evaluation Officer, Department of Evaluation and Social Sciences, International Planned Parenthood Federation, London.

Mr. van Ginneken has extensive experience with consultancies, among which, in Geneva, Egypt, Kenya, Bangladesh, and Columbia and short-term consultancies for the Ministry of Foreign Affairs, The Netherlands, UNFPA, The European Union and the World Health Organization.

Prof. Dr. Frans Willekens **PRC, Professor in Demography, University of Groningen**

Tasks

1. Guidance and supervision of both investigators in the field of demography and analysis of data.
2. Promotor at University of Groningen
3. In his capacity as a member of the steering committee of HERA: supervision of the embedding of the research project in the general program on reproductive health.

Background

Mr. Frans Willekens is professor of Demography at the University of Groningen, Faculty of Spatial Sciences, and Vice-Dean for Research. He studied Agronomy (field of specialization: Tropical Agriculture) and Economics (University of Leuven, Belgium) and holds a Ph.D. in Urban Systems Engineering and Policy Planning from Northwestern University in Evanston, Ill., USA (1976).

From 1980 to 1993, he was Deputy Director of the Netherlands Interdisciplinary Demographic Institute (NIDI), The Hague. In 1991, he founded the Population Research Centre at the University of Groningen. The Centre has three research themes: demographic forecasting, individual choice theory and population-environment interaction. Prof. Willekens is Chairman of the Board of the Netherlands Graduate School of Research in Demography (PDOD), which is a joint venture of the Universities of Amsterdam, Brabant, Groningen, and Utrecht and the NIDI. He is a member of the Executive Board of the Groningen Graduate School of Systems, Management and Organization (SOM), which is a joint venture of the Business School, the Faculty of Economics and the Faculty of Spatial Sciences of the University of Groningen.