, citation and similar papers at core.ac.uk

brought to

provided by Research P

Demographic Research a free, expedited, online journal
of peer-reviewed research and commentary
in the population sciences published by the
Max Planck Institute for Demographic Research
Konrad-Zuse Str. 1, D-18057 Rostock · GERMANY
www.demographic-research.org

DEMOGRAPHIC RESEARCH

VOLUME 13, ARTICLE 4, PAGES 83-116
PUBLISHED 30 AUGUST 2005
http://www.demographic-research.org/Volumes/Vol13/4/
DOI: 10.4054/DemRes.2005.13.4

Research Article

Fertility decline in North-Central Namibia: an assessment of fertility in the period 1960-2000 based on parish registers

Riikka Shemeikka

Veijo Notkola

Harri Siiskonen

© 2005 Max-Planck-Gesellschaft.

Table of Contents

Demographic Research: Volume 13, Article 4
a research article

Fertility decline in North-Central Namibia: an assessment of fertility in the period 1960-2000 based on parish registers

Riikka Shemeikka [1]

Veijo Notkola [2]

Harri Siiskonen [3]

Abstract

This study examines fertility decline in North-Central Namibia in the period 1960-2000. A Scandinavian-type parish-register system, established in the beginning of 20th Century and still in use, provided register-based data for fertility analysis. Fertility decline began in 1980, was rapid in the 1980s, levelled off in the early 1990s, started again in 1994 and continued until the year 2000. Fertility declined in every age group, except among the 15-19 year olds, whose fertility increased. Cohort fertility started to decline among the 1940-44 birth cohort. During the 1980s, fertility decline was associated with increasing age at first marriage and declining marital fertility, connected to e.g. the War of Independence. During the 1990s, an increase in both the use of contraceptives and HIV-prevalence contributed to the fertility decline.

[1] M.Sc., Researcher, Department of Sociology, University of Helsinki, Finland; e-mail: riikka.shemeikka@helsinki.fi

[2] Ph.D., M.Sc., Dos., Department of Sociology, University of Helsinki, Finland and Managing Director, Rehabilitation Foundation, Helsinki, Finland; e-mail: veijo.notkola@kuntoutussaatio.fi

[3] Ph.D., Dos., Professor of general history, Department of History, University of Joensuu, Finland; e-mail: harri.siiskonen@joensuu.fi

1. Introduction

Recent decades have witnessed a decline in fertility in several sub-Saharan African countries, including many countries neighbouring Namibia: South Africa, Botswana and Zimbabwe are forerunners in the fertility decline. In South Africa, the decline in fertility began in the 1960s or possibly even earlier, in Zimbabwe it began in the 1970s, and in Botswana in the late 1970s or early 1980s (see e.g. Gaisie 1995, Muhwava and Timæus 1996, Central Statistical Office – Zimbabwe and Macro International 1995, 2000, Moultrie and Timæus 2003, Swartz 2003, Central Statistical Office - Botswana 2004). Fertility is also declining, though at a slower pace, in Zambia (Central Statistical Office – Zambia, Central Board of Health – Zambia, and ORC Macro 2003). In Angola, some researchers estimate that fertility decline had not yet begun in the late 1990s (Agadjanian and Prata 2001), while others consider that the decline began in the early 1990s (Casterline 2001).

Based on the 1992 Namibia Demographic and Health Survey (NDHS), Kirk and Pillet (1998) classified Namibia into the group of countries with a steady fertility decline. In 2001, total fertility in Namibia was 4.1, this level being about the same (or slightly-higher) than in Botswana and Zimbabwe, clearly higher than in South Africa, and notably lower than the level of fertility in Zambia or in Angola.

Within Namibia, however, there were wide regional differences in the level of fertility and the state of fertility transition, as noted by e.g. Tabutin and Schoumaker (2001). Regional differences have their background in the colonial history of the country, among other reasons. The policy of ethnical segregation, practiced first by the German colonial rulers and later by the South Africans, culminated in the foundation of so-called “homelands” on the basis of a report by the Odendaal Commission (Odendaal Commission 1964).

At the beginning of independence, i.e. in the early 1990s, fertility was highest in the northern part of the country, clearly lower in the central regions, and lowest in southern Namibia (Ministry of Health and Social Services and Macro International 1993, Central Statistics Office 1994a, Raitis 1995). Fertility patterns were connected with the historical context of the regions: in all former “homeland” regions total fertility was above six, except in Damaraland, Namaland and Rehoboth (Odendaal Commission 1964, Raitis 1995). During the 1990s, fertility declined in every region but regional differences remained. According to the 2000 NDHS, total fertility was highest in the Northeast and Northwest Directorates, 4.8 and 4.7, respectively, and lowest in the Central and South Directorates, 3.9 and 3.6, respectively. According to the 2000 NDHS, the national average for total fertility was 4.2, very close to the figure of 4.1 reported in the 2001 Population and Housing Census.

Knowledge of demographic trends is scarcer in Namibia than in many other countries in sub-Saharan Africa. Since reliable data on demographic variables from the colonial period have been lacking, the few demographers studying fertility in Namibia have concentrated on censuses and demographic surveys collected after Namibia gained her independence in 1990 (e.g. Raitis 1995, Chimere-Dan 1997, Gage 1998, Arowolo 2000, Hamata n.d.). In-depth studies on fertility decline in Namibia have been lacking so far.

An exception with a wider historical perspective is previous research on the demographic development of Northern Namibia on the basis of parish registers from the historical Ovamboland and the Kavango regions (e.g. Notkola 1996, Lemström 1999, Notkola and Siiskonen 2000, Notkola, Timæus, and Siiskonen 2000, Notkola, Timæus, and Siiskonen 2004). In their research, Notkola and Siiskonen (2000) studied fertility trends in the historical Ovamboland region until the mid-1980s.

Long-term parish register data provides an opportunity to study fertility in the North-Central Namibia during a period preceding the current demographic knowledge: in its time focus, this study fills the gap between studies of historical Ovamboland (Notkola and Siiskonen 2000), and those concentrating on the period after 1990. Because of the longer time focus than studies based on data for the period following independence, it is possible to examine both the timing and details of the current fertility decline. In addition, since they are a long-term register-based data set, parish registers provide an opportunity for using direct demographic analysis methods, including cohort fertility rates, as tools for fertility analysis. In order to study the differences and similarities in the picture of fertility decline given by parish registers and traditional demographic data, comparisons will be made for the period during which more conventional data exists.

The two major aims of this study are 1) to increase knowledge concerning fertility decline in Namibia, and 2) to contribute to research into fertility decline in sub-Saharan Africa in general by introducing an unconventional data set, i.e. parish registers. This study assesses their suitability for fertility analysis, and explores the new opportunities they provide compared to the other types of data. The specific aims of this study are 1) to determine the starting point of the fertility decline among the study population, 2) to examine fertility development among different age groups, 3) to compare cohort and period fertility in order to differentiate between the tempo and quantum effects in fertility decline, and 4) to compare the results based on parish registers with information obtained from the Population and Housing Censuses of 1991 and 2001, and from the Namibia Demographic and Health Surveys (NDHS) of 1992 and 2000.

This paper first describes the data and methods used. Secondly, it briefly provides some contextual information about the study region. Thirdly, it studies the period and cohort fertility using data from parish registers. Fourthly, it compares the results based

on parish registers with those obtained from the NDHS and census data, and finally, it briefly discusses the processes behind the fertility decline, as well as the contributions made by HIV and AIDS.

2. Study region

The former Ovamboland region was defined during the German colonial period in 1884-1915, and was one of the "homelands" founded during South African rule. It is still, in ethnical terms, relatively homogenous: in 2001, inter-intelligible Ovambo dialects were spoken by 93-97 per cent of population in the Ohangwena, Omusati and Oshana regions and by 87 per cent of population of the Oshikoto region (Central Bureau of Statistics 2003).

The former Ovamboland area is part of the current administrative regions of Omusati, Oshana, Ohangwena and Oshikoto. These regions also include some areas outside the former Ovamboland, the most important additions being incorporation of the former Tsumeb area and parts of the Etosha National park into the Oshikoto region, and expansion of the Omusati region in west by incorporation of the Ruacana area (for more details, see Erkkilä 2001). Together, the Omusati, Oshana, Ohangwena and Oshikoto regions form the Northwest Health Directorate. In the 1992 NDHS, the former Ovamboland region was called the Northwest Region, and in the 2000 NDHS this region was called the Northwest Directorate. In this study, the former Ovamboland region is called North-Central Namibia. Because the 2000 NDHS and the population and housing census data are at the level of current administrative regions, we also refer to information about the Northwest Health Directorate, which is a somewhat wider region than North-Central Namibia (i.e. former Ovamboland).

In 2001, 43 per cent of Namibians lived in the Northwest Health Directorate, on an area of land representing ten per cent of the country's total area. Namibia is sparsely populated, the average population density being 2.2 persons per sq. km in 2001 (Central Bureau of Statistics 2003). The average population density in the Northwest Health Directorate was 9 persons per sq. km. There are, however, wide differences in population densities within the administrative regions, as well as between them.

The very uneven population distribution of Namibia has its roots in both natural conditions and historical events. One explanation for the higher population density in North-Central and North-East Namibia is the more favourable natural environment, especially the better availability of water for irrigation compared to other parts of the country (Erkkilä and Siiskonen 1992). In addition, during the more than one-hundred-year-long period of colonial rule, the majority of the country's land area was reserved for white settlers' commercial farms. This so-called Police Zone covered most of

Central and Southern Namibia. Indigenous Namibians were forced to live in the reservations, later the "homelands", which served as labour reserves for the needs of commercial farms, mines and the like. Movements between regions were restricted and entry into the Police Zone was restricted to temporary labourers employed within the contract labour system.

Populous Ovamboland was an important source of labour for the central and southern regions, and this was also the region most affected by the war of liberation from 1966 to 1989. North-Central Namibia is still a mostly-rural region, in which subsistence agriculture and communal land-ownership are practised. Agriculture as a means of living is often supplemented, however, by other income strategies, including the labour migration of (mostly) male family members. There are also centres of rapid urban growth, the most important of these being the Oshakati-Ongwediva-Ondangwa complex.

3. Data

3.1 Parish register data

This paper studies the fertility decline in the North-Central Namibia using parish registers from eight Evangelic-Lutheran congregations. These eight congregations are located in the northern part of the country in the historical Ovamboland region. In order to get a more representative view of the development of the study region, the sample congregations were chosen from different parts of the region.

Collected according to the principles of the Scandinavian parish register system, these data allow the direct analysis of fertility. This is exceptional in the context of sub-Saharan Africa, where fertility analysis has mainly been based on population censuses and retrospective surveys.

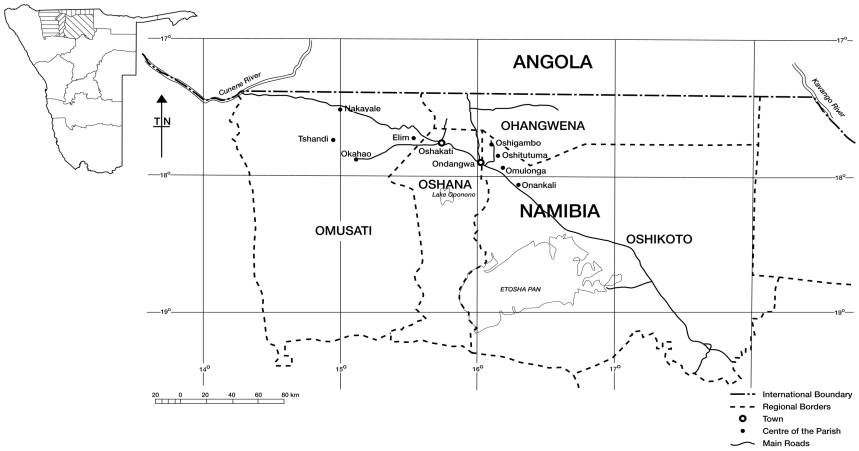
Finnish missionaries started their work in North-Central Namibia in 1870, in a region then known as Ovamboland. They established a parish register system in the new congregations that was similar to the Finnish system. Gradually, congregations were placed under the leadership of local ministers. In 1954, the independent Evangelical Lutheran Ovambo-Kavango Church, later known as the Evangelical Lutheran Church in Namibia (ELCIN), was established. The parish register system has essentially remained the same since the beginning of the 20th century with only minor alterations (for further information on parish register data from former Ovamboland, see Siiskonen, Taskinen, and Notkola 2005). In other words, ministers record baptisms, deaths, migrations, and other events such as confirmations, events that members of their congregations

experience. In practice therefore, the parishioners participate in a vital registration system.

According to the ELCIN statistics, the former Ovamboland congregations had 552,000 members at the end of 2001. Approximately 71% of the 780,000 inhabitants of the Ohangwena, Omusati, Oshana and Oshikoto regions were therefore members of the Evangelical Lutheran Church. (ELCIN 2002, Central Bureau of Statistics 2003.)

The data consists of the records of eight congregations, i.e. Elim, Nakayale, Oshigambo, Okahao, Tshandi, Onankali, Oshitutuma and Omulonga (Figure 1). The sample congregations are located in the Omusati and Oshikoto administrative regions. Some of the congregations are the administrative and economic centres of their region, others are more peripheral. The oldest among the sample congregations is Okahao, founded in 1906. The youngest is Oshitutuma, founded in 1982.

Figure 1: Location of the sample congregations



The parish registers of the sample congregations, i.e. the main books (also called family books) and the registers of deaths, baptisms and migration, were microfilmed. From this data, information concerning all the couples married during the years 1956-2000 was collected. The collected information included deaths, migrations and baptisms among these families, and also information on other events such as confirmations or possible expulsions from the congregation. The follow-up period continued until October 2003.

The original parish register data of the 1956-2000 marriage cohorts consisted of 6,354 marriages, out of which 1,651 (26%) had to be excluded from the final data either

because the couple could not be followed from one main book to the next one, or because no information concerning the couple was listed after their marriage. Of the women, 9% lacked information concerning their year of birth. These cases were not included in the fertility analysis. In cases of missing day of birth, the 15th day of the month was used as the person's birthday, and in case of a missing month of birth, the sixth month (June) was used. The final parish register data consists of 4,703 marriages and information on births, deaths, migrations, and some other events occurring among these families. The data used in fertility analysis for the period 1960-2000 consists of 4,421 women.

The original parish register data included 18,400 children born in the years 1950-2003. However, some of these births had to be excluded from the final data. The most common reason for excluding a birth was that the mother was not in the follow-up at the time of the birth. Other reasons for exclusion were poor follow-up of a marriage, the unknown birthday of the mother, or that the mother was under 15 or over 50 years old at the time of giving birth. Children whose birthdays were unknown and children born before the year 1950 were also excluded from the data. The total number of births in the final data was 15,134. The number of births included in the fertility analysis for the years 1960-2000 was 14,365.

In the fertility analysis, the follow-up of women began on each person's fifteenth birthday or following her baptism. The data also therefore includes information on births occurring before a woman was married. When the time of baptism was unknown, follow-up started from the time of a woman's marriage. Follow-up ended if a woman was excommunicated from the parish or migrated out of it, and began again on her return. If the time of in-migration was unknown, the woman concerned was not included in the data unless she had migrated before her marriage. In such cases, follow-up began from the time of her marriage. Follow-up ended at the time of a woman's death or on her 50th birthday.

One possible weakness of the church register data is that the children who have died before their baptism are missing. Nevertheless, the influence of this factor is reduced by the parental wish to have a weak or sick child baptised before his or her death. The sex ratio at birth (i.e. the number of males per 100 females) in this church register data was 97, while the normal figure is 104-107, probably indicating under-reporting of children who have died before baptism. Church register data are therefore more useful for studying changes in fertility levels than studying precise levels of fertility. The mean age of children at baptism was 6.4 months.

In addition to fertility levels, this study examines the changes in age at first marriage, in the proportion of women with children born before marriage, in the proportion of childless women at the end of their reproductive period, and in the

intervals between the second and third birth and between the third and fourth birth in the sample congregations.

3.2 Population and Housing Censuses and Demographic and Health Surveys

In addition to parish register data, this study utilises other available data sets. These include the Population and Housing Censuses of 1991 and 2001, and the Namibia Demographic and Health Surveys (NDHS) of 1992 and 2000. These data sets provide comparative data on fertility levels, as well as additional information on the determinants of fertility, e.g. the use of contraceptives. Reliable and available censuses for Namibia are the Population and Housing Censuses conducted in 1991 and 2001. The results of these censuses have been published both as analytical reports and as aggregate level tables by region, including, e.g., information about all children ever born and on children born in the 12 months preceding the census (Central Statistics Office 1993, 1994a, 1994b, Central Bureau of Statistics 2003). In addition to the 13 administrative regions, the 2001 Population and Housing Census results and tables were published at the level of administrative sub-regions, i.e. constituencies (e.g., Central Bureau of Statistics 2004a, 2004b, 2005a, 2005b). Moreover, *Statistics Namibia* produced some extra census tables from the 1991 Population and Housing Census for five out of eight of the sample congregations, i.e. for Elim, Nakayale, Oshigambo, Okahao, and Tshandi. These extra tables provided additional information on fertility, education, and the marital status of women in the sample congregation areas.

Data from the Namibia Demographic and Health Surveys (NDHS) of 1992 and 2000 are available both as individual level data-sets for computer analysis, and as published reports presenting the main results of the surveys (Ministry of Health and Social Services and Macro International 1993, Ministry of Health and Social Services 2003b). The 1992 NDHS data consisted of information on 5,421 women, which was representative of four large regional units, i.e. the Northwest, Northeast, Central and South Regions. The 2000 NDHS data consisted of 6,755 women and all the 13 regions of Namibia were included. In addition, the 1996 Intercensal Demographic Survey provide information concerning fertility in 1996 (Central Statistics Office n.d.).

4. Methods

The family reconstitution method (Wrigley 1966) was used to collect data from the microfilmed parish registers of the sample congregations (see Siiskonen, Taskinen, and Notkola 2005). Fertility was studied by means of Age-Specific Fertility Rates (ASFR)

and total fertility (TFR), Marital Age-Specific Fertility Rates (MASFR) and total marital fertility (TMFR), and Coale's index of marital fertility (I_g). Coale's index of marital fertility is an indirectly-standardised ratio which expresses the level of fertility as a proportion of the fertility a population would have had if it had experienced the highest fertility pattern reliably recorded (Newell 1988). These parameters were calculated to produce information on fertility levels and changes in them during the period from 1960 to 2000.

Cohort fertility (CFR) was calculated so as to distinguish between the 'tempo' effect, i.e. changes in timing of childbearing, and the 'quantum' effect, i.e. changes in the completed child number (Newell 1988). Cohort fertility was calculated starting from the birth cohort of 1920-24 and the last birth cohort included was from the years 1975-79. The full set of Age-Specific Fertility Rates by birth cohort could be calculated for the 5-year birth cohorts beginning from 1940-44 until 1950-54, and the birth cohorts from 1935-39 and 1955-59 were only modestly affected by age truncation.

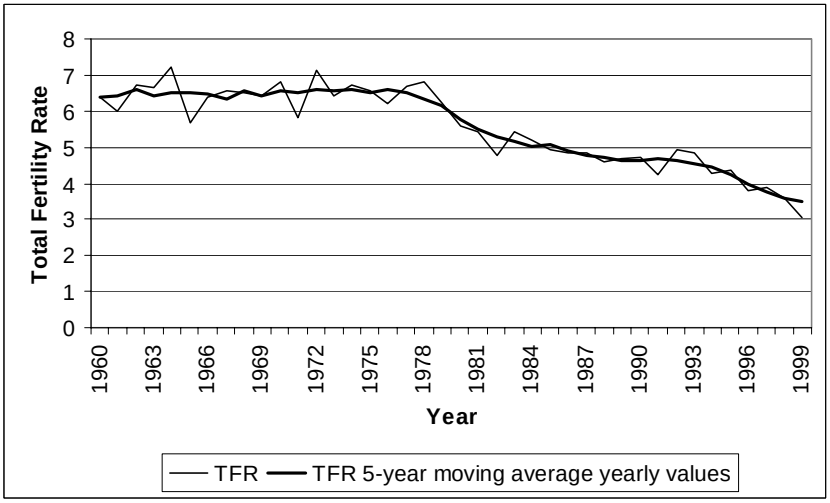
Data from the Population and Housing Census was analysed using indirect demographic analysis. Fertility was analysed using the Brass-type method, which is based on a comparison of period fertility with reported average parities, i.e. the so-called P/F ratio method based on the data for all children (United Nations 1983). The P/F ratio method was chosen because of its comparability with the published Population and Housing Census results produced using this method.

5. Fertility change in the sample congregations 1960-2000

5.1 Period fertility

During the period from 1960 until 1979, total fertility was close to 6.5 children per woman (Figure 2). A decline in total fertility did not occur until the late 1970s, but some yearly fluctuation did take place. However, at the beginning of the 1980s, fertility began to decline. The decline was rapid until late in the same decade. In the late 1980s and early 1990s, the decline in fertility slowed and the level of total fertility remained stable until another decline started around 1994. The decline then continued until the end of the research period.

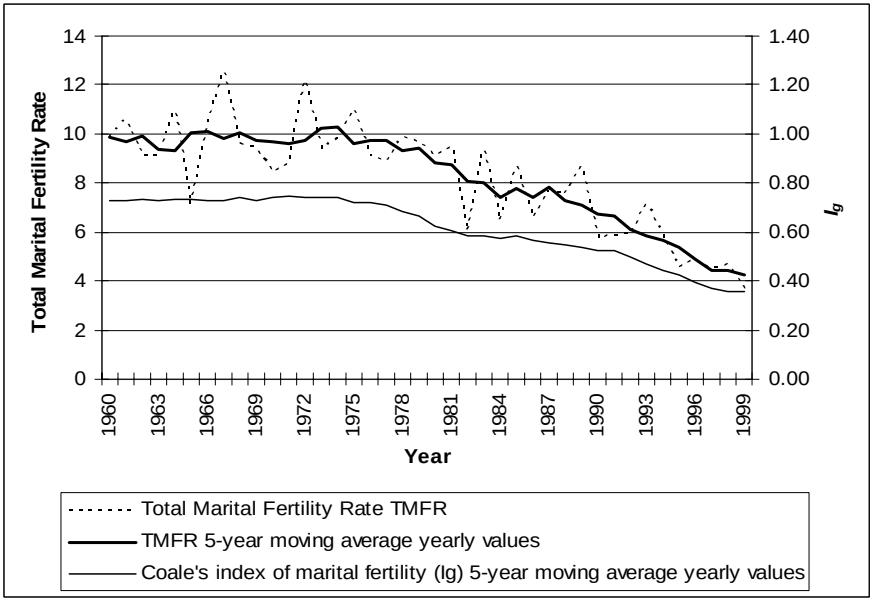
Figure 2: Total Fertility Rate in North-Central Namibia, 1960-1999



When total fertility is analysed using ten-year periods, it was about the same during 1960-69 and 1970-79, i.e. 6.4 and 6.5, respectively. Fertility declined sharply during the 1980s, and the total fertility during this decade was 5.1. The decline continued in the 1990s and total fertility fell to 4.2 in 1990-2000.

Marital fertility was high during the 1960s and most of the 1970s, with total marital fertility being around ten until the later half of the 1970s (Figure 3). The decline in total marital fertility began in the late 1970s, slightly earlier than the decline in overall total fertility. Marital fertility continued to decline until the end of the research period. The 5-year moving average of Coale's index of marital fertility (I_g) for the sample congregations was above 0.7 until the year 1978 (Figure 3), meaning that marital fertility was approximately 70% of that of the Hutterites. In 1978-79, this average was below 0.7 and continued to decline until the end of the research period. The decline in marital fertility did not level off in a similar way to overall fertility during the late 1980s and early 1990s.

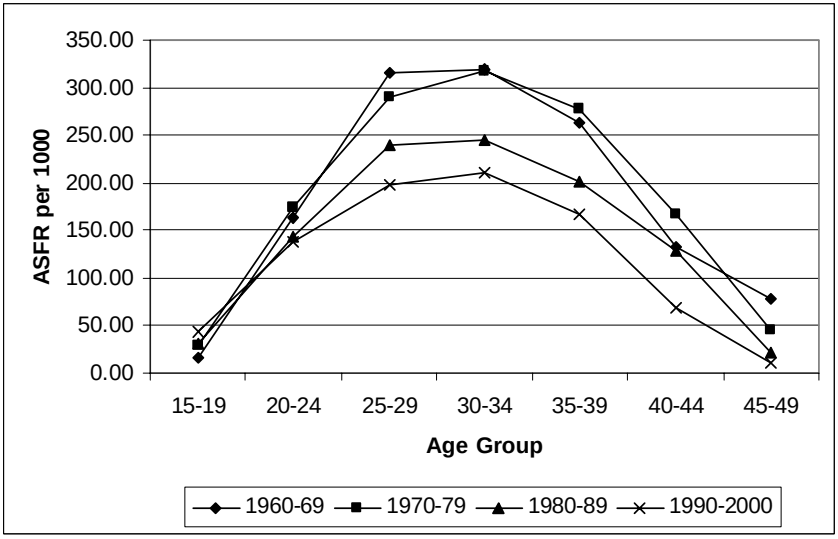
Figure 3: Total Marital Fertility Rate and the Coale's index of marital fertility in North-Central Namibia, 1960-1999



The Age-Specific Fertility Rates (ASFR) for the ten-year periods show that fertility is highest in three age groups (25-29, 30-34 and 35-39), with the peak level occurring in the 25-29 and 30-34 age groups (Figure 4). This is a typical age pattern for fertility for the former Ovamboland region, and this has been confirmed by both the census and Demographic and Health Survey data (e.g. Ministry of Health and Social Services and Macro International 1993, Raitis 1995). In this region, peak fertility occurs in older age groups than in other regions of Namibia (cf. Ministry of Health and Social Services and Macro International 1993, Raitis 1995) and in older age groups than the average for sub-Saharan Africa (cf. Robinson 1987).

During the periods 1960-69 and 1970-79, the level of Age-Specific Fertility Rates was relatively stable. Subsequently, fertility began to decline. The greatest reduction occurred during the 1980s, and the decline continued in the 1990s. Fertility declined in all age groups, except among 15-19 year-old women, whose fertility increased slightly. Throughout the research period, the age pattern of fertility remained fairly stable, except for a slight shift in the fertility peak from the 25-29 age group to the 30-34 age group which occurred between the 1960s and 1970s, and a systematic increase in fertility for the 15-19 age group.

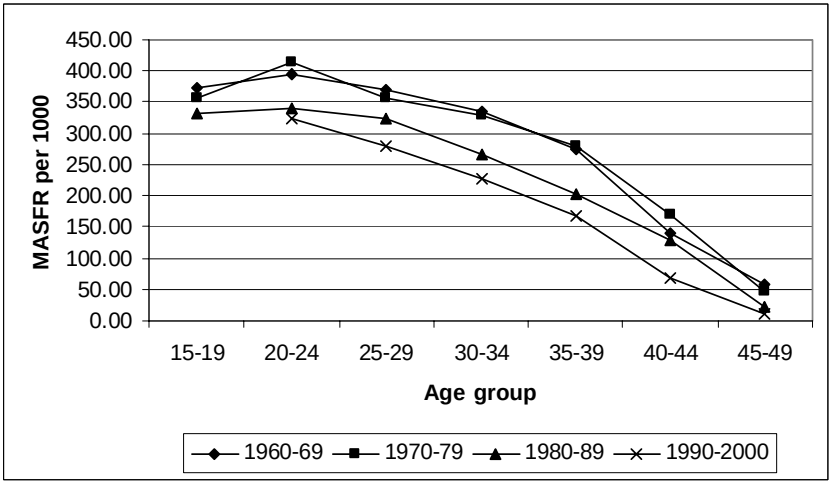
Figure 4: Age-Specific Fertility Rates (ASFR) in North-Central Namibia, 1960-2000



The yearly calculations of Age-Specific Fertility Rates show that the fall in fertility started at a different time in different age groups. The first age group showing a sign of fertility decline was the 25-29 age group, in which fertility declined slowly from the beginning of the 1970s and accelerated from the beginning of the 1980s. The ASFR of the 30-34 age group started to decline in the mid-1970s, and the ASFR of 35-39, 40-44 and 45-49 age groups began to decline in the late 1970s. In chronological terms, the last age group whose fertility started to decline was the 20-24 age group, among whose members fertility began to decline in the beginning of the 1980s. In contrast to the other age groups, the fertility of 15-19 year-olds started to increase in the early 1970s.

Fertility decline also shows up in the Marital Age-Specific Fertility Rates (Figure 5). The decline was the highest in the 1980s and continued in the 1990s. Contrary to the fertility of all women, there was no increase in marital fertility in the 15-19 age group in the 1980s.

Figure 5: Marital Age-Specific Fertility Rates (MASFR) in North-Central Namibia, 1960-2000



5.2 Cohort fertility

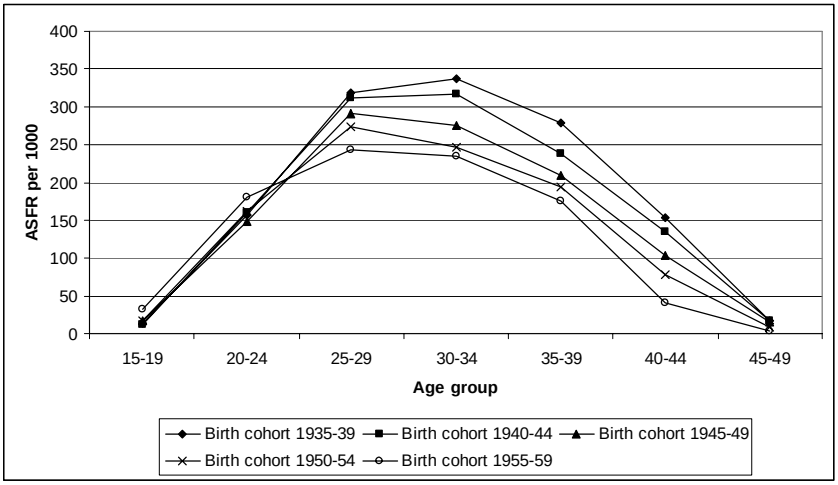
The full set of Age-Specific Fertility Rates by birth cohort were produced for the cohorts from 1935-39 to 1955-59. The ASFR of the youngest age group (15-19 years old) was partly censored in the 1935-39 birth cohort, and the same is true of the oldest age group (45-49 years old) in the 1955-59 birth cohort. This had, however, only a minor impact on the total cohort fertility of these birth cohorts. Annual analysis of total fertility by birth cohort shows that the decline in cohort fertility began from the birth cohorts of 1940-1942. Analysis using 5-year groups of birth year shows that total cohort fertility was 6.4 in the birth cohort of 1935-39 and had fallen to six in the birth cohort of 1940-44. In the birth cohort of 1955-59, it was 4.6.

Age-Specific Fertility Rates by birth cohort show that the decline occurred for the 25-29 age group and in age groups older than that (Figure 6). The fertility of 15-19 year-old women started to increase for the birth cohort of 1955-59.

Among the younger birth cohorts (not shown in the figure), the fertility of 15-19 year-olds remained at this new higher level until the birth cohort of 1970-74. Among the 1960-64 and 1965-69 birth cohorts, Age-Specific Fertility Rates also declined for

the 20-24 age group, in contrast to older birth cohorts, among whom fertility among 20-24 year old women remained stable.

Figure 6: Age-Specific Fertility Rates by birth cohort in North-Central Namibia, 1935-39 to 1955-59 birth cohorts



5.3 Birth intervals, age at first marriage, pre-marital fertility, and childlessness

Simultaneously with declining fertility, the median duration between births increased. This study examined intervals between the second and third births and intervals between the third and fourth births. The median of birth intervals was around 27 months until the end of the 1970s. It then began to increase and was 29 months at the end of the 1980s. This increase in birth intervals continued until the end of the research period, and in the late 1990s the median of birth intervals was around 34 months. The median length of birth interval was shorter if an older sibling had died at an age of less than one year in the 1960s and 1970s; later decades cannot be studied as there were too few cases.

Age at first marriage was quite stable during the first part of the study period. The mean age of females at first marriage was around 24 years and the median was around 23 years from 1956 until 1969. During the 1970s, age at first marriage began to slowly increase, and at the end of 1970s, the mean age of females at first marriage was around

25 years. The increase in the age of females at first marriage accelerated during the 1980s. In the 1990s, the mean age of females at first marriage was around 30 years and the median age at first marriage was around 29 years. This very high age at first marriage has been confirmed by other studies. According to the 2000 NDHS (Ministry of Health and Social Services 2003b), median age at first marriage was 29 years among 30-49 year-old women in the Northwest Directorate. The increase in the mean age of males at first marriage started later than that for females, i.e. in the 1980s. The median age of males at first marriage was 34 years during the 1990s. The mean age difference between spouses was one year less in the 1970s than it was in the 1980s.

In the 1980s therefore, in parallel with the onset of fertility decline, the starting of marital life was moving to later age groups among both men and women. As women's entry into married life was postponed, its connection with the beginning of motherhood was weakened and the proportion of women who bore children before marriage increased. While 9-11% of the women who married at an age of less than 30 years had given birth to a child in 1956-1979, the corresponding proportion in the 1990s was 29%. Parish registers also contain information about fathers of children. Provided that this information is accurate, an increasing proportion of couples had a child in common before their marriage. The proportion of women who had a child with their future husbands before marriage was 27% of all women (married at any age) in the 1990s, in the 1960s this figure was 10%.

The level of premarital fertility increased slightly during the early 1970s, was stable in the second half of the 1970s and the first half of the 1980s, and began to increase strongly from the mid-1980s. This increase continued until the end of the research period.

Among the women who married before the age of 30, the proportion of those who were childless at the age of 45 was 2-5% in the 1956-1989 marriage cohorts, indicating a normal level of primary sterility in a study population in a sub-Saharan African context. Due to age truncation, the proportion of childless women at the age of 45 among women who married before the age of 30 cannot be estimated for the years 1990-2000.

5.4 Comparison between parish registers and other data

Comparison of parish register results with other sources is hampered by different regions and periods. Other sources usually provide data for broader administrative units and start from the year 1990.

A sub-sample of 1991 Population and Housing Census data consisting of five out of eight sample congregations shows that fertility was in general somewhat lower in the

parish register data than in the census data, although different reference periods, study populations and estimation methods hamper comparison. In the early 1990s, total fertility in the sample parishes was approximately 4.6. According to calculations made from 1991 census data, total fertility in five out of the eight sample congregations varied from 5.1 in Tshandi to 6.4 in Oshigambo (Table 1).

Table 1: Total fertility by congregation and administrative region

Congregation	1960-69	1970-79	1980-89	1990-2000	1991*	2001#
Elim	6.8	6.6	6.4		5.7	2.9
Nakayale	7.5	6.5	4.5	3.1	5.6	3.6
Okahao	5.7	6.1	4.6	3.3	5.6	3.1
Oshigambo	5.9	6.9	5.0	4.2	6.4	4.0
Tshandi	6.3	6.7	4.5	3.2	5.1	5.9
Onankali	3.3	4.6	6.0	5.2		4.0
Omulonga				3.7		4.2
Oshitutuma				4.5		4.0
All congregations	**6.4**	**6.5**	**5.1**	**4.2**	**5.7**	**4.0**

Region	1991 **	1990-92 ***	1996 +	1998-2000 ++	2001 **
Oshana	5.6		4.8	3.3	3.7
Omusati	5.7		4.9	5	4
Oshikoto	6.7		4.7	4.3	4.6
Ohangwena	7.7		6.9	6.5	5.3
Northwest Health Directorate	**6.8**	**6.7**	**5.3**	**4.7**	**4.4**

Notes:
* Indirect estimates (P/F ratio method) from the 1991 Population and Housing Census data
** The 1991 Population and Housing Census (Central Statistics Office 1993), the 2001 Population and Housing Census (Central Bureau of Statistics 2003), and indirect estimates of 1991 and 2001 census data
*** Namibia Demographic and Health Survey (NDHS) 1992
+ Intercensal Demographic Survey 1996 (Central Statistics Office n.d.)
++ Namibia Demographic and Health Survey (NDHS) 2000 (Ministry of Health and Social Services 2003b)
# Fertility in the constituency area where congregation is located, according to the 2001 census (Central Bureau of Statistics 2004a, 2005a)

One possible explanation for lower fertility in parish register data is the under-registration of children who died before baptism. Also, comparison between census-based results from the sample congregation regions and census results for the whole Northwest Health Directorate shows that total fertility in the congregation regions in 1991 was lower than that for the whole Northwest Health Directorate, i.e. 5.7 as compared to 6.8, respectively.

The 2001 census results were also given by constituency. These administrative sub-regions are a long way from being identical to congregations, but may provide

some additional information for regions in which congregations are located. The 2001 census results for the same five congregation areas included in the sub-sample of the 1991 census show that fertility was lowest in Elim, i.e. 2.9, and highest in Tshandi, i.e. 5.9. The three other congregations were located in constituencies where total fertility varied from 4.0 to 4.2.

There are many possible explanations for the difference in fertility between the congregation regions and the average for the Northwest Health Directorate. The 1991 census data show that on average, the proportion of never-married women was higher in every age group in the congregation regions than in the Northwest Health Directorate. It also seems probable that the educational level in congregation regions is higher than the average for North-Central Namibia. In 1991, the proportion of people without any formal education was smaller in the congregation regions than in the Northwest Health Directorate in general. Similarly, in 2001, in constituency regions where congregations were located, the literacy rate was higher and the proportion of people without any formal education was smaller among members of the population aged 15 years or more.

Total fertility based on census data for the five congregation regions in 1991 and for the constituency regions of congregations in 2001 was on average 0.7 children higher than total fertility based on parish register data (rate ratio 1.18). Assuming that this difference was similar in earlier periods, this would mean that the real level of total fertility was close to 7.6 in the period 1960-1979 and 6.0 in the period 1980-89.

For the whole Northwest Health Directorate, the 1991 census estimate is very close to the 1992 NDHS estimate for the 0-3-year period prior to the survey, i.e. 6.8 compared to 6.7, respectively. The 2000 NDHS estimated that total fertility in the period 0-3 years prior to the survey was 4.7, while the 2001 census estimated that total fertility was 4.4 during the 12-month period preceding the census.

6. Conclusions and discussion

6.1 Fertility decline started in 1980 and was most rapid during the early 1980s

The parish registers of North-Central Namibia proved to be a useful addition to conventional demographic sources, especially in the case of Namibia, where reliable data from the long period of colonial rule have been lacking. These data allowed for precise timing of the onset of fertility decline among the study population, which occurred before the current reliable surveys and censuses were conducted in the independent Namibia. Continuous register-based data also provides an opportunity to study the pace of fertility decline.

Earlier research on fertility trends in the historical Ovamboland region has shown that in 1925, total fertility was almost eight and total marital fertility around ten (Notkola and Siiskonen 2000). Fertility declined during the 1940s, most likely as a result of the increased migration of male labour. Fertility began to increase in the late 1950s, with the probable cause being a reduction in infertility resulting from improved treatment of STDs. Simultaneously, increased coverage for vaccinations improved general levels of health in the population. This study shows that fertility was high from the beginning of the 1960s until the end of the 1970s. During this period, the Total Fertility Rate was around 6.5 and the Total Marital Fertility Rate was almost ten. In 1979-80, or in the case of marital fertility some 2-3 years earlier, fertility began to decline from its plateau level (cf. Casterline 2001). This decline continued throughout the research period, and was identified in all the fertility indicators employed. In 1980, the fall in both the TFR and TMFR exceeded 10%, a conventionally accepted marker of the beginning of a fertility transition (cf. Coale and Treadway 1986, Caldwell, Orubuloye, and Caldwell 1992).

During the early 1980s, the pace of fertility decline was highest. After the War of Independence in the early 1990s, the decline in fertility levelled off although marital fertility continued to decline. In 1994, fertility started falling again, and the decline continued until the end of the research period.

6.2 Cohort fertility shows a decline in completed number of births

As a long-term register-based data set, parish registers provide an opportunity to study cohort fertility, an opportunity which is relatively rare in sub-Saharan Africa. This examination proved that a real change towards smaller completed number of births per woman has taken place, not only a change in the timing of births along each woman's lifespan. The reduction in cohort fertility started with the birth cohort of 1940. A decline in cohort fertility exceeded the 5% marker in the 1941 birth cohort (cf. Bongaarts 2002) and the 10% marker in the 1942 birth cohort. While the completed number of births was 6.4 among women born in 1935-39, it was 4.6 among those born in 1955-59.

6.3 Disparity in fertility development between adolescents and other women

Parish registers also allow for an examination of long-term changes in the fertility rates of specific age-groups. We were therefore able to discover among which age groups the decline began, and whether a decline occurred among women in all age-groups.

Fertility decline started among 25-29 year-old women in the early 1970s, and the decline in this age group was followed by women of 30-34 years, whose fertility began to decline in the mid-1970s. A comparison of Age-Specific Fertility Rates using 10-year periods in the 1960s, 1970s, 1980s, and 1990s show that in the 25-29 age group and among women older than that, fertility declined in every 10-year period. This is a phenomenon typical of sub-Saharan Africa, where fertility regulation is used more for spacing out births than for stopping childbearing. Cohort fertility declined in the 25-29 age group and among older age groups in the 1935-39 – 1955-59 birth cohorts.

Fertility in the youngest age group, i.e. 15-19 year-old women, increased in all the 10-year periods studied. In terms of cohort fertility, the fertility of the 15-19 age group increased among the birth cohort of 1955-59 and subsequently reached a new, higher level. In this respect, our study region differs from many other regions of sub-Saharan Africa where the fertility of young women is declining as a result of the increasing use of contraceptives by young, unmarried women (see e.g. Caldwell, Orubuloye, and Caldwell 1992, Kirk and Pillet 1998). This phenomenon appears to be typical of the Southern African fertility regime. Our study region shares the experience of increasing adolescent fertility with the neighbouring countries of Botswana, Zambia and Zimbabwe (cf. Chimere-Dan 1997, United Nations 2004). A high level of adolescent fertility has also been reported in South Africa (Garenne, Tollman, and Kahn 2000, Dickson 2003).

An increase in the age of females at first marriage started in the 1970s, accelerated in the 1980s, and continued until the end of research period. Together with an increase in adolescent fertility, this resulted in an increasing level of premarital fertility. In their analysis of South African fertility, Garenne, Tollman, and Kahn (2000) found a two-peaked fertility system, in which extra-marital fertility peaked among the younger age group. This system also seems to be applicable in the case of North-Central Namibia.

6.4 Contraceptive prevalence increased

In the early 1970s, the South African colonial government introduced modern contraceptive methods to Namibia. Family planning services were gradually expanded, especially after 1979, when the training of professional and sub-professional nurses began (Ministry of Health and Social Services 1995). Before Independence, family planning services as well as the selection of methods were segregated in accordance with ethnic groups (Lucas 1992). For the indigenous majority, proper advisory services were not available and the methods most commonly used were injectables and the Pill.

Hospital statistics show that the distribution of contraceptives in North-Central Namibia had already started during the 1980s (Notkola and Siiskonen 2000).

Contraceptives were distributed in hospitals under an action called family spacing. The methods used were the Pill and injections (Depo-Provera). Between 1st April 1984 and 31st March 1985, 20,514 doses of Depo-Provera were given. The Pill was used to a lesser extent. From 1983 to 1984, the number of Depo-Provera doses was 6,735. From 1985 to 1986, Depo-Provera was also distributed less than in the 1984 to 1985 period, so it is possible that a special family planning campaign was initiated in North-Central Namibia in 1984. (Notkola and Siiskonen 2000). During the 1980s, there are also some mentions of IUDs in hospital reports. The Pill possibly outnumbered injections as the primary contraceptive method in the 1990s, but in the 2000s, injections once again became the most popular method, followed by the Pill. According to family planning workers in Oshigambo clinic (1994b), the Pill was recommended to younger women and injections were recommended for older women. (Lutheran Medical Mission 1985, 1988, 1991, Lutheran Medical Service 1994, Oshakati Health Centre 1994a, 1994b, Oshigambo Clinic 1994a, 1994b, Onandjokwe District DDC 2003, 2004, Onandjokwe Lutheran Medical Service 1999.)

At the beginning of independence, accusations of malpractice (especially in connection with Depo-Provera) together with pro-natal opinions held by some political leaders may have created prejudices against contraception. On the other hand, those who were interested in using contraceptives faced the problem of insufficient family planning services. (Cleaver and Wallace 1990, Ahrensen-Pandikow 1992, Lucas 1992, Marcus and Baden 1992, Ministry of Health and Social Services 1995.)

Surveys show that contraceptive prevalence was low in the study region in the early 1990s (UNICEF Namibia 1991, Ahrensen-Pandikow 1992, Namibia Development Trust 1994) and increased quickly during the 1990s (Ministry of Health and Social Services 2003b). In 1992, only 7% of currently-married women were using some modern contraceptive method, while in 2000, 26% of currently-married women and 39% of all sexually-active women were using modern contraceptives (Ministry of Health and Social Services and Macro International 1993, Ministry of Health and Social Services 2003b).

Primary and secondary sterility are caused by e.g. sexually-transmitted diseases (STDs). These have been present in this region from at least the beginning of the 20th century (Notkola and Siiskonen 2000), but were, however, cured in a relatively-efficient manner. Notkola and Siiskonen assume that increasing treatment of the STDs contributed to the increase of fertility during the 1960s. Primary sterility can be estimated by calculating the proportion of women married before the age of 20 who remain childless at the end of their reproductive period. The average for primary sterility in sub-Saharan Africa is 3-6%. In North-Central Namibia, the average age at first marriage is higher than in sub-Saharan Africa in general, and we therefore

examined the proportion of childless females among women married before the age of 30. Among these women, the proportion remaining childless at the age of 45 is 2-5%.

6.5 Causes of fertility decline: The changing cultural and socio-economical context in the study region

The decline in fertility that began in 1980 was connected with long-term social changes in the study region. These changes have deep roots. Christianisation, the contract labour system, increasing levels of female education and the War of Independence are some of the factors which have contributed to this change.

Christianisation, which began in the late nineteenth century, began to erode the initiation into womanhood which was an important part of the system used to control adolescent childbearing, and also played an important role in the education of young women concerning reproduction. The Christian ideal of monogamous and life-long marriage reshaped the marital system, which, together with male absenteeism resulting from the contract labour system, increased women's vulnerability and led to attempts to redefine the marital and social systems (Tuupainen 1970, McKittrick 1997, 2002, Fox 2002).

In the study region, both courtship and the marital system are complicated. Many young women express their hope of protecting their independence by remaining unmarried. At the same time, however, many young women and single mothers are economically dependent on their lovers, and may even have multiple partners to guarantee adequate levels of economic assistance. Even though some young men and women have low regard for marriage as an institution, others seek the safety offered by an official union. Getting pregnant in a lover-relationship may, for the woman, be a means of obtaining increased economic support from her partner, safeguarding the continuity of the relationship, or improving the chances of an official marriage with her partner. The burden of a premarital child is also diminished by the tradition of child fostering; in many cases the child's grandparents rather than the young mother take care of her/him. There are also many types of marital union, and many factors influence the decision on which one will be chosen. Even among married couples, living separately is relatively common. (LeBeau et al. 1999, 2002, Tersbøl 2002, Research Facilitation Services and Health Communication Partnership 2004.)

The contract labour system and the War of Independence caused prolonged periods of spousal separation in the study region during the research period. The contract labour system has a long history in the study region; it was introduced by the German colonial rulers and was continued by the South Africans during their period of administration which started in 1915. The volume of labour migration within the

contract labour system was so high that it affected levels of fertility in the study region: according to Notkola and Siiskonen (2000), an increasing number of male labour migrants and their lengthened contract periods was the main reason for the decline on fertility during the 1940s and 1950s. The number of labour migrants recruited from Ovamboland increased from 14,557 to 35,577 between 1960 and 1974, respectively (Notkola and Siiskonen 2000). Starting from the 1970s, the system used to control migrant labour started to lose its power. Migrant labour from the study region has continued until the present day, but the improved availability of transportation during the current decade may have diminished its impact on spousal separation.

The War of Independence resulted in spousal separation, and probably also resulted in delayed marriages during the 1970s and 1980s. North-Central Namibia shares the experience of Zimbabwe, where fertility declined during the war and that decline continued after a short period of stagnation after the war ended (Muhwava and Timæus 1996). In the study region, as in Zimbabwe, a significant number of men were expatriated during the war. The exact number of those who left the country is unknown, but within a period of eight months before Namibia's independence in March 1990, 43,387 registered exiles returned to the country, and some 80% of them returned to their homes in the study region by 1990 (Tapscott and Mulongeni 1990, Webb and Simon 1995). In Angola, Agadjanian and Prata (2002) discovered that war reduced fertility especially in regions most heavily affected by fighting, and also among the more-educated and more-affluent segments of the population.

Also, the roles women adopted during the fight for independence may have changed both their values and their status in society. The War of Independence was also associated with urbanisation in the study region. The war economy offered working opportunities and attracted young women and men to the expanding cities (Van der Merwe 1989, Pendleton, LeBeau, and Tapscott 1992).

Among socio-economic differentials in fertility, the most extensively studied, and consequently the best known, are educational fertility differentials. Women with a higher educational status have a lower fertility than their counterparts with a lower educational status (e.g. Jejeebhoy 1995, Martín 1995, Wils and Goujon 1998, Lutz and Goujon 2001, Cleland 2002, Bongaarts 2003). Fertility differentials are also closely related to socio-economic factors, especially to female education, in Namibia (Arowolo 2000, Hamata n.d.).

In the study region, education, including female education, began early, once again as a result of the presence of missionaries. During the apartheid period in South Africa, a so-called Bantu education system was introduced. In North-Central Namibia, however, missionary schools and churches continued with their educational work. Educational levels are probably higher in the congregation regions than in North-Central Namibia on average: according to the 1991 and 2001 population and housing

censuses, the average literacy rate is higher and the average proportion of people without any formal education is lower in regions where congregations are located than in other regions of the Northwest Health Directorate on average.

6.6 Contribution of HIV and AIDS to fertility decline

Several studies have shown that HIV-positive women have lower level of fertility than their HIV-negative counterparts in sub-Saharan Africa (Ryder et al. 1991, Ntozi, Nakanaabi, and Lubaale 1997, Gray et al. 1998, Glynn et al. 2000, Hunter et al. 2003, Lewis et al. 2004). HIV/AIDS affects the level of fertility via both biological and behavioural mechanisms. HIV-infected women have lower rates of conception and increased rates of foetal loss compared with HIV-negative women, partly because of co-infections with the other STDs (Carpenter et al. 1997, Gray et al. 1998, Zaba and Gregson 1998, Ross et al. 1999, Crampin et al. 2003). Also, HIV/AIDS may change reproductive behaviour in HIV-affected societies and thus affect the level of fertility (Gregson et al. 1997, Zaba and Collumbien 1997, Kamali et al. 2000, Rutenberg, Biddlecom, and Kaona 2000, Gregson, Zaba, and Hunter 2002, Caldwell and Caldwell 2003, Du Plessis 2003, Terceira et al. 2003). Based on the experience of several regions in sub-Saharan Africa, Zaba and Gregson (1998) have estimated the impact of the HIV pandemic on fertility at the population level. According to their results, an increase of 1% in HIV-prevalence is associated with a reduction of 0.4% in total fertility.

The results from HIV sentinel surveillance show that HIV-prevalence in 1992 among pregnant women was 4% in Oshakati in North-Central Namibia. This may be higher than the overall prevalence in the region in general, because Oshakati is an urban centre and most of the region is rural. In 1996, the average HIV-prevalence of three sentinel sites located in the study region was 19%, whereas in 2000, the average HIV-prevalence in four sentinel sites located there was 24%. In 2004, there were five sentinel sites in the study region. HIV-prevalence among pregnant women varied from 18% to 27%, depending on the site. HIV-prevalence among pregnant women declined between 2002 and 2004 at all but one of the sentinel sites. The average HIV-prevalence in these sentinel sites declined from 25% in 2002 to 23% in 2004 (Shemeikka 1999, Ministry of Health and Social Services 2003a, 2004).

Assuming that the sentinel-site prevalence rates are accurate, and using the 0.4% reduction in fertility per 1% HIV prevalence, HIV infections would have caused a decline of 1.6% in total fertility in the early 1990s. This means a reduction of approximately 0.1 children per woman in total fertility in the study region. From 1996 onwards, the decline in total fertility would have been around 8-10%, which would mean a reduction of around 0.4-0.5 children per female in total fertility. Among the four

administrative regions of the Northwest Health Directorate (Ohangwena, Omusati, Oshana and Oshikoto), the fertility decline varied from 0.1 children to 1.6 children in the years 1996 to 2001, and the average fertility decline for the whole Northwest Health Directorate was 0.9 children between 1996 and 2001 (Central Statistics Office n.d., Central Bureau of Statistics 2003). HIV infections affecting women are therefore probably one important explanation for declining fertility during the second half of the 1990s.

The parish records of North-Central Namibia provide a data set that can be used for register-based demographic analysis. In the sub-Saharan African context, this data set is rather unique. In this study, parish register data has been used to examine fertility trends from 1960 to 2000. It appears that the parish register data can provide important new information on fertility decline in the former Ovamboland region during the past decades. Compared to retrospective surveys, parish register data allows more accurate timing of both the beginning of fertility decline and changes in fertility among different age groups. Long-term data also allows for an examination of cohort fertility, thus helping to distinguish between the tempo and quantum effects of fertility. Although levels of fertility according to parish register data may differ from other data sets, mainly because of the under-registration of children who have died prior to baptism, parish registers appear to be a promising source of data for the analysis of demographic trends.

7. Acknowledgments

The authors wish to thank the Evangelical Lutheran Church in Namibia and its clergy for access to these data, Mr O. Lemström for computing assistance, and Mr K. Miettinen for his valuable comments. This research was funded by grants from the Academy of Finland and the Emil Aaltonen Foundation.

References

Agadjanian, Victor, Ndola Prata. (2001). "War and Reproduction: Angola's Fertility in Comparative Perspective." *Journal of Southern African Studies*, 27, 2: 329-347.

Agadjanian, Victor, Ndola Prata. (2002). "War, Peace and Fertility Angola." *Demography*, 39, 2: 215-231.

Ahrensen-Pandikow, Helena. (1992). Survey of Attitudes Towards the Use of Contraceptives in Namibia. Namibian Institute for Social and Economic Research (NISER), Research Report 15. Windhoek: University of Namibia.

Arowolo, O.O. (2000). Fertility in Namibia. In: Ben Fuller, Isolde Prommer, Wolfgang Lutz, editors. Population-Development-Environment: Background Readings on Namibia. Laxenburg, Austria: International Institute for Applied Systems Analysis (IIASA): 253-271.

Bongaarts, John. (2002). The End of the Fertility Transition in the Developing World. In: Completing the Fertility Transition. Part Three: Country Papers. United Nations Population Division, Department of Economic and Social Affairs: 288-307.

Bongaarts, John. (2003). "Completing the Fertility Transition in the Developing World: The Role of Educational Differences and Fertility Preferences." *Population Studies*, 57, 3: 321-336.

Caldwell, John C., Pat Caldwell. (2003). The Fertility Transition in Sub-Saharan Africa. In: Fertility: Current South African Issues of Poverty, HIV/AIDS and Youth. Seminar Proceedings. Human Sciences Research Council (HSRC) and Department of Social Development. Cape Town, South Africa: HSRC Publishers: 117-123.

Caldwell, John C., I.O. Orubuloye, Pat Caldwell. (1992). "Fertility Decline in Africa: A New Type of Transition?" *Population and Development Review*, 18, 2: 211-242.

Carpenter, Lucy M., Jessica S. Nakiyingi, Anthony Ruberantwari, Samuel S. Malamba, Anatoli Kamali, James A.G. Whitworth. (1997). "Estimates of the Impact of HIV Infection on Fertility in a Rural Ugandan Population Cohort." *Health Transition Review*, 7, Suppl. 2: S113-S126.

Casterline, John B. (2001). "The Pace of Fertility Transition: National Patterns in the Second Half of the Twentieth Century." *Population and Development Review*, 27, Supplement: 17-52.

Central Bureau of Statistics [Namibia]. (2003). 2001 Population and Housing Census. National Report: Basic Analysis with Highlights. Central Bureau of Statistics, National Planning Commission. Windhoek

Central Bureau of Statistics [Namibia]. (2004a). 2001 Population and Housing Census. Oshikoto Region: Basic Analysis with Highlights. Central Bureau of Statistics, National Planning Commission. Windhoek.

Central Bureau of Statistics [Namibia]. (2004b). 2001 Population and Housing Census. Oshana Region: Basic Analysis with Highlights. Central Bureau of Statistics, National Planning Commission. Windhoek.

Central Bureau of Statistics [Namibia]. (2005a). 2001 Population and Housing Census. Omusati Region: Basic Analysis with Highlights. Central Bureau of Statistics, National Planning Commission. Windhoek.

Central Bureau of Statistics [Namibia]. (2005b). 2001 Population and Housing Census. Ohangwena Region: Basic Analysis with Highlights. Central Bureau of Statistics, National Planning Commission. Windhoek.

Central Statistical Office [Botswana]. (2004). Demography and Tourism Statistics. Http://www.cso.gov.bw/cso/demo_stats.html. Accessed March, 2004.

Central Statistical Office [Zambia], Central Board of Health [Zambia], ORC Macro. (2003). Zambia Demographic and Health Survey 2001-2002. Calverton, Maryland, USA: Central Statistical Office, Central Board of Health, and OCR Macro.

Central Statistical Office [Zimbabwe], Macro International Inc. (1995). Zimbabwe Demographic and Health Survey 1994. Calverton, Maryland: Central Statistical Office and Macro International Inc.

Central Statistical Office [Zimbabwe], Macro International Inc. (2000). Zimbabwe Demographic and Health Survey 1999. Calverton, Maryland: Central Statistical Office and Macro International Inc.

Central Statistics Office [Namibia]. (1993). 1991 Population and Housing Census. Report A. Statistical Tables. Volumes I-V. Central Statistics Office, National Planning Commission. Windhoek.

Central Statistics Office [Namibia]. (1994a). 1991 Population and Housing Census: Basic Analysis with Highlights. Central Statistics Office, National Planning Commission. Windhoek.

Central Statistics Office [Namibia]. (1994b). 1991 Population and Housing Census. Report B. Statistical Tables. Central Statistics Office, National Planning Commission. Windhoek.

Central Statistics Office [Namibia]. (n.d.) Printout of Selected Results from the 1996 Intercensal Demographic Survey. Central Statistics Office, National Planning Commission. Windhoek

Chimere-Dan, Orieji. (1997). "Non-Marital Teenage Childbearing in Southern Africa: The Case of Namibia." *African Population Studies*, 12, 2: 87-95.

Cleaver, Tessa, Marion Wallace. (1990). Namibia Women in War. Guildford and King's Lynn, UK: Zed Books.

Cleland, John. (2002). Education and Future Fertility Trends, With Special Reference to Mid-Transitional Countries. In: Completing the Fertility Transition. Part Two Background Papers. United Nations Population Division, Department of Economic and Social Affairs: 187-202.

Coale, Ansley J., Roy Treadway. (1986). A Summary of the Changing Distribution of Overall Fertility, Marital Fertility, and the Proportion of Married in the Provinces of Europe. In: A.J. Coale, S.C. Watkins, editors. The Decline of Fertility in Europe. Princeton: Princeton University Press: 31-181.

Crampin, Amelia C., Judith R. Glynn, Bagrey M.M. Ngwira, Frank D. Mwaungulu, Jörg M. Pönnighaus, David K. Warndorff, Paul E.M. Fine. (2003). "Trends and Measurement of HIV Prevalence in Northern Malawi." *AIDS*, 17, 12: 1817-1825.

Dickson, Kim Eva. (2003). Adolescent Fertility: A Population Concern. In: Fertility: Current South African Issues of Poverty, HIV/AIDS and Youth. Seminar Proceedings. Human Sciences Research Council (HSRC) and Department of Social Development. Cape Town, South Africa: HSRC Publishers: 59-71.

Du Plessis, Gretchen. (2003). HIV/AIDS and Fertility. In: Fertility: Current South African Issues of Poverty, HIV/AIDS and Youth. Seminar Proceedings. Human Sciences Research Council (HSRC) and Department of Social Development. Cape Town, South Africa: HSRC Publishers: 77-116.

ELCIN (Evangelical Lutheran Church in Namibia). (2002). ELCIN Statistics: Reports and Tables 2002. Ondangwa, Namibia.

Erkkilä, Antti. (2001). Living on the Land: Change in Forest Cover in North-Central Namibia 1943-1996. Silva Carelica 37. Joensuu, Finland: University of Joensuu.

Erkkilä, Antti, Harri Siiskonen. (1992). Forestry in Namibia 1850-1990. Silva Carelica 20. Joensuu, Finland: University of Joensuu.

Fox, Tom. (2002). The Culture(s) of AIDS - Cultural Analysis and New Policy Approaches for Namibia. In: Volker Winterfeldt, Tom Fox, Pempelani Mufune, editors. Namibia Society Sociology. Windhoek: University of Namibia Press: 317-331.

Gage, Anastasia J. (1998). "Premarital Childbearing, Unwanted Fertility and Maternity Care in Kenya and Namibia." *Population Studies*, 52, 1: 21-34.

Gaisie, S. Kwesi. (1995). "Determinants of Fertility Decline in Botswana." *African Population Studies*, 10, 1. Union of African Population Studies. Http://www.uaps.org. Accessed January, 2004.

Garenne, Michel, Stephen Tollman, Kathleen Kahn. (2000). "Premarital Fertility in Rural South Africa: A Challenge to Existing Population Policy." *Studies in Family Planning*, 31, 1: 47-54.

Glynn, Judith R., Anne Buvé, Michel Garaël, Maina Kahindo, Isaac B. Macauley, Rosemary M. Musonda, Eva Jungmann, Francis Tembo, Leopold Zekeng. (2000). "Decreased Fertility Among HIV-1-Infected Women Attending Antenatal Clinics in Three African Cities." *Journal of Acquired Immune Deficiency Syndromes*, 25, 4: 345-352.

Gray, Ronald H., Maria J. Wawer, David Serwadda, Nelson Sewankambo, Chuanjun Li, Frederick Wabwire-Mangen, Lynn Paxton, Noah Kiwanuka, Godfrey Kigozi, Joseph Konde-Lule, Thomas C. Quinn, Charlotte A. Gaydos, Denise McNairn. (1998). "Population-Based Study of Fertility in Women with HIV-1 Infection in Uganda." *Lancet*, 351, 9096: 98-103.

Gregson, Simon, Tom Zhuwau, Roy M. Anderson, Stephen K. Chandiwana. (1997). "HIV and Fertility Change in Rural Zimbabwe." *Health Transition Review*, 7, Suppl. 2: S89-S112.

Gregson, Simon, Basia Zaba, Susan-Catherine Hunter. (2002). The Impact of HIV-1 on Fertility in Sub-Saharan Africa: Causes and Consequences. In: Completing the Fertility Transition. Part two: Background Papers. United Nations Population Division: 104-136.

Hamata, Sylvia Amanda. (n.d.). Fertility Determinants in Namibia. Unpublished and undated manuscript. Windhoek, Namibia.

Hunter, Susan-Catherine, Raphael Isingo, J. Ties Boerma, Mark Urassa, Gabriel M.P. Mwaluko, Basia Zaba. (2003). "The Association Between HIV and Fertility in a Cohort Study in Rural Tanzania." *Journal of Biosocial Science*, 35, 2:189-199.

Jejeebhoy, Shireen J. (1995). Women's Education, Autonomy, and Reproductive Behaviour: Experience from Developing Countries. Oxford: Clarendon Press.

Kamali, Anatoli, Lucy Mary Carpenter, James Alexander Grover Whitworth, Robert Pool, Anthony Ruberantwari, Amato Ojwiya. (2000). "Seven-Year Trends in HIV-1 Infection Rates, and Changes in Sexual Behaviour, Among Adults in Rural Uganda." *AIDS*, 14, 4: 427-434.

Kirk, Dudley, Bernard Pillet. (1998). "Fertility Levels, Trends, and Differentials in Sub-Saharan Africa in the 1980s and 1990s." *Studies in Family Planning*, 29, 1: 1-22.

LeBeau, Debie, Tom Fox, Heike Becker, Pempelani Mufune. (1999). Taking Risks, Taking Responsibility: An Anthropological Assessment of Health-Risk Behaviour in Northern Namibia. Windhoek, Namibia: French Cooperation and Ministry of Health and Social Services.

LeBeau, Debie, Tom Fox, Heike Becker, Pempelani Mufune. (2002). "Agencies and Structures Facilitating the Transmission of HIV/AIDS in Northern Namibia." *Society in Transition*, 32, 1: 56-68.

Lemström, Ossi. (1999). Hedelmällisyys ja kuolleisuus Kavangossa 1950-1996 verrattuna Ambomaahan. (Fertility and Mortality in Kavango 1950-1996 Compared to Ovamboland. In Finnish). Unpublished Master's thesis, Department of Sociology, University of Helsinki, Finland.

Lewis, James J.C., Carine Ronsmans, Alex Ezeh, Simon Gregson. (2004). "The Population Impact of HIV on Fertility in Sub-Saharan Africa." *AIDS*, 18, Suppl. 2: S35-S43.

Lucas, David. (1992). "Fertility and Family Planning in Southern and Central Africa." *Studies in Family Planning*, 23, 3: 145-158.

Lutheran Medical Mission. (1985). Annual Report of Lutheran Medical Mission of the Evangelical Lutheran Owambokavango Church 1984. English Version. Onandjokwe, Namibia.

Lutheran Medical Mission. (1988). Lutheran Medical Mission: Annual Report 1987. Ondangua, Namibia.

Lutheran Medical Mission. (1991). Lutheran Medical Mission: Annual Report 1990. Ondangua, Namibia.

Lutheran Medical Service. (1994). Lutheran Medical Service: Annual Report 1993/4. Ondangua, Namibia.

Lutz, Wolfgang, Anne Goujon. (2001). "The World's Changing Human Capital Stock: Multi-State Population Projections by Educational Attainment." *Population and Development Review*, 27, 2: 323-339.

Marcus, Rachel, Sally Baden. (1992). Gender and Development in Namibia: a Country Study. Directorate General of Development, Commission of the European Communities BRIDGE (development – gender) Report 6. Institute of Development Studies, University of Sussex, UK and Institute of Development Studies, Brighton.

Martín, Tessa Castro. (1995). "Women's Education and Fertility: Results from 26 Demographic and Health Surveys." *Studies in Family Planning*, 26, 4: 187-202.

McKittrick, Meredith. (1997). "Reinventing the Family: Kinship, Marriage, and Famine in Northern Namibia, 1948-1954." *Social Science History*, 21, 3: 265-296.

McKittrick, Meredith. (2002). To Dwell Secure: Generation, Christianity, and Colonialism in Ovamboland. Portsmouth, NH, USA: Heinemann.

Ministry of Health and Social Services [Namibia]. (1995). Family Planning Policy. Windhoek.

Ministry of Health and Social Services [Namibia]. (2003a). Report of the 2002 HIV Sentinel Survey. Ministry of Health and Social Services, Directorate of Primary Health Care and Nursing Services, National AIDS Co-ordination Programme. Windhoek.

Ministry of Health and Social Services [Namibia]. (2003b). Namibia Demographic and Health Survey 2000. Ministry of Health and Social Services. Windhoek.

Ministry of Health and Social Services [Namibia]. (2004). Media Release: 2004 HIV/AIDS Sentinel Sero Survey Results. Windhoek.

Ministry of Health and Social Services [Namibia], Macro International Inc. (1993). Namibia Demographic and Health Survey 1992. Windhoek: Ministry of Health and Social Services and Macro International Inc.

Moultrie, Tom A., Ian M. Timæus. (2003). "The South African Fertility Decline: Evidence from Two Censuses and a Demographic and Health Survey." *Population Studies*, 57, 3: 265-284.

Muhwava, William, Ian Timæus. (1996). Fertility Decline in Zimbabwe. Centre for Population Studies Research Paper 96-1. London: Centre for Population Studies, London School of Hygiene and Tropical Medicine, University of London.

Namibia Development Trust. (1994). Improving the Legal and Socio-Economic Situation of Women in Namibia. Uukwambi, Ombalantu and Uukwanyama Integrated Report. Volume 1. Namibia Development Trust (NDT) with assistance from SIAPAC-Namibia (Social Impact Assessment and Policy Analysis Corporation), FES (Friedrich Ebert Foundation) and CASS (Centre for Applied Social Sciences). Windhoek, Namibia: NDT.

Newell, Colin. (1988). Methods and Models in Demography. Guildford and King's Lynn, UK: Belhaven Press.

Notkola, Veijo. (1996). "Parish Records from Nambia 1925-1990 - An attempt to Analyze Fertility and Mortality in Ovamboland." *Yearbook of Population Studies in Finland*, 33: 295-305.

Notkola, Veijo, Harri Siiskonen. (2000). Fertility, Mortality and Migration in SubSaharan Africa: The Case of Ovamboland in North Namibia, 1925-90. London: Macmillan Press.

Notkola, Veijo, Ian M. Timæus, Harri Siiskonen. (2000). "Mortality Transition in the Ovamboland Region of Namibia, 1930-1990." *Population Studies*, 54, 2: 153-167.

Notkola, Veijo, Ian M. Timæus, Harri Siiskonen. (2004)."Impact on Mortality of the AIDS Epidemic in Northern Namibia Assessed Using Parish Registers." *AIDS*, 18, 7: 1061-1065.

Ntozi, James P.M., Immaculate M. Nakanaabi, Yovani A.M. Lubaale. (1997). "Fertility Levels and Trends in the Face of the AIDS Epidemic in Uganda." *Health Transition Review*, 7, Suppl. 2: S145-S155.

Odendaal Commission (1964). Report of the Commission of Enquiry into South West Africa Affairs 1962-1963. Pretoria, Republic of South Africa.

Onandjokwe District DDC (District Development Committee). (2003). Onandjokwe District: Annual Report for the year 2002/2003. Prepared by the Onandjokwe District DDC Members. Onandjokwe Lutheran Hospital. Ondangwa, Namibia.

Onandjokwe District DDC (District Development Committee). (2004). Onandjokwe District: Annual Report for the year 2003/2004. Prepared by the Onandjokwe District DDC Members. Ondangwa, Namibia.

Onandjokwe Lutheran Medical Service. (1999). Annual Report for Onadjokwe District for the Year 1998/9. Onandjokwe Lutheran Medical Service, Onandjokwe Lutheran Hospital. Ondangwa, Namibia.

Oshakati Health Centre. (1994a). Family Planning Statistics: Visitors in January, February and March, 1994.

Oshakati Health Centre. (1994b). Interview of Nurse D. Namukwambi on 6th April, 1994.

Oshigambo Clinic. (1994a). Family Planning Register: Visitors in February, March and April, 1994.

Oshigambo Clinic. (1994b). Interview of family planning workers on 6th April, 1994.

Pendleton, W., D. LeBeau, C. Tapscott. (1992). Socio-Economic Study of the Ondangwa/Oshakati Nexus Area. The Namibian Institute for Social and Economic Research, Research Report 8. Windhoek: University of Namibia.

Raitis, Riikka. (1995). "Fertility in the Northwest Region of Namibia." *Yearbook of Population Research in Finland*, 32: 106-117.

Research Facilitation Services, Health Communication Partnership. (2004). Attitudes Towards Marriage in Namibia: Executive Summary. Research Facilitation Services and Health Communication Partnership, Based at Johns Hopkins University, Center for Communication Programs. Windhoek, Namibia.

Robinson, W.C. (1987). "Regional Variation in the Age-Specific Natural Fertility Curve." *Journal of Biosocial Science*, 19: 57-64.

Ross, Amanda, Dilys Morgan, Rosemary Lubega, Lucy Carpenter, Billy Mayanja, James A.G. Whitworth. (1999). "Reduced Fertility Associated with HIV: The Contribution of Pre-Existing Subfertility." *AIDS*, 13, 15: 2133-2141.

Rutenberg, Naomi, Ann E. Biddlecom, Frederick A.D. Kaona. (2000). "Reproductive Decision-Making in the Context of HIV and AIDS: A Qualitative Study in Ndola, Zambia." *International Family Planning Perspectives*, 26, 3:124-130.

Ryder, R.W., V.L. Batter, M. Nsuami, N. Badi, L. Mundele, B. Matela, M. Utshudi, W.L. Heyward. (1991). "Fertility Rates in 238 HIV-1-Seropositive Women in Zaire Followed for 3 Years Post-Partum." *AIDS*, 5, 12: 1521-1527.

Shemeikka, Riikka. (1999). "HIV/AIDS: The Major Demographic Challenge of Namibia." *Yearbook of Population Research in Finland*, 35: 65-81.

Siiskonen, Harri, Anssi Taskinen, Veijo Notkola. (2005). "Parish Registers: A Challenge for African Historical Demography." *History in Africa*, 32. In Print.

Swartz, Leon. (2003). Fertility Transition in South Africa and Its Impact on the Four Major Racial Groups. In: Fertility: Current South African Issues of Poverty, HIV/AIDS and Youth. Seminar Proceedings. Human Sciences Research Council (HSRC) and Department of Social Development. Cape Town, South Africa: HSRC Publishers: 7-26.

Tabutin, Dominique, Bruno Schoumaker. (2001). Une Analyse Régionale des Transitions de Féconité en Afrique Sub-Saharienne. Paper presented at XXIV IUSSP General Population Conference, Salvador, Brazil on 18 – 24 August 2001. Http://www.iussp.org/Brazil2001/s40/S43_02_Tabutin.pdf. Accessed 30 May, 2005.

Tapscott, Chris, Ben Mulongeni. (1990). An Evaluation of the Welfare and Future Prospects of Repatriated Namibians in Northern Namibia. Namibian Institute for Social and Economic Research, Research Report 3. Windhoek: University of Namibia.

Terceira, Nicola, Simon Gregson, Basia Zaba, Peter R. Mason. (2003). "The Contribution of HIV to Fertility Decline in Rural Zimbabwe, 1985-2000." *Population Studies*, 57, 2: 149-164.

Tersbøl, Britt Pinkowsky. (2002). How to Make Sense of Lover Relationships - Kwanyama Culture and Reproductive Health. In: Volker Winterfeldt, Tom Fox, and Pempelani Mufune, editors. Namibia Society Sociology. Windhoek: University of Namibia Press: 347-359.

Tuupainen, Maija. (1970). Marriage in a Matrilineal African Tribe: A Social Anthropological Study of Marriage in the Ondonga Tribe in Ovamboland. Transactions of the Westermarck Society XVIII. Forssa, Finland: Westermarck Society.

UNICEF Namibia. (1991). A Situation Analysis of Children and Women in Namibia. UNICEF Namibia and the Namibian Institute of Social and Economic Research (NISER), University of Namibia, in consultation with the Government of Republic of Namibia. Windhoek: UNICEF Namibia.

United Nations. (1983). Manual X: Indirect Techniques for Demographic Estimation. Population Studies 81. New York: United Nations, Department of International Economic and Social Affairs.

United Nations. (2004). World Fertility Report 2003. New York; United Nations Population Division, Department of Economic and Social Affairs.

Van der Merwe, I.J. (1989). "The Role of War in Regional Development and Urbanization of Namibia." *African Urban Quarterly*, 4, 1-2: 263-274.

Webb, Douglas, David Simon. (1995). Migrants, Money and the Military: The Social Epidemiology of HIV/AIDS in Owambo, Northern Namibia. The Namibian Economic Policy Research Unit (NEPRU), Occasional Paper No. 4. Windhoek, Namibia: NEPRU.

Wils, Annababette, Anne Goujon. (1998). "Diffusion of Education in Six World Regions, 1969-90." *Population and Development Review*, 24, 2: 358-368.

Wrigley, E.A. (Editor). (1966). An Introduction to English Historical Demography. London: Weidenfeld and Nicolson.

Zaba, Basia, Martine Collumbien. (1997). HIV and Fertility: Modelling the Effects of Changes in Union Dynamics. International Population Conference Beijing 1997, Vol. 2. Liège, Belgium: International Union for the Scientific Study of Population (IUSSP): 583-609.

Zaba, Basia, Simon Gregson. (1998). "Measuring the Impact of HIV on Fertility in Africa." *AIDS*, 12, Suppl. 1: S41-S50.