Review article

Demographic transition in an Ethiopian context

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Abstract: The Demographic Transition Theory is briefly presented, and related to Natural increase of population, and its components, in Ethiopia. From a literature review the factors generally assumed to influence levels of fertility and mortality are extracted, and comments of their role on Ethiopian population growth are made. Doubts about Ethiopia experiencing a development similar to the Demographic Transition are discussed. The author concludes that, despite scant data on Ethiopia to support the theory, based on present knowledge it is too early to reject the Demographic Transition Theory as relevant to future population changes in Ethiopia. Economic development and change of people's attitudes are pointed out as two possible key factors in reaching a replacement level with low levels of fertility and mortality. [*Ethiop. J. Health Dev.* 1998;12(2):149-160]

Introduction

Demographic Transition Theory tries to analyse and explain the changes from high levels of fertility and mortality to low levels at, or close to, replacement level (see Fig.1, and also 'Notes and References for Figures' at the end of the article). Approximate stability exists initially with high rates of both fertility and mortality. The latter, though, fluctuates more from year to year due to what Malthus expressed as "positive checks" (epidemic diseases, starvation, wars etc.) (1). The transition from 'high level' stability to 'low level' stability is characterized by fluctuating, but falling, mortality and fertility. This is an unstable period lasting anywhere between a generation to over a century. As mortality rate is typically first to fall, a rapid and unpredictable population growth takes place before social and economic changes cause a decline in fertility to balance the equation. The magnitude of population increase(2) depends largely on the length of this transition period. The amplitude of annual population growth for most large countries depends generally on the difference between the fertility level and the mortality level(3).

The theory has proven itself valid on European data, with all countries successfully completing the transition(4). It is also likely that South American and Asian countries will follow suit within varying time periods(5). However, it is uncertain whether African countries, such as Ethiopia, will adhere to this model. The social, economic and political conditions in Ethiopia are quite different from those found historically in Europe. Therefore we should not necessarily expect Ethiopia to follow the same sequence as the countries in other continents(6).

Method

The intention of this article is to present the idea of Demographic Transition Theory to persons interested in health and development in Ethiopia but with little demographic knowledge. Specific demographic terminology has deliberately been avoided to make the article more suitable for a larger audience. Since data on the Horn of Africa with which to confront the question of the

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Demographic Transition Theory's applicability to Ethiopia with any certainty are scant, this article should be regarded as a preliminary statement about the relevance of the demographic transition model to Ethiopia based on existing data.

Discussion

Population growth: In a global long-term perspective, high population growth is a recent phenomenon. Before the 19th Century, a population increase of more than 2% per year was very rare, and if it did occur it did not continue for more than a few years(7).

The world's average yearly population growth is now estimated at 1.5%, and annual population increases are likely to remain above 86 million persons for some years to come(8). In many developing countries population growth is well above 2% per year.

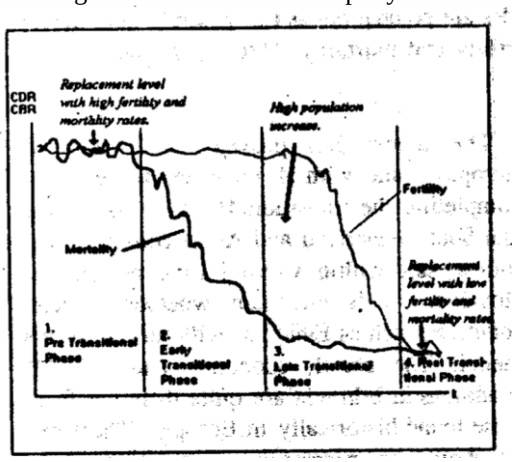

Figure 1: **Principles of the Demographic Transition Theory**

High population growth is even more recent in Ethiopia than in most other countries. Population growth of around 2% per year and above has been prevalent in the last 40 years. The current population growth rate of Ethiopia is estimated by the UN to be 3.1% per year (9), with even higher rates in the major urban areas. If the population continues to grow at this rate, the number of people in Ethiopia will double in less than 25 years(10).

In Ethiopia a reduction in mortality rates can be seen despite 20 years of civil wars, drought and famine. Maintenance of high fertility rates and reduced mortality rates have so far resulted in a high Natural increase for the population(11). The estimated and projected values for mortality and fertility shown in Figure 2 suggest that Ethiopia is likely to be in the beginning of stage three of the curves in Figure 1. It should be noted that Figure 1 normally covers a much longer time span than the 75-85 year period encompassed by Figure 2.

However, the Demographic Transition Theory does not provide a fine tool to predict the future. It simply tries generally to describe the pattern of the past. The differences between full line and the dotted line for the projected mortality rates in Figure 2 can illustrate the fact that big variations exist among projections of mortality rates for Ethiopia.

Rates of Natural increase in all regions of Ethiopia indicate that the country is well into a process that resembles the demographic transition experienced in the European countries some decades ago. Figure 3 shows Rates of Natural increase ranging from just above 2% per year to just below 4% per year. This displays an overall significant difference between Crude death rates and Crude birth rates(12).

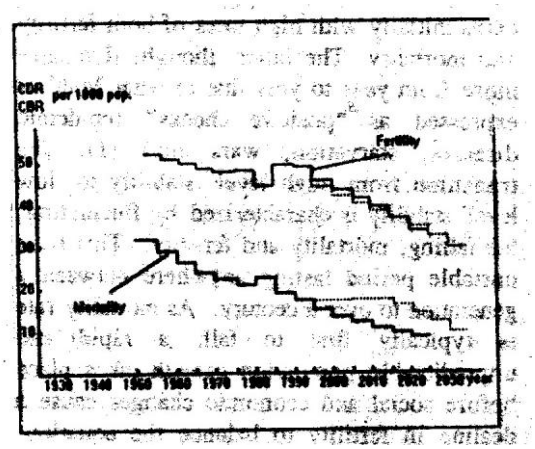

Figure 2: **Crude death rate and crude birth rate per 1000 population for Ethiopia. UN estimates to 1995 and Un projections thereafter (full line). US bureau of census projections (dotted line).**

The Bale region (darkest coloured area in southeast) that had the highest Natural increase in 1984 also had the highest Total Fertility Rate - more than eight children per woman. Welo (light grey area west of Djibouti) was repeatedly struck by drought and famine, and had, in 1984, a relatively low Natural increase(13). It is important not to draw the conclusion that the regions with lower Natural Increase had gotten further in the demographic transition due to modernization and development. It is more likely, that the lower rate Natural increase in some regions can be explained by harsh conditions causing higher mortality rates.

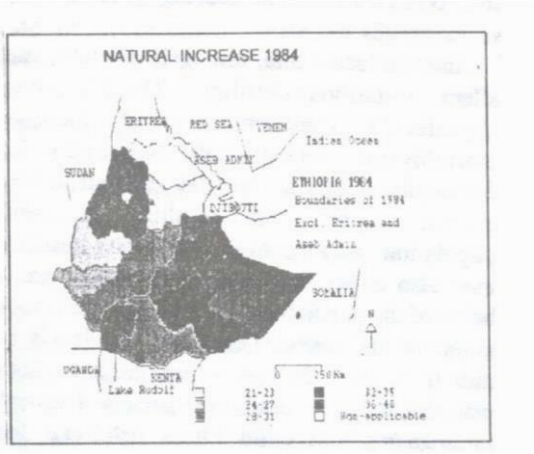

Figure 3: **included due to lack oNatural increase per 1000 of population per region in 1984. [Tigray (the white region south of Eritrea) is not f reliable data.]**

Demographic transition and decline of mortality: For the last few decades it has been a common belief that all countries will experience a demographic transition similar to the one observed in Europe.

When discussing whether Ethiopia will complete a demographic transition, the important factors affecting fertility and mortality must be reviewed. In this article some important factors affecting mortality and mortility will be presented below.

According to the theory of demographic transition, economic development that changes a subsistence economy to an economy with a greater division of labour, more intensive use of capital, and which is generally more industrialized and urbanized, leads to a drop in the death rate. This as

shown in Fif. 4, is due to increased productivity, improvements in sanitation, development of preventive medicine and better communication systems(14).

Looking at the last few decades in Ethiopia, it is clear that developments in the medical area have affected a large part of the population. Modern drugs (when available) to fight common diseases help people to survive longer, and preventive medicine and access to community health care lessen mortality rates. Improvements in medical technology reduce the significance of diseases like smallpox, cholera and typhoid on mortality. Large scale
vaccination programs have a significant effect on the rate of Natural increase of population through preventing epidemics and thereby lowering mortality rates.

Improved information and faster methods of transportation(15) have made a tremendous impact on the daily life of parts of the poor population. Through media the world's nations were informed and alerted to the droughts and following hunger catastrophes of 1973 and 1984. Without improvements in information and transportation the surplus of the world's rich nations could not have been redistributed to the hunger struck areas of Ethiopia. Hundreds of thousands of people were estimated to have died from hunger in 1973 as well as in 1984; but without the food aid received, the effects would have been even more devastating. Effects on the long-term trends of mortality for Ethiopia, from this relief effort, were of a temporary nature rather than permanent (see Fig. 2).

In regard to other factors that reduce mortality, the declining rates are also largely supported by outside influences(16). New

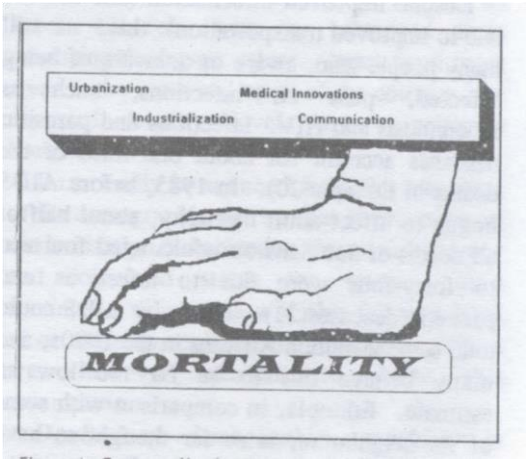

Figure 4: **Factors affecting mortality levels to fall.**

pharmaceutical inventions are dispersed faster around the globe. The increase of productivity in the western world and Asia in industry as well as in agriculture helps support the country via improved information and transportation systems. Ethiopia is consequently experiencing some of the important factors that led to the fall of mortality rates in Europe and elsewhere. They are the same general factors giving the same general result (reduced mortality levels), but the ways the factors affect the mortality rates are altogether unique.

More important than actual medical improvements for the reduction in mortality rates in European countries, as they passed through the demographic transition, were improvements in sanitation, hygiene, housing conditions, and diet(17). In the case of improved hygiene and sanitation, it is doubtful if any long-lasting development has been made for the majority of Ethiopians. Only 8% of the rural population receives safe drinking water and only 4% have access to sanitation facilities(18). Housing conditions are poor despite the cold climate due to the high altitudes where much of Ethiopia's population dwells. The diet is generally based on one single crop which, in central and northern Ethiopia, is teff(19). The poor hygienic standards within most areas of Ethiopia do not

allow for overcrowding without the severe risk of the epidemic spread of disease, which could counteract the fall of mortality rates.

Despite improved information (and maybe, due to improved transportation), there are still many people who, aware or unaware of being infected, pass on infections, such as tuberculosis and HIV. Infectious and parasitic diseases account for about one third of the deaths in Ethiopia(20). In 1985, before AIDS began to affect adult mortality, about half of all deaths of Sub-Saharan adults aged fourteen to forty-four were due to infectious and parasitic deceases(21). Death by AIDS could total some 2 million Africans in the 1990s, and many believe this to be far too low an estimate. Ethiopia, in comparison with some of its neighbours, is so far thought to have seen only the tip of the iceberg for the spread of AIDS. AIDS is a type of disease unknown when Europe struggled through its demographic transition. The AIDS virus strikes disproportionately among adults, that is, among the productive and (to some degree) educated parts of the population; it will thus deal a severe economic blow to Ethiopian society in addition to causing great human suffering(22).

Another factor that, strangely enough, can affect mortality is fertility. The prevailing high fertility rates can eventually increase mortality if not properly supported by development in a medical infrastructure, because "apart from resulting in rapid population growth, high and rising fertility may also affect the health and general well-being of the population. In societies with poor sanitation and antenatal care, and low levels of nutrition, high fertility often leads to high maternal and child death rates because frequent pregnancies and child births debilitate the mother's health and short birth intervals reduce the probability of child survival" (23).

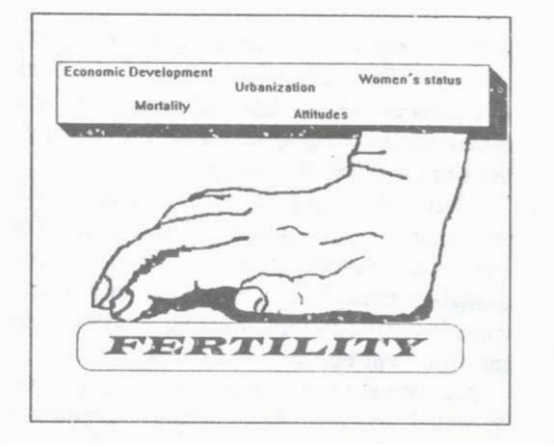

Figure 5: **Factors believed to affect fertility levels.**

Decline of fertility: The decline of fertility rates in Europe was triggered by many factors. The industrial revolution accompanied by economic development, lower mortality rates and urbanization(24) allowed women's status to improve, and created an environment where religious beliefs and customs as well as general attitudes could change (see Fig. 5) (25).

In the Ethiopian society religious beliefs, customs, aand general attitudes are changing slowly. The attitudes perhaps change more due to a breach of feudal traditions and political turbulence than due to freedom of thought or a multitude of alternative lifestyles being available to the individual. Whatever the cause, in Ethiopia low mortality rate and high rate of urbanization create an environment indicative for a society in transformation.

About 90% of the population still have a rural lifestyle, but the few urban areas have a much faster population growth than the rural areas. The process of urbanization is obviously present(26).

Women's status appears to be getting higher. Through education, women's literacy rate has increased, so has their knowledge of contraceptive techniques. The habit of using modern contraceptive techniques is, however, still exceptionally rare among couples in Ethiopia. Female enrollment in the first years of primary school is fairly equal to male enrollment, but higher up in

the education system the female proportion of students is drastically reduced. Nevertheless, it is still possible to assume that a process of improving women's status has begun(27).

Reduced infant and child mortality should also cause fertility to decline due to a reduction of 'the replacement effect' (i.e. couples do not have to make up for dead children)(28).

Where alternative sources of child care are either inexpensive or readily available within the extended family, neighbours or friends in the rural village, no major conflicts arise when women attempt to combine work with raising a family. It is a persistent finding in studies of Sub-Saharan Africa that women's employment in agricultural activities(29), and in work at or near the home, has a neutral if not a positive effect on fertility(30). The negative relation-ship between female labour force participation outside the home and fertility is, nevertheless, more apparent in urban conditions. The Ethiopian urban population still consists of less than 15% of the total population. Noticeably, reduced fertility from increased female labour force participation requires higher levels of urbanization and industrialization.

It can be concluded that most of the processes that influenced fertility rates to decline in many other areas of the world have also started in Ethiopia. There is, however, no indication of a strong sustainable economic development in Ethiopia. It is, however, not likely that there is a close relationship in timing between the economic modernization and development on one hand, and the fall of fertility levels on the other - and, if true, this may be the most important generalization of our time. According to John C. Caldwell the concept of the nuclear family and reversing the intergenerational flow of wealth is much more essential to the reduction of fertility than economic modernization and development. If a non-western culture with a much less nucleated family system, instead of western culture, had brought economic development, industrialization might have continued far beyond its present level in the Third World without reversing the intergenerational flow of wealth(31). Conversely, in the present situation, family nucleation and the reversal of the intergenerational wealth flow are likely to penetrate deeply into the Ethiopian society in the next half century, almost independently of the success of industrialization, and, almost inevitably, they will guarantee slower global population growth(32).

A few years ago fertility showed no signs of a decline in Ethiopia(33). Preliminary results from the 1994 census show lower fertility all across Ethiopia, with the urbanized areas producing the lowest values. Apart from some areas in the north and south of the country, the reported fertility levels are surprisingly low(34).

It can easily be assumed from the reasoning of the demographic theory that if processes of modernization (urbanization, improved literacy and improved status for women, etc.) continue, fertility rates will also fall to a level at or close to replacement level(35). There are, however, reasons to doubt this assumption.

Doubts of demographic transition in Ethiopia: Previously it was argued that most of the factors that first caused mortality and later fertility rates to drop in Europe and many other parts of the world are also present or initiated in Ethiopia. Why, then, are there scholars who argue that the Demographic Transition Theory is not deterministic, and that it is not certain that Ethiopia will go through a demographic transition?

The fertility level reported from Ethiopia is much higher than it was ever in Europe. Consequently, when the mortality level in Ethiopia fell drastically (see Fig. 1, phase two; and Fig. 2, the years 1950-1990) population growth became much more elevated than ever experienced in Europe. We should not necessarily expect Ethiopia to follow the same sequence as other countries.

In Ethiopia, customs and attitudes towards marriage and childbearing undoubtedly favour high fertility. In Western Europe, even before the nineteenth century, the age of marriage fluctuated considerably. Late marriage was especially common and therefore overall fertility levels were already quite low before Western European countries entered the process of demographic transition(36), and certainly much lower than in Ethiopia today.

Population growth can be reduced not only through reduced fertility, but also through increased mortality or increased emigration. In Figure 2 the decline in Crude birth rate is only obvious in the

projected values. Looking only at the estimated values for Crude birth rates (CBR), no downward trend can be detected(37).

There are three major obstacles to a continuous decline in the fertility rates and, thereby, to Ethiopia completing demographic transition in the near future.

1) In Europe there were safety valves to handle the effects of population pressure in the rural areas. People could migrate to the cities to find work in industry and service. Migration could also take place to countries with less developed technology where the local population was forced to share their resources with the new settlers. In Ethiopia the low level of economic development does not create many work opportunities in the cities, and the possibility for Ethiopians to emigrate in large numbers is not present.

2) The very low economic status of women does not provide them a valid incentive to postpone marriage and to space births. Even in case of rapid restructuring, Ethiopia's progress will be crucially dependent on processed or unprocessed primary products for foreign exchange within the foreseeable future. This also requires women finding the resources and time to achieve more in the economic sphere. However, women are also the main providers of daily maintenance, which comes from both self-provisioning and market-oriented production and paid employment. Women in Ethiopia have, for a long time, been stressed by the gap between their economic responsibilities and their access to resources. With increasingly fewer per capita resources in terms of quality as well as quantity, this stress is intensifying in ever-diminishing circles of resource rearrangements(38).

3) Very rapid population increase hampers the abilities of governments to improve access to preventive medicine. If economic development cannot support investments to improve health care and sanitation at a rate higher than population increase, then there are obvious risks that mortality rates will increase and reverse the development from an early transitional phase back to a preindustrial situation.

The lack of economic development should slow down the process of demographic transition in Ethiopia. Economic development is regarded as one key factor in the completion of the demographic transition in Europe. No close relationship in timing between economic development and reduction of fertility can be established, but economic development is an important background factor affecting other factors of development. It forms the frame-work for other types of change.

However desirable economic development may be, it cannot be a primary target - at any cost. Destruction of natural resources such as deforestation and soil erosion, together with a strong population increase, makes it impossible for the rural population to support themselves with traditional agricultural methods(39). This peasants' poverty creates waves of migrants and refugees, but hardly decreases fertility levels(40).

It is one thing to create an environment where religious beliefs and customs and general attitudes can change, and another thing for people actually to change their attitudes, just as well as it is one thing to know about family planning and to practice it. It is possible that we know too little about how attitudes change. To generate a durable reduction in fertility rates down to replacement level, Ethiopians' attitudes towards crucial concepts such as women's status, the nuclear family, and the value of children have to change.

Conclusion

Although the Demographic Transition Theory gives us a hint of future changes of mortality and fertility in Ethiopia, and a general idea of the social and economic factors affecting the two components of Natural increase, it does not provide a tool for reliable predictions. A reduction in fertility rates is a likely expectation and that a replacement level will be reached is probable (see Figure 1, Stage 4). It is, however, very difficult to predict how long the transition will take, and at which level of Crude death rate the Natural increase will stabilize at, or around, replacement(39).

Further research on how the modernization of Ethiopia affects mortality and fertility is needed. Many decisions of national importance are based on assumptions of how certain factors of modernization affect mortality and fertility. The independent variables in the Demographic

Transition Theory are taken from the whole concept of modernization. A few distinct variables cannot be pointed out as key factors to demographic transition, since most variables are interdependent. Two indistinct factors are related to most aspects of modernization. These are also necessary if Ethiopia is to complete a demographic transition, at low levels of CDR and CBR similar to the levels we see today in European countries. Firstly, a strong and sustained economic development is needed, without environmental degradation of the country's resource base. Secondly, and maybe of even greater importance are people's attitudes towards creating the changes in society needed to complete a demographic transition. We create our own future. Everybody needs to have an opinion on this essential aspect to human life - our reproduction.

Notes and references for figures

Figure 1. Principles of the Demographic Transition Theory.

The figure intends to visualize the principles of the Demographic Transition Theory, and the shapes of the curves are not based on any particular data. Since the figure shows the general concepts of demographic transition the horizontal axis (time) and the vertical axis (fertility and mortality) have no scales indicated. The graph can be divided into three, five, or six phases as well, but for this article a division into four phases is sufficient.

Mortality and fertility in presentations of the Demographic Transition Theory are most often shown as crude rates. Mortality as 'crude death rate' (CDR) and fertility as 'crude birth rate' (CBR) are expressed as numbers of deaths and births, respectively, per 1000 inhabitants, using the midyear population for the calculation.

Figure 2. Crude death rate and Crude birth rate per 1000 population for Ethiopia.

Source of data 1: UN, Department for Economic and Social Information and Policy Analysis (1993). *World Population Prospects - The 1992 Revision* (ST/ESA/SERA/135). UN, New York. p.456.

Source of data 2: US Bureau of the Census, International Data Base from May 1996 (*http://www.census.gov/ipc.bin/idbsprd*).

The medium variant projections have been used for UN figures, and five year averages have been calculated for US Bureau of Census data.

Figure 3. Natural Increase per 1000 of population per region in 1984. [Tigray (white) is not included due to lack of reliable data.]

Source of data: Central Statistical Authority (1989). *Analytical Report on National Level 1984.* CSA, Addis Ababa.

Natural increase (NI) has been calculated and a map produced using the UN developed software "PopMap". The map shows the regional divisions of Ethiopia in 1984, which have been drastically revised twice since then.

Figure 4. Factors affecting mortality levels to fall.

Only a few major factors affecting mortality have been incorporated in the box, and the figure is included as an illustration to the text.

Figure 5. Factors believed to affect fertility levels.

Only a few major factors affecting fertility have been incorporated in the box, and the figure is included as an illustration to the text.

Notes and references on text

1. Malthus, Robert Thomas. An Essay on Population. London 1798.

In this publication Malthus indicates that 'Positive checks' are those that increased mortality and 'Preventive checks' are those that lower fertility. The latter is also divided into 'vice' and 'virtue'.

2. This rapid population increase was compared to an 'explosion' when the biologist Paul Erlich alerted the world to the danger of over-population in 1968 with the publication of the Population bomb.
3. Ravenstein E. G. noted that migration depended on distance in "The Laws of Migration" in Journal of the Royal Statistical Society 48,2:pp 167-235. So if a country has a large area, then

the migration movements are less likely to extend across national boundaries. If a country has a large population size, then the relative effect of international migration on population growth is likely to be small. Exceptions can be found among countries with high rates of immigration and sparse population (USA and Argentina at the turn of the century). A country with very low Natural increase can also be drastically affected by emigration (East Germany just after the fall of "the iron curtain"). 4. Maybe all European countries with the exception of Albania, a country that has been isolated since the second world war, and where reliable demographic data are scarce. North America maintained high fertility longer, commonly explained with the lifestyle of the settlers along the western frontiers.

Regarding demographic transition in Europe see:

Anderson M. and Morse J. (March 1993). "High Fertility, High Emigration, Low Nuptiality: Adjustment Process in Scotland's Demographic Experience 1861-1914 Part I. "Population Studies A Journal of Demography, Vol 47, No. 1.

Film M. W. (1972). British Population Growth 1700-1850. The Anchor Press, London.

Gage TB. March (1993). "The Decline of Mortality in England and Wales 1861 to 1964: Decomposition by Cause of Death and Component of Mortality, "Population Studies - A Journal of Demography, vol. 47 No. I. Devis, Kingsley (1949), Human Society, The Mac Millan Company, New York.

Notestein, Frank W. (1945). "Population - The Long View" In food for the World, ED. Schultz, T.W., University of Chicago Press, Chicago.

Wesley D.C. (1961). Marriage and Family in France since the Revolution. Bookman Associates, New York.

5. Many Asian countries seem to pass through the transition stage much faster than the European countries. A common situation is also that death rates have fallen to levels similar to Europe, and Birth rates have fallen more rapidly, but the rapid reduction of birth rates has come to a halt before reaching replacement levels.

Steven E. Beaver (1975) in Demographic Transition Theory Reinterpreted, D.C. Health and Company, Lexington (Mass.), used South American data to evaluate demographic transition. His findings "suggest that transition theory works quite well in modern Latin America" (p. 147). Apart from more typical independent variables in Demographic Transition Theory, he also embellishes the variable of land availability, which appears to have significant influence in the early stages of demographic transition.

6. Regarding demographic transition in East Africa the following seasoned literature can be of interest:

Brass W., Coale A.J. and Demeny (1968). The Demography of Tropical Africa. University Press, Princeton.

Disaine, Bruno (1972). The Demographic Transition in Madagascar. Antananarivo, Madagascar.

Kpedekpo G.M.K. (1973). The Extent and Nature of Existing Statistical Data for the Measurement of Demographic Transition in Tropical Africa. Legon, Ghana.

Thomilson R. (1976). Population Dynamics: Causes and consequences of World Demographic Change. New York: Random House. pp. 13-29.

7. One exception to the rule are early industrialized cities, which could grow rapidly for long periods due to heavy influx of people from other areas. In Europe this happened mostly through inmigration. In-migration is a term used to describe population movement within a country's

boundaries, whereas immigration describes population movement across one or more national boundaries. The Demographic Transition Theory, however, deals with population growth due to variations between fertility and mortality, and not to migration.

8. According to UNFPA, (1995). State of World Population United Nations Secretariat, New York. The UN Organization has, however, published estimates as high as 1.7% annual population increase in UN, The Population Division, Department of Economic and Social Development (December 1992). Population Newsletter No. 54, United Nations Secretariat, New York. In the US Bureau of Census, International, Data Base (Updated 15 May 1996) the worlds average annual growth rate is estimated as low as 1.38% for 1996 and 1.41% for 1995.
9. UNFPA, (1993). State of World Population, United Nations Secretariat, New York.
10. If population growth is maintained at exactly 3.100% per year the doubling time will be about 22.7 years ($1.31^{22.704}=2.000$).
11. The Natural Increase (NI) is expressed as the difference between the Crude death rate (CDR) and the Crude birth rate (CBR). [CBR-CDR=NI] The value of Natural increase reflects population growth without considering the effects of migration.
12. Notestein, Frank W. et al. (1944). The future Population of Europe and the Soviet Union - Population Projections 1940-1970. League of Nations, Geneva. p.87.

For each random group of 1000 people in all regions of Ethiopia, births exceed deaths by more than 20 people in 1984. In Europe, before the Second World War, all countries were about to close the gap between CBR and CDR or had already reached replacement level, and thereby entered the fourth phase in the demographic transition. In 1983 rates of Natural increase ranged from -08 in France to 12.0 in the Netherlands. Albania was an exception with a NI of 16.7. No European country had values of NI above 20.

13. Tigray (white area north of Welo) is not included because the census for many rural areas of the region was based on estimates and not actual counts. People from Tigray and Eritrea, as well as foreigners, living in Ethiopia were habitually included in the census both according to the 'de jure' and the 'de facto' principle.
14. Henin, Roushdi A. (1971). 'On the applicability of the Theory of Demographic Transition to African Countries' in The Demographic Transition in Tropical Africa. Proceedings of an Expert Group Meeting Paris.
15. Access to statistics of the number of motor vehicles registered in Ethiopian or another indicator of increased communication, would show a strong steady increase. An increased number of private cars can, however, even have an amplifying effect on mortality through an increase in traffic accidents, and a lowering effect only to the few fortunate enough to drive a car. The recent rise of independent newspapers is also a way of increasing the communication of information, especially in areas where literacy rates are high.
16. To benefit from influence outside the country is historically not rare in any part of the world. Imports of science and technology has been fundamental for the development of many different cultures. A discussion of whether or not aid is beneficial to the society of the recipient country is, however, beyond the scope of this article.
17. From the chapter no. 8 Population in Barke, Michael and O'Hare, Greg (1992) The Third World - Diversity, Change and Interdependence. Second Ed. Oliver and Boyd, Harlow, United Kingdom. It has been argued by Gunnar Fridizius (1984) that vaccination programs had almost no effect on the early decline of mortality in Sweden in the publication 'The Mortality decline in the first phase of the demographicn transition: Swedish experience. I: Pre-industrial Population Change. Ed. Tommy Bengtsson et al Lund 1984.
18. UN, United Nations Conference on Environment and Development: National Reports Summaries, Rio de Janeiro 1992. Nations of the Earth Report, Vol. II. UNCED, Geneva. P.93.

These figures rise to 47% and 52%, respectively, in urban areas. Due to the fact that only a small portion of the Ethiopian Population lives in urban areas the situation for the total population is not

less tragic. Despite the fact that Ethiopia is one of the major sources of fresh water in the East African region, only 10% of its population has access to clean drinking water.

19. Teff is an African cereal grass, which is an important staple food for many Ethiopians. Other crops of some importance are maize, millet and enset (Abyssinian Banana), which are crops more suited for the lowlands of Ethiopia.
20. In Britannica Book of the Year 1995 (1996) a sample survey from 1987-88 is quoted, showing infectious and parasitic diseases 33.1%, respiratory diseases 15.7%, and digestive system diseases 10.7%.
21. World Bank (1994), Better Health in Africa - Experience and Lessons Learned, Washington DC, USA. In this publication Table 2-2 show infectious and parasitic diseases as the main causes of death in Africa 1985. Table 2-4 separates tuberculosis as causing 4-5% of the burden of diseases and injuries in Africa 1990. Depending on the source, tuberculosis can either be classified as respiratory disease or an infectious disease.
22. Kennedy, Paul (1993). Preparing for the Twenty-first Century. Harper Collins Publisher, London. pp. 27-31.
23. As quoted in the article 'An Overview of determinants of high fertility in Ethiopia' by Dr. Assefa Hailemariam in the Ethiopia Journal of Development Research, October 1992;14:(2).
24. In an urbanized society, women are no longer part of the agricultural labour force, the extended family system declines and rearing children becomes more of an economic cost than an economic benefit. This results in a negative relationship between female labour force participation outside the home and fertility.
25. A more detailed description can be portrayed by studying how these socio-economic and psychological factors affect proximate determinants of fertility (contraceptive prevalence, female singulate mean age at first marriage, average time between birth and weaning, etc). Also, discussions in line with the almost reversed casual relationships argued by Ester Boserup would be in place here, but is unfortunately beyond the scope of this article.
26. The 'push factors' are probably a stronger cause of urbanization in Ethiopia than the 'pull factors'. The high unemployment rates and the low level of industrialization are indications of this as well as the frequent famine situation in rural areas, a situation unlike the result in Gunnar Malmberg's thesis 'Metropolitan Growth and Migration in Peru' (1988). Geographical Reports no. 9, University of Ume_. Sweden. He exhilarates the importance of 'pull factors' for migration to Lima.

The urban proportion in localities over 2000 people increased from 8.3% (8.5% including Eritrea) in 1967 to 10.1% (10.4% including Eritrea) in 1984. See.

Rafiq M and Hailemariam A (1987), 'Some Structural Aspects of Urbanization in Ethiopia' in Genus, Vol. XLIII - n. 3-4. Lugllio-December 1987, pp 183-204.

The Ethiopian Census results show a continued increase of urban proportion in all urban localities from 10.9% in 1984 to 13.7% in 1994 (preliminary results).

27. Although you get a bit doubtful of the level of women's status when you see the female fuelwood gatherers walking with heavy loads into town beginning just after sunrise.
28. "The effect of infant/child mortality on fertility is well documented. It influences reproductive behaviour in three ways; namely: through the replacement or behavioural effect, the insurance or hoarding effect, and the biological or physiological effect." [As quoted in the article 'An Overview of determinants of high fertility in Ethiopia' by Dr. Assefa Hailemariam in Ethiopian Journal of Development Research October 1992;14:(2).
29. The importance of the organization of agricultural production on fertility levels is often mentioned in studies of predominantly rural societies. See:

Cleaver, Kevin M and Schreiber, Gotz A. (1994) Reversing the spiral: the population, agriculture, and environment nexus in Sub-Saharan Africa. World Bank, Washington, DC.

Fargues, Philippe (1989). 'Subsistence crop deficit and family structure in Sub-Saharan Africa' in Population, Vol. 2, 1990. Paris. France.

Stokes C. Shannon (1995). 'Explaining the demographic transition: institutional factors in fertility decline' in Rural Sociology, Vol 60, No1, Spring 1995. Urbana, Illinois.

30. Palmer, Ingrid (1991). Gender and Population in the Adjustment of African Economies: Planning for Change. Geneva, ILO/UNFPA. pp 55-65.
31. In a pre-transitional society, the net flow of wealth goes from the younger generation to the older. In a post-transitional society, the net flow of wealth goes from the older generation to the younger.
32. Caldwell John C. (1982). Theory of Fertility Decline. United States Edition, Academic Press Inc. New York Chapter 5.
33. Fertility was reported as very high, except for the upper levels of society in a few highly urbanized areas.

The variations in birth rates was included in a limited study of the Kafa region by Amnon Orent (1975). 'Cultural Factors Inhibiting Population Growth among the Kafa of Southwestern Ethiopia' in Population and Social Organization. Mouton Publ.., The Hague, The Netherlands. The CBR was found to be remarkably low for this sample. The low CBR was, however, not seen as a result of modernization, but rather social or cultural factors.

Evidence has been produced in which increases in fertility levels prior to the fertility decline described in the Demographic Transition Theory could be part of a general fertility trend in developing countries. This can be linked to a temporal decline in age at marriage. See:

Dyson T and Murphy M (1986). 'Rising fertility in developing countries' in Population structures and models: development in spatial demography. Ed. By Robert Woods and Philip Rees, Boston, Mass./London, England.

34. Preliminary result of the 1994 census published by The Federal Democratic Republic of Ethiopia, Office of Population and Housing Census Commission, Central Statistical Authority (1995-96), The 1994 Population and Housing Census of Ethiopia - Summary Report, Addis Ababa.
35. The doctoral thesis 'Modernization and differential fertility in Ethiopia - multivariate analysis'. Ann Arbor, Michigan, by Teserach Ketema (1985) tends to support the idea that Ethiopia is going through a process of demographic transition.

36. See eg. Barke, Michael and O'Hare, Greg (1992) The Third World - Diversity, Change and Interdependence, Second Ed. Oliver and Boyd, Harlow, United Kingdom. p.189; and Wesley D.C. (1961). Marriage and Family in France since the Revolution. Bookman Associates, New York; and also Coale, Ansley J. and Cotts-Watkins, Susan (1986) The Decline of Fertility in Europe Conference on the Princeton European Fertility Project 1979, Princeton, N.J.
37. The results from the 1994 census should, however, cause these projections to be revised.
38. Palmer Ingrid (1991). Gender and Population in the Adjustment of African economies: Planning for Change. ILO/UNFPA, Geneva. pp. 3-5.
39. See eg. Grepperud S. (1996) 'Population Pressure and Land Degradation: The Case of Ethiopia' in Journal of Environmental Economics and Management. Orlando, Florida. 1996;30(1):18-33.
40. Regarding the role of poverty on fertility see: Egerö B and Hammarskjöld M.. Understanding Reproductive Change - Kenya, Tamil Nadu, Punjab, Costa Rica, Lund University Press (Art. nr. 20315) Lund. pp 16-17.
41. A fast growing population has an age structure with a large proportion of young men and women. Since the risk of dying is smaller in most younger ages than in older ages, the CDR can become reduced without any major reduction of life expectancy at age 0. This makes it more complicated to discuss demographic transition based on CDR, CBR and NI only.