"Issues in the demography of Mongolian nomadic pastoralism"

Sara Randall

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Taking a historical perspective this paper examines the ecological and political influences on Mongolian demography. Changes in political policy, domestic economy, health services, venereal diseases and shortages of men are considered in examining the unusual pattern of very low fertility, followed by a rise in the 1950s and 1960s and a gradual fertility decline, even in the absence of modern contraception. It is concluded that the lack of simultaneity between major political and demographic changes suggest that there are no direct responses to policy, despite the strong pronatalist stance, but that health services, particularly in the realms of venereal disease treatment, have had a major influence on Mongolian demographic patterns. The indirect consequences of government policy—education, health services in rural areas, rapid urbanisation—appear to have a stronger influence than the pronatalism, and ironically have led to rapid fertility decline.

The demography of pastoral nomads

Where the demography of pastoral nomadic populations has been addressed specifically, there has tended to be a preoccupation with identifying a particular demographic pattern related to aspects of the economy and ecology of pastoral nomads. In Africa this has often led to a stereotypical picture of a progression from low growth hunter gatherer populations, through higher growth pastoral populations to the highest growth sedentary agricultural populations—at least under the conditions of natural fertility where high levels of sterility are not found (Handwerker 1983, Roth 1985, Swift 1977, Henin 1968, 1969). Analysis dominated by non African examples (Campbell and Wood 1988) failed to find this progression and showed that all traditional production systems were very heterogenous in their fertility levels.

A theme emerging from comparative analysis in Africa is the paucity and poor quality of demographic data for pastoral nomads compared to sedentary agricultural populations, and this may have contributed to the interpretations of different demographic behaviour (Randall 1993). Poor data is often a function of their minority status in most countries; as well as being ethnic minorities, nomadic pastoralists are minorities in terms of their whole mode of life, which leads to marginalisation on a number of fronts, directly and indirectly affecting the quality and quantity of demographic data. That Mauritania, one of the few countries which had a pastoral nomadic majority until recently, is the only example where the data are better for the pastoralists, corroborates this interpretation.

In Mongolia these issues of minority status do not apply; until relatively recently pastoral nomads were a majority, with the nomadic lifestyle known and respected by all. By avoiding this complication, the demographic issues of Mongolian pastoral nomads can be conceptualised more clearly and become a question of the extent to which their demography is shaped by ecological constraints, and the role of external socio-political events in determining demographic outcomes. This question subsumes a whole range of influences which this paper will attempt to outline, although in many cases the outcome remains speculative.

Ecological and socio-political influences

Ecological constraints ranging from the adaptive response to climatic extremes to the availability of health care affect demographic outcomes. Climate in combination with terrain influences demography both directly, through its influence on patterns and levels of mortality, and indirectly through its role in predisposing towards a pastoral economy.

To understand ecological influences on demographic parameters, ideally one would want to examine the different effects of the pastoral economy and nomadism as well as the interactions between the two. For example, the relationship between the household, its individual members and their animals could be analysed from the perspective of labour demands and requirements, long term security, marriage potential, nutrition, or the role of zoonoses. All of these have serious implications for both fertility and mortality. Nomadism could affect demography in myriad ways: spousal separation reduces fertility, but could also increase the potential for temporary liaisons and the probability of sexually transmitted diseases; the rigours of long migrations could lead to increases in foetal wastage (Henin 1969); low population density reduces the incidence of infectious diseases although movement increases contact with new pathogens.

An important issue for the demography of Mongolian pastoralists is the effect of changing health services on their fertility and mortality. The availability (physical, social and economic) of health care can have a major influence on the demography of a population—and is itself critically affected by external socio-political strategies. Another example of the influence of politico-economic policy on Mongolian ecology was the substantial rural-urban migration in the late 1950s and 1960s coupled with a major change in the form of nomadic pastoralism, when collectivisation led to semi-sedentarisation and cushioned the rural population against some of the risks inherent in their environment. Consequences of the recent collapse of communism and the new diminished role of the state may herald a return to increased vulnerability to climatic and other crises with demographic repercussions.

Mongolian demographic data

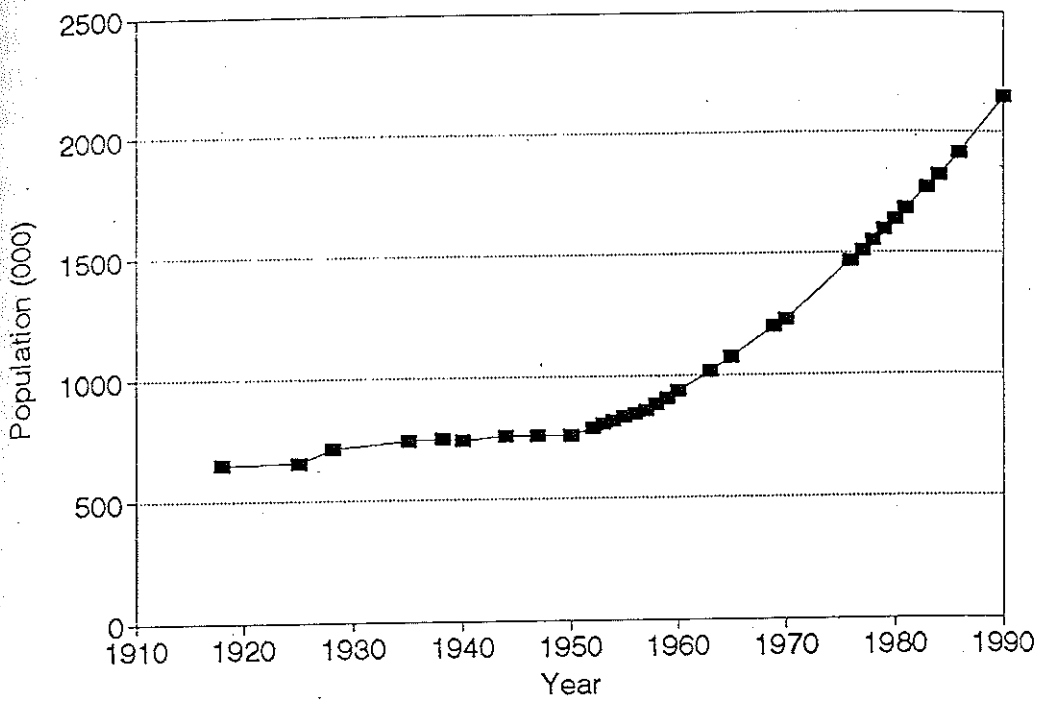
One problem in trying to evaluate the different effects of political-economic changes and ecological factors on the demography of Mongolian pastoral nomads is that the quality and quantity of demographic data available have also been seriously influenced by contemporary policies[1] making it difficult to separate the reality from the apparent[2]. Most of the data used in this paper are taken from Government reports, other published sources, census data on age-sex structures provided by the State Statistical Office, and demographic rates provided by personnel from the Ministry of Health and the Academy of Sciences. I have been unable to verify the quality of the last two sources. Together these data show a relatively slow growing population until the 1950s and then rapid growth (Figure 1).

In an attempt to examine both the ecological and socio-political influences on the demography of Mongolian pastoralists, four different time periods are considered. In each the quantity of demographic information differs, but the political events which start each time period can each be considered to be a stimulus to changes in the ecological conditions.

Pre-communist Mongolia: demography before 1921

Few data are available for this period. The population was estimated to be 647,500 (CSB 24–84) in 1918, although Maiskii (quoted in Murphy 1966) states that 5000 of these were Russians and 100,000 were Chinese. Since Maiskii also considers the total

Figure 1. *Mongolia population 1918–90*



Sources:

CBS 1921–61	1928–36, 1952–60
CBS 1921–81	1918, 1925, 1965, 1976–81
CBS 1924–84	1963, 1969–70, 1983–84
CBS 1921–86	1940, 1944
CBS 1921–91	1986–90
State Statistical Office 1950	

Mongols to be undercounted by about 100,000 the final figure is probably fairly accurate.

Population stagnation or even decline, low fertility, high incidence of sexually transmitted diseases especially syphilis, and a deficit of married men because of lamaist Buddhism, are recurrent themes (Murphy 1966, Bawden 1989). Murphy also considers that the population growth rate was low because: *Disease was rife, rheumatism, trachoma, syphilis and epidemic diseases being the most prevalent...Although reliable figures are lacking, one may assume that life expectancy was low and that mortality, especially infant mortality, was high* (p.61).

What were the major influences on demographic parameters in this period? If population growth was genuinely extremely low, was this due to high mortality or low fertility. If it was low fertility, to what degree was this caused by sexually transmitted diseases and what role did the other proximate determinants of fertility play—in particular breastfeeding, induced abortion, marriage or deliberate fertility control.

Disease and mortality

Murphy (1966) quotes a study by Kool-Estivend in 1915 which found that out of 173 children 67 died in the first four years of life. This probability of dying of .39 before age 4, although high, is matched by levels in contemporary populations in West Africa which are able to maintain high growth rates through high fertility (Hill 1985).

There was little health care apart from (probably ineffective) forms of traditional

medicine. Epidemic diseases almost certainly were important, although low population density and the absence of cities will have reduced their impact considerably. The effect of climatic severity, and disasters to livestock herds on which the population depended could have had an effect on population growth if they really were about every four years as Murphy suggests. Simulations have shown that a single famine has little effect on population growth in the long term (Watkins and Menken 1985) but that a 'regime of crises' (Palloni 1988) where growth rates are already low, can maintain a population at a fairly constant size.

Nutrition

Although nutritional status influences fertility, the consequences of moderate malnutrition on fertility are slight, compared to the effect of starvation (Bongaarts 1980). Moderate malnutrition increases susceptability to some diseases, but has little effect in others and may even protect in some cases. Severe malnutrition is clearly related to mortality although often caused by, rather than results in disease. The pastoralist nomadic Mongolian diet would have been dominated by animal products leading to a high protein diet which could provide good weaning foods, both milk based and the traditional meat based bantan (UNICEF 1993). In general food quality is unlikely to have been a problem, although seasonal fluctuations in food supply coupled with regular food crises could have exacerbated mortality crises. Such a diet may lead to specific deficiencies: iodine deficiency and a high incidence of rickets and vitamin D deficiency are documented in the 1990s (UNICEF 1993) and these are unlikely to have emerged recently. Vitamin C deficiency is also possible.

Fertility

Two main causes of Mongolian low fertility are said to have been a high level of sexually transmitted diseases, especially syphilis, and a shortage of men because of lamaism; the two may be linked.

Syphilis itself has only a limited effect on a population's fertility because it does not cause sterility. At early stages in the disease, its major effect during pregnancy is an increased risk of spontaneous abortion, 40% pregnancies that reach full term may end in a perinatal death (Schultz *et al.* 1992) with a further 40% pregnancies producing an infected infant. Late syphilis has less effect, with around 20% pregnancies ending in a perinatal death but only 2% producing an infected infant. Because it is self limiting, syphilis alone is unlikely to have a major effect on population growth rates. However, populations that have a high prevalence of syphilis usually have sexual behaviour patterns that predispose to high incidence of other STDs such as gonorrhoea and chlamydia trachomitis which do have a significant effect on fertility. Gonorrhoea can cause sterility in both males and females, chlamydia can cause PID in women—its effect on men is unquantified (Mardh *et al.* 1989). Travellers' descriptions suggest that syphilis was a severe problem in Mongolia, and therefore one can assume that other sexually transmitted diseases were highly prevalent. The subsequent sterility alone could lead to low population growth rates.

The unavailability of men because of Buddhist lamaism is only likely to have caused low fertility if substantial numbers of women were unable to find sexual partners. The information on STDs rather belies this idea, and any adaptation to shortage of men through institutions such as polygamy or concubinage can effectively overcome the disparity in available numbers. There is evidence from the Gobi (Potkanski and Szynkiewicz 1993) where there was a large number of monks in the nineteenth century, that marriage was very

unstable with the development of a matrifocal family and 'indifference about [the biological father]' (p.28). This suggests that in the Gobi at least, low fertility was not caused by the celibacy of women unable to find partners.

Pre-collectivisation: 1921–1958

Demographically this period divides around 1951 when patterns change dramatically. Between 1918 and 1952 the mean annual growth rate was .58% per annum, from 1952 to 1957 it was between 1.75 and 1.95% per annum and thereafter has always been above 2.5% per annum (Figure 2).

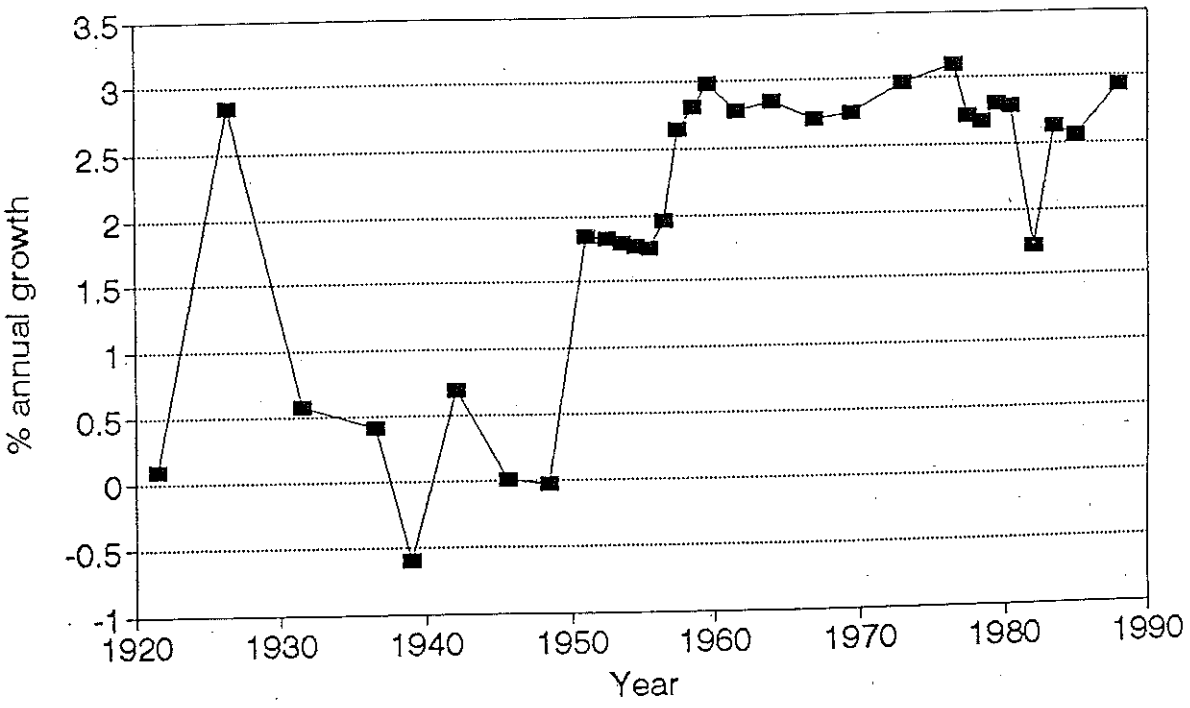
Political turbulence

The main political feature of the period was turbulence, especially in the 1920s and 30s, with substantial hardship from 1929–1932 when the failed forced collectivisation programme led to a fall in the national herd from over 25 million in 1931 to 16 million in 1932 (Murphy: Table 17). If this had actually led to famine in the rural population one would expect it to show up in the age distributions (similar to the deficit of births in China in 1961–62 as a consequence of the famine provoked by the Great Leap Forward). There is little evidence of such a temporary fertility decline in Mongolia, suggesting either that the population was able to accomodate such herd losses or that other factors (such as migration) mitigated the hardship. The effect on mortality cannot be established from the available data.

If sustained migration out of the country as a consequence of the political instability were maintained throughout the period, this could explain the slow population growth. In the absence of migration data I will examine the hypothesis that ecological or socio-political constraints restricted population growth until 1952.

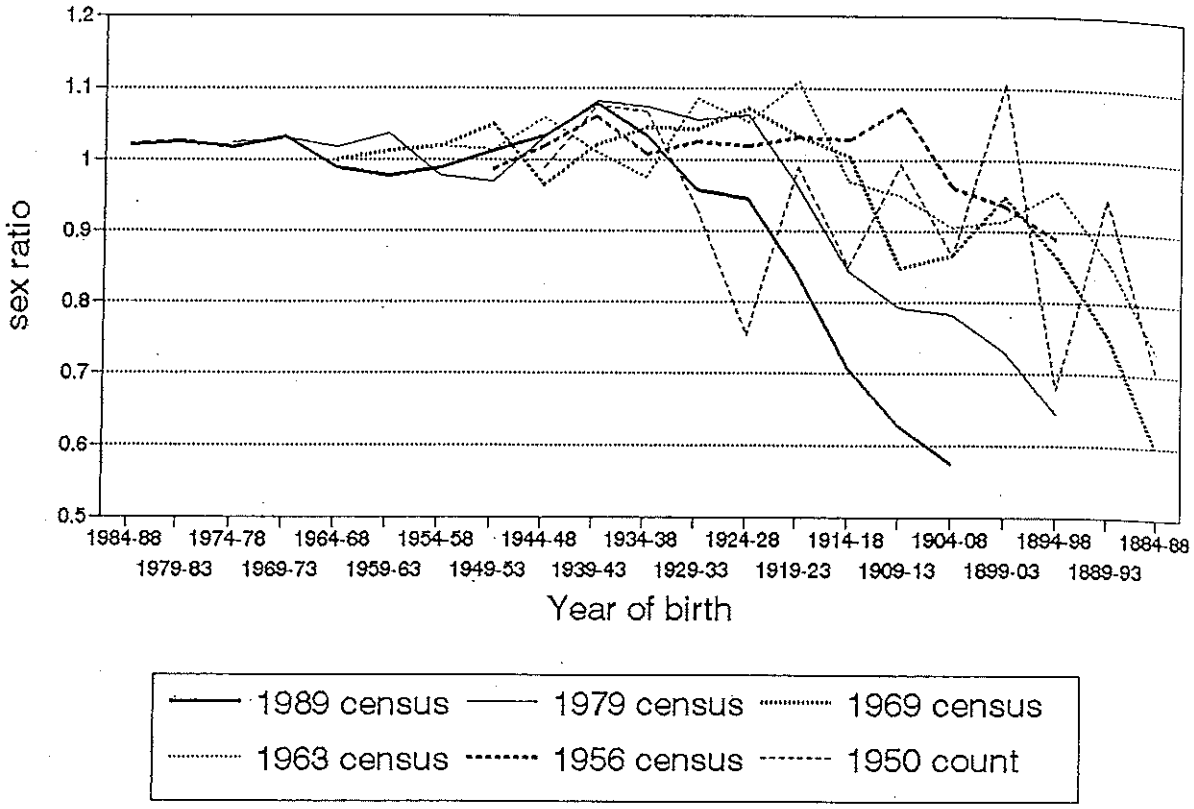
Using evidence from published statistics which show greater population increases in women than men Bawden considers that: *the effective cause of the population drop and the stagnating birth rate in the late thirties and early forties must have been the great purges* (Bawden 1966:345–6). This is not confirmed by an examination of the sex ratios for those

Figure 2. *Population growth rates 1918–1990*



Source: as for Figure 1.

Figure 3. *Mongolia sex ratios (for birth cohorts, data from SSO)*



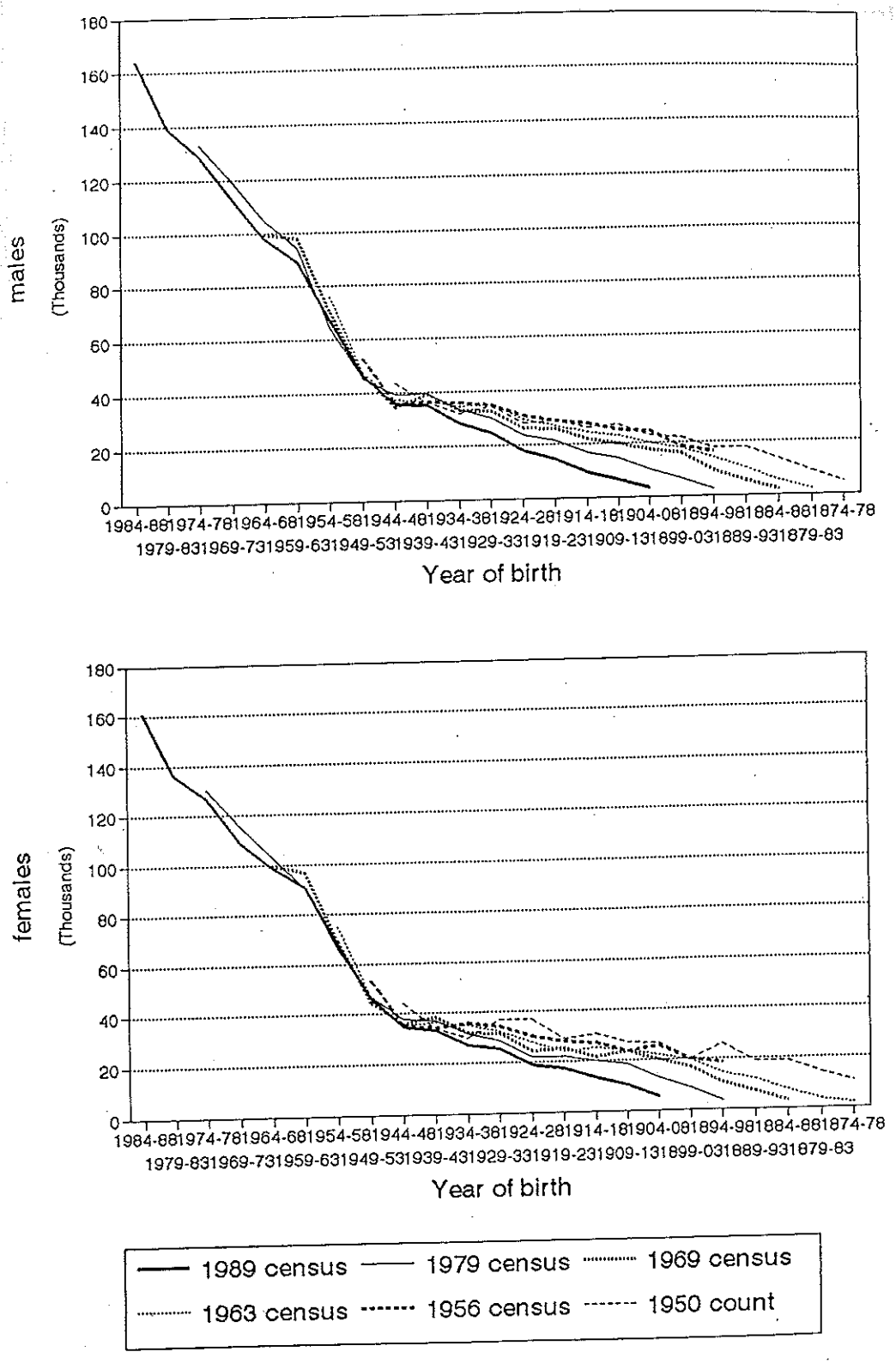
over 35 in 1950 and over 40 in 1956 (Figure 3). These sex ratios are in line with most other populations where sex ratios usually descend below unity at ages 40 to 50.

Fertility, venereal disease and health services

Growth in both education and health facilities was extremely limited until the late 1940s, and it seems very likely that the latter triggered the substantial increase in population growth in the 1950s. The number of hospitals increased from 20 in 1940 to 68 in 1960 (CSB 24–84). This timing, coupled with evidence from the age sex distributions, suggests that it is extremely likely that disease was a major constraint on population growth operating largely through fertility. According to Bawden special venereal hospitals first opened in 1947, by 1966 there were 20. It was post second world war that the antibiotics which could effectively treat venereal disease became available, and it is remarkable that the change in population structure seems to occur precisely around this 1950 period.

Matching up the cohorts from single year census age-sex distributions (Figure 4) shows a dramatic change in age structure for both sexes around 1950 suggesting a sudden increase in fertility probably coupled with a decline in infant and child mortality. With the exception of the cities, *aimag* level data (available for 1963 onwards) all show the same pattern of a population with little change in cohort size before the early 1950s. Suddenly for every *aimag* the base of the pyramid broadens rapidly. For the eastern and southern *aimags* this increase in surviving children appears to occur around 1947–49. For the Western *aimags* it occurs about five years later. Dramatic increases in fertility are unlikely to occur from changes in policy. Even strong pro-natalist policies are unable to increase fertility where a population is already controlling fertility (Lee *et al.* 1991). However, where fertility is constrained involuntarily by disease, the advent of technology can

Figure 4. *Cohort size in census years*



Source: SSO

cause a rapid increase, (Retel-Laurentin and Benoît 1976) and it seems likely that this happened in Mongolia.

The destruction of the lamaist church and the subsequent increase in available husbands may have contributed to the the 1950s changes; it is plausible that in the 1930s and 40s the psychological disturbances generated by the destruction would have inhibited a rapid transformation of family structure, whereas by the post war period things were more stable. In the Gobi however, female headed households and absentee fathers were still extremely frequent (Potkanski and Szynkiewicz 1993), yet the age-sex pyramids resemble those for the rest of Mongolia demonstrating that fertility is not necessarily constrained by an absence of conventional two-parent households.

Demand for children

In 1921–1958 individual pastoral family households were the basic units of production (Potkanski and Szynkiewicz 1993) with little change in methods of herding and nomadising. Although these basic units did cooperate in larger units, the domestic demand for labour was largely provided by children which would generate a demand for high fertility even if this were not realised. Widespread practice of adoption suggests that the supply of children was not always regular or reliable enough to ensure adequate labour supply for most families, and this too corroborates the evidence that a lack of children (or low fertility) was a generalised problem. The fertility rise nearly a decade *before* the dramatic changes in domestic organisation, livestock ownership and nomadic lifestyle provoked by the collectivisation programme, is evidence against an interpretation of fertility determined by economic considerations based on inheritance, labour requirements, costs of children or old age security. In fact once the collectivisation programme was established most of the economic changes would predict a decrease rather than a rise in fertility. Only Henin's theory, where fertility is predicted to rise with sedentarisation, is appropriate.

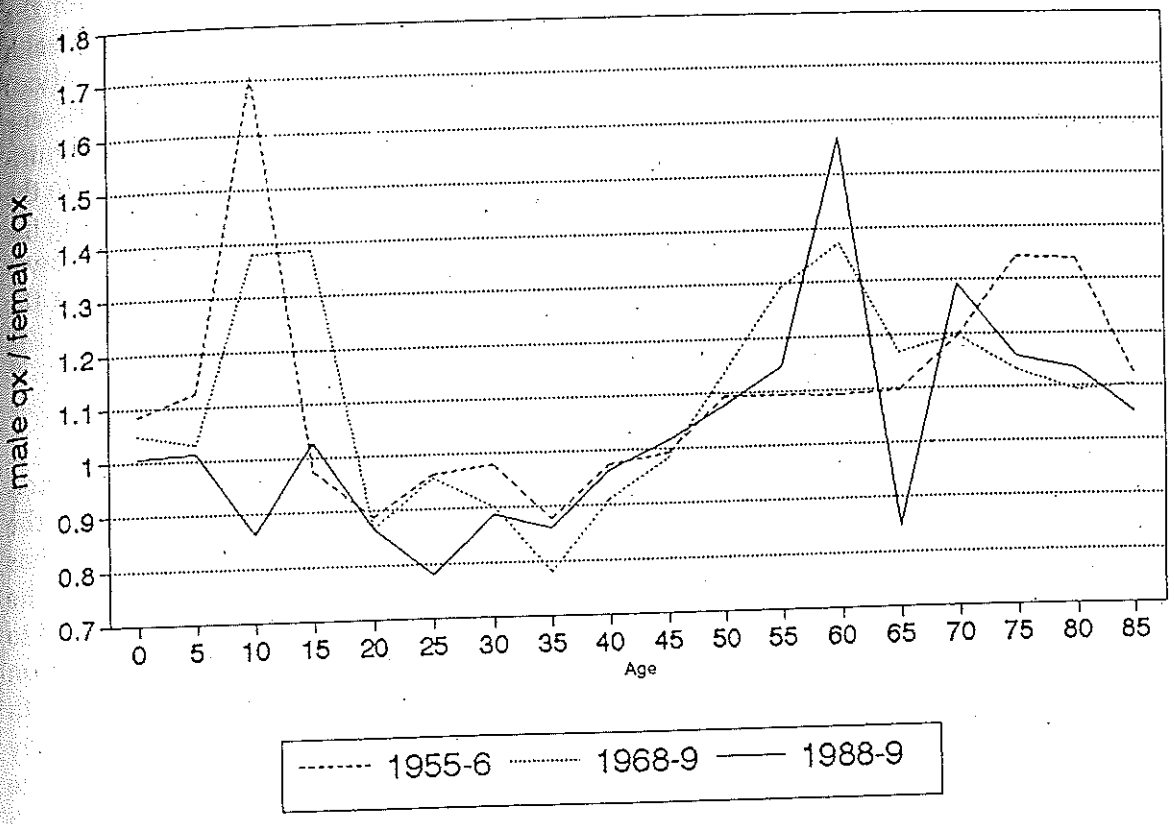
Mortality

The absence of effective medical care until the 1940s probably meant that mortality patterns changed little until then. The minor redistributions of animals in the 1920s and 30s may have reduced the vulnerability of the poorest groups. One issue that should be investigated is the extent of seasonal mortality patterns and whether these decreased after collectivisation, since for most of the 1921–59 period there were few factors which could have buffered the population against strong seasonal variation in climate, workload, and food availability.

Sex differentials in mortality reflect the different stresses on the sexes and the different values placed upon them. Using life table measures calculated for various periods by Gur of the Mongolian Academy of Sciences[3] female expectation of life (56.72) is slightly higher than for men (55.06) for 1955–6, the earliest data available. Up to age 14 males have higher mortality than females, from 15–49 females have higher mortality after which male mortality is again higher (Figure 5). This suggests that during the reproductive years women faced increased stresses which were clearly not removed by the financial and health supports given to childbearing women since collectivisation, since the same pattern occurs in 1989. Part of this excess mortality may be directly attributed to maternal mortality, which even in the 1990s is relatively high, and may have been exacerbated by the increase in fertility during the 1950s. The burden of sexually transmitted diseases and reproductive tract infections, as well as syphilis induced miscarriages are likely to have contributed to higher female morbidity and mortality in the reproductive years.

Jadamba's 1954 study (quoted in Potkanski and Szynkiewicz 1993:25) shows that women worked longer hours than men

Figure 5. *Ratio male–female mortality*



Source: Dr. Gur

in both slack and busy seasons, and they were working for over 11 hours a day. More recent work (Cooper and Geleezhamstin 1993) suggests that these physical demands on nomadic women have not diminished, but that they are not always restricted to the reproductive years. More work is needed to establish to what degree excess mortality of reproductive age women can be ascribed to the consequences of childbearing and long breastfeeding, and the role of excessive work loads, although the two clearly interract.

Nutrition

State farming enterprises set up after the second world war may have had an effect on nutrition both in terms of increasing variety—primarily grain—and food security. There had been a small amount of agriculture before that time (Bawden 1989) but with little impact on the majority of the pastoral nomads.

Collectivisation 1958–1990

The collectivisation programme included provision of basic services such as health and education, as well as payment of salaries (Rosenberg 1977), which would buttress pastoralists against some of the annual and seasonal stresses, and pensions which alter strategies of people looking for support in old age. Education, health, political control and a move towards an economy based on salaries rather than selfsufficiency, all decreased the mobility of the pastoralists generating a movement towards semi-sedentarisation.

To what degree did collectivisation modify the demography of Mongolian pastoralists? The major change in Mongolian demography, the increase in fertility, occurred before collectivisation, which suggests that domestic labour organisation played a relatively minor role in influencing fertility. Collectivisation however had far-reaching consequences on other aspects

of demography, primarily the distribution of the population.

Urbanisation

In 1950 Ulaanbaatar comprised 12.6% of the Mongolian population; in 1956 this had risen to 14% and 21.6 of the total population was defined as 'urban' CSB 24–84). Since 1963 around one quarter of the population lives in the capital, whilst proportion urban rose through 44% in 1969 to just over 50% in 1979 and 56% in 1991.

The implications of rapid urbanisation on the demography of the pastoral nomadic population are twofold. The first relates largely to available manpower. The cities contain a disproportionate amount of young adults (Figure 6) thus removing these people from the rural production system. In 1963, Ulanbaatar also contained a disproportionate amount of males of working age, with a sex ratio of 1.16 for those aged 15–59 compared with 0.97 for the rest of the country. This presumably had repercussions for women in the rural areas (though not apparently having much effect in reducing fertility, maybe because of the need for children to replace adult male labour).

In terms of some key indicators urban areas were clearly advantaged over the rural ones; data from the Ministry of Health (Purevsurem, personal communication) show that after 1977 (when data became reliable) maternal mortality was significantly lower in the cities compared to the rural areas. On the other hand, during the 1980s, infant mortality levels were no lower in the three cities than they were in the *aimags* (Figure 7).

Changes in health care

The number of doctors per ten thousand population increased rapidly during the 1960s, from 9.7 to 17.9 (CBS 24–84) and has increased a little more since then. The number of hospitals increased from 68 to 112 in the 1960s. An increasing proportion of rural women gave birth in hospital, with the development of rest homes which they stayed in for the two weeks before the due date. By making health care accessible to all through a (relatively) decentralised programme with mobile health workers and an effective referral system, many of the traditional access problems of pastoral nomads have been addressed.

Figure 6. *Age structure (Cities and aimags)*

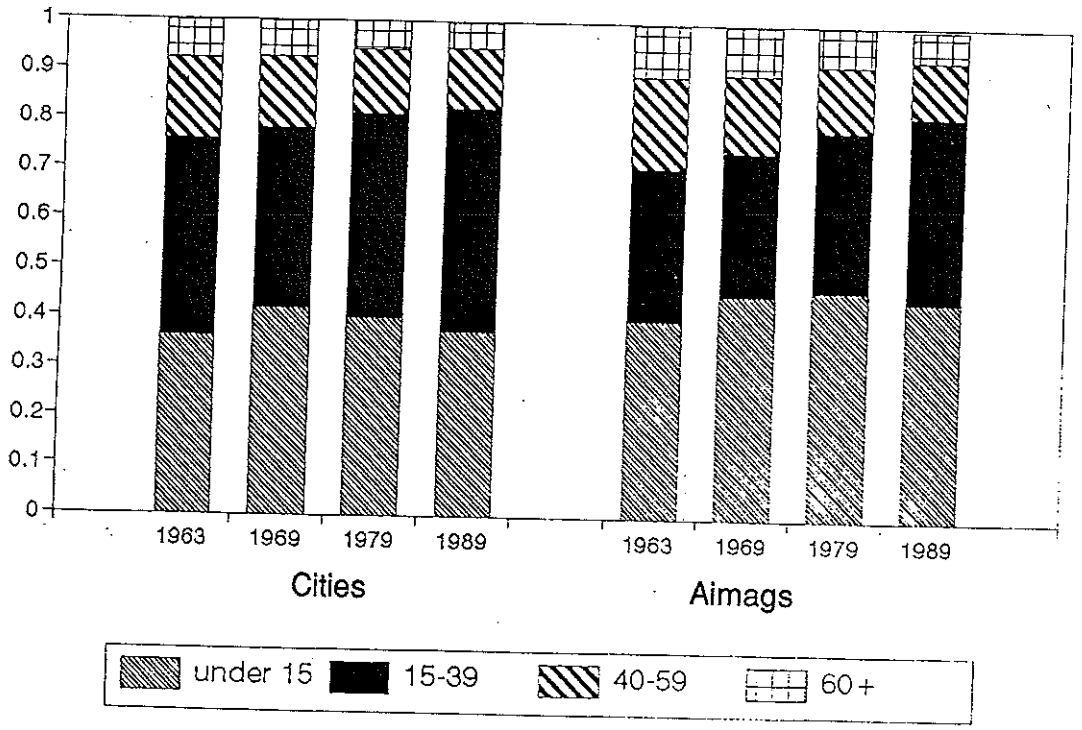
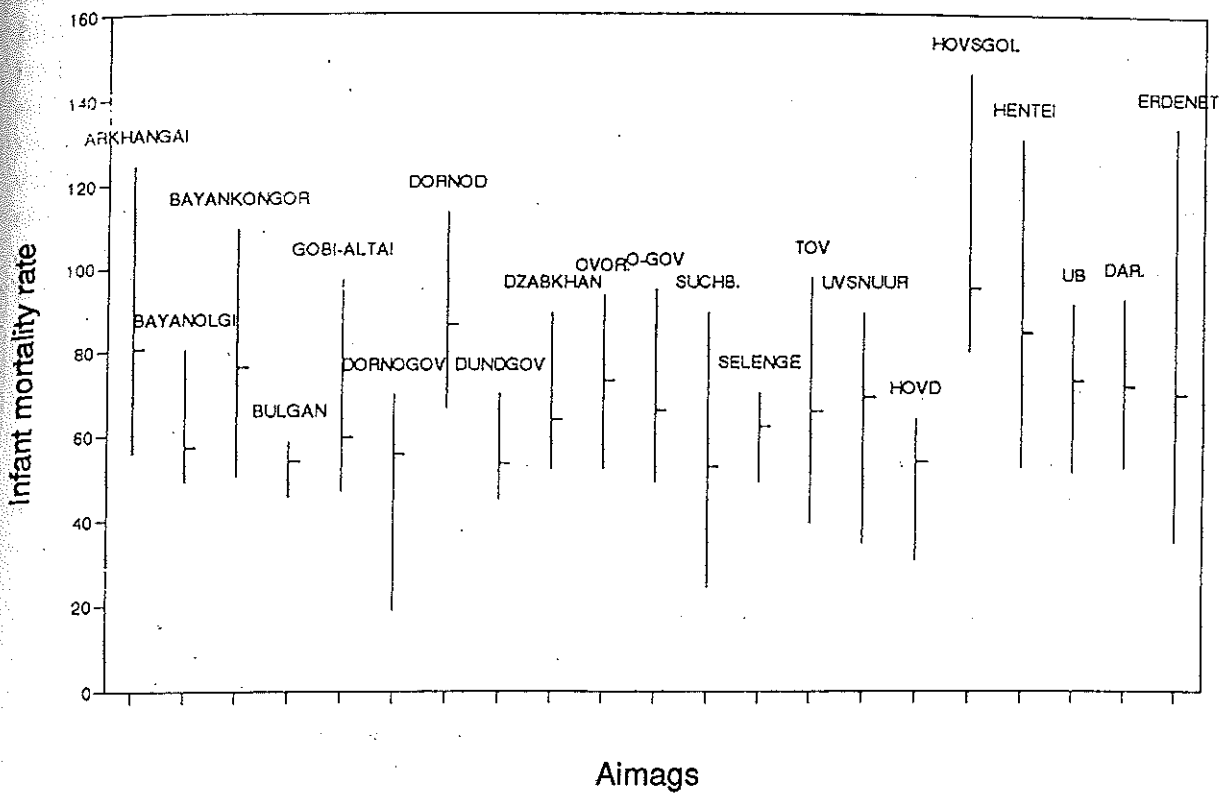


Figure 7. *Infant mortality 1980–92 (Mean, min. & max.)*



Source: from Dr. Orsoo, MOH

Problems of access to health care are however only indirectly a consequence of pastoral nomadism because of population mobility. There are other direct consequences which health and veterinary services have to deal with, like the zoonoses such as brucellosis. Acute respiratory infections (the main cause of death in the under fives, UNICEF 1993) may be a direct consequence of living in tents which however well ventilated will be smokier than centrally heated flats, and exposure to cold may increase morbidity from specific diseases. Babies are exposed to little sunlight because of fear of the cold and wind, and this, coupled with swaddling probably has a significant effect on the incidence of rickets which is extremely high (UNICEF 1993). Thus although improved health services through immunisation programmes and monitoring pregnant women can mitigate some of the health disadvantages of pastoral nomadism, they cannot deal with all the particular problems, some of which remain even when the population is semi-sedentarised.

The epidemiological advantages to being mobile in a scarcely populated environment, (sanitation and disposal of faeces is not a health hasard) decrease with semi-sedentarisation. One might therefore expect to see a change in disease patterns over this time, with a decrease in the incidence or severity of easily treatable diseases and an increase in those linked with sanitation.

Education

Education expanded enormously during the 1960s. In 1963, 44% males and 30% females over age 10 had had some education. By 1979 these figures had risen to 82% males and 74% females. Rural Mongolia is thus in the unusual position of having a pastoral nomadic population of which the younger adults are all literate. In 1963 only 3.1%

women had finished secondary school and 5.5% had incomplete secondary education. By 1979, 16.3% had completed secondary school with 20% having partial secondary (CBS 24–84). This is an extremely rapid increase—far more rapid than for men, and with the exception of higher education there was little difference between men and women by 1979.

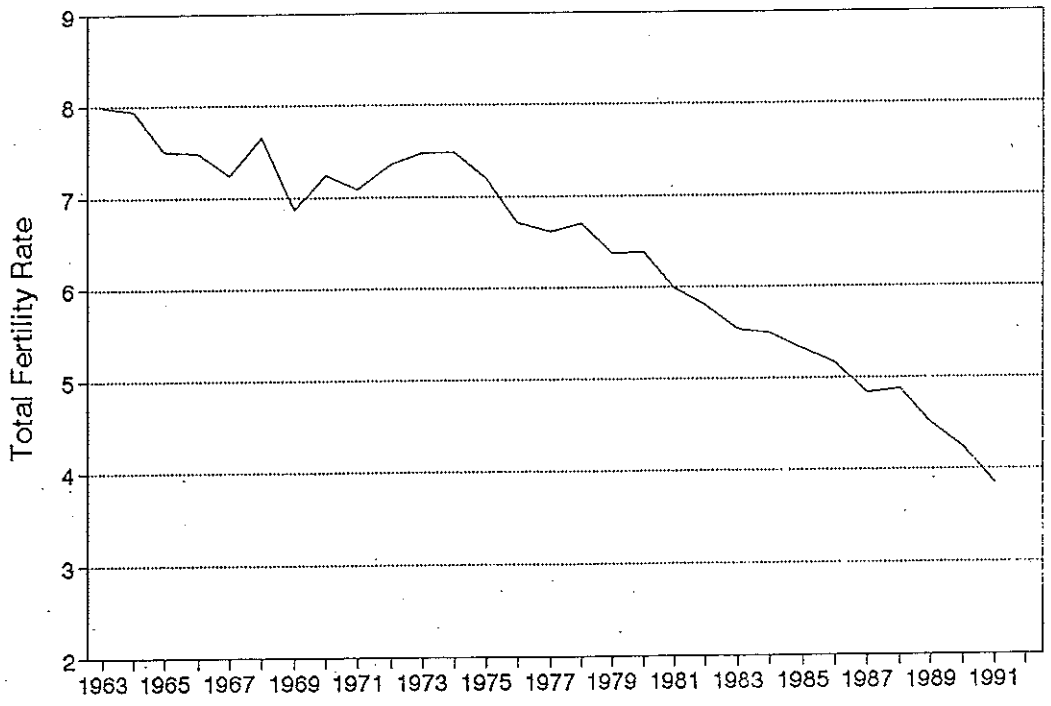
This presents an anomaly. In most developing countries there is a clear correlation between increased education for girls and decreases in fertility, yet in Mongolia both fertility and education increased simultaneously. This is yet further evidence that fertility had been kept artificially low by some unwanted factor (such as veneral disease) and fortuitously that problem was resolved at the same time as the expansion of education.

Fertility

Fertility started to decline from the mid 1970s (Figures 8 and 9 taken from Neupert 1992). Through the 1980s there was increasing control of fertility by women in their 30s—the first cohorts to receive primary education. Since the education programme reached rural areas and was not limited to the urban, it would be interesting to see if fertility fell there too and for which women, in order to disentangle the effect of education on fertility decline from the disassociation of family labour and income.

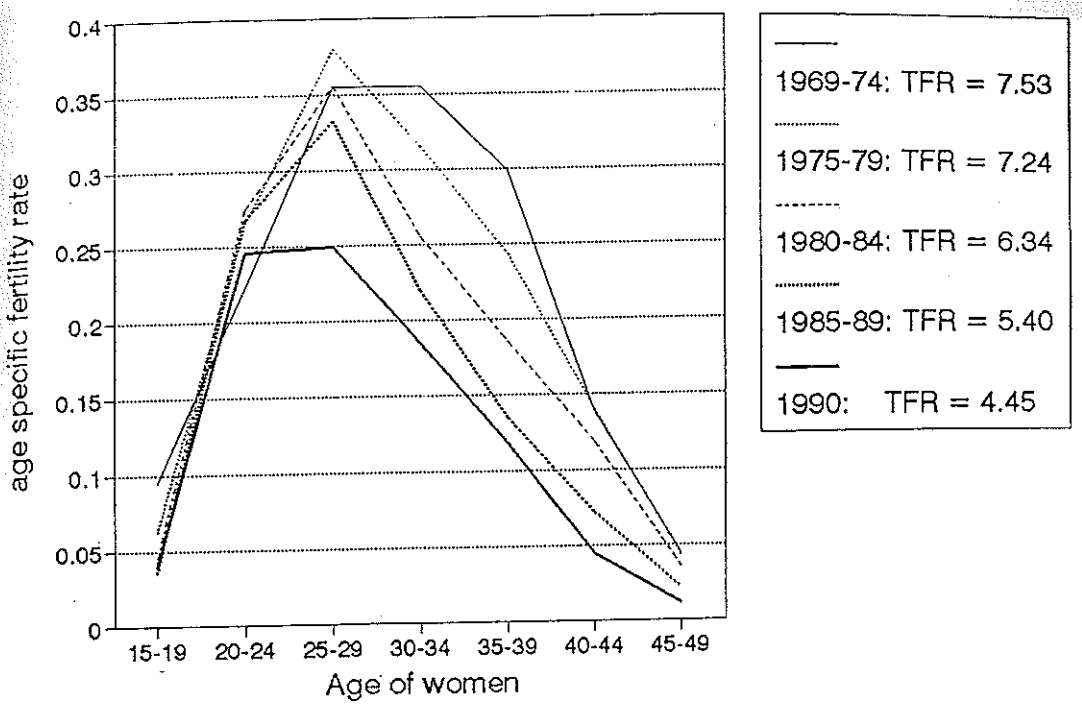
Aimag level total fertility rates (Figure 10, from SSO 1992) show a strong regional pattern in both the level of fertility in the 1970s and in the fertility decline. Two pockets of high fertility, the West (particularly Bayan-Ölgii) and the Central South remained higher than the rest of the country in each 5 year period. By 1990–91, in most of the country TFR was below 5.0 except in these areas. Influences on fertility decline are multiple, although cultural factors are probably a strong feature of the uniqueness

Figure 8. *Total Fertility Rate 1963–91*



Source: SSO Working Paper No. 2, 1992.

Figure 9. *Mongolia–ASFR 1969–90*

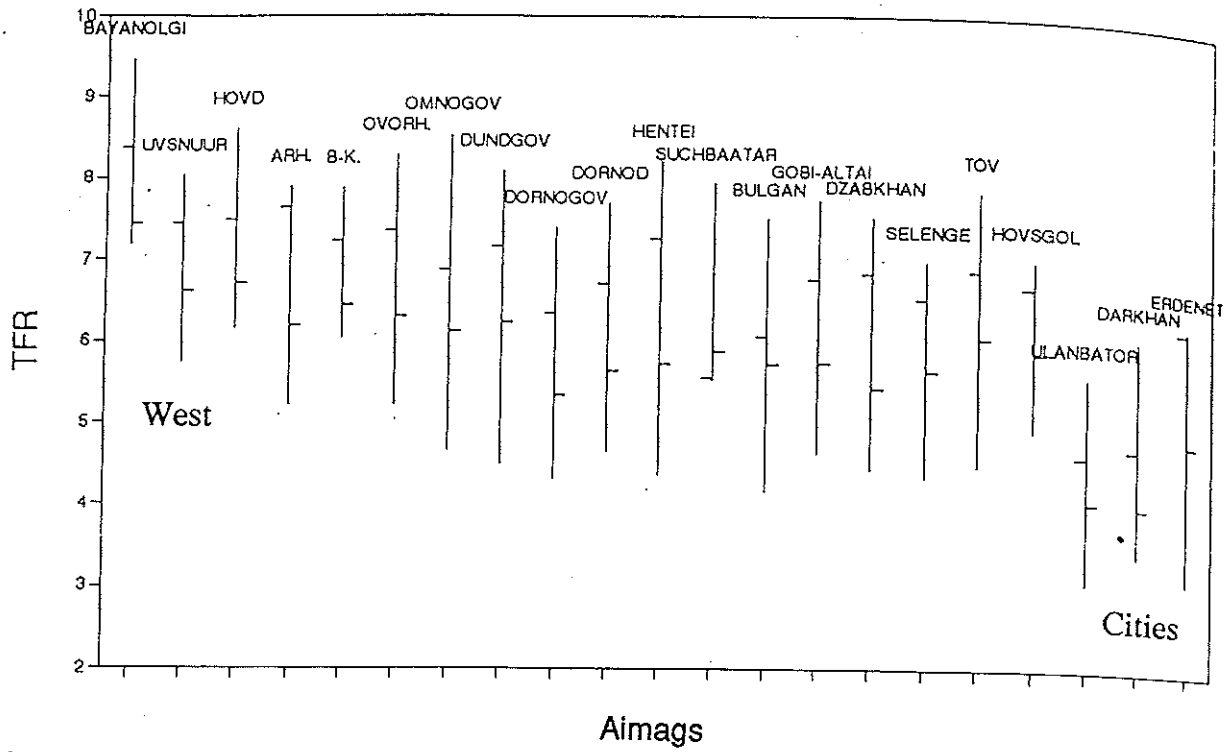


Source: Neupert 1992.

of Bayan-Ölgii, where around 80% of the population is Kazakh. The three cities had much lower fertility, even in the 1970s when the *aimag* total fertility was almost universally above 7. The absence of earlier time series means we do not know if urban areas always had lower fertility, or whether the decline started earlier there. The rate of fertility decline is no faster in the cities and there is no significant relationship between the percentage urban in the *aimags* and their fertility levels in the 1970s or the rapidity of decline.

Thus collectivisation was preceded by a rise in fertility and the subsequent fall occurred despite a barrage of pronatalist policies which included medals and substantial financial benefits (see Rosenberg 1977:81) for fulfilling 'Order of Maternal Glory' criteria (5 children for second class, 8 children for first class), child benefits for women with 4+ living children under age 17, hospital care and rest rooms designed to reduce the risks of childbirth. That the Mongolian fertility decline occurred despite the strong pronatalist policy, and a ban on contraception and abortion except under very stringent conditions related to the mother's health, suggests there there were strong incentives to control fertility and to circumvent the absence of easy control methods. Neupert (1992) believes that illegal abortion played a major role, citing the decline in numbers of spontaneous abortions once induced abortion was legalised. Interviews in 1993 suggested many women use the 'calendar method', although rural woman just count days in their menstrual cycle whereas urban women with access to other sources of information are more likely to use thermometers for estimating ovulation. Sources of information are said to be magazines, which are also more available in urban areas. In urban areas, sex education provided by mothers to daughters apparently included an explanation of this calendar method (Sarchana, personal communication).

Figure 10. *Aimak fertility decline 1975–91*



Maximum: 1975–79 Left mark: 1980–84
Minimum: 1990–91 Right mark: 1985–89

Source: SSO 1992.

Marriage

Marriage does not appear to be a constraint on fertility (suggesting that the deficit of men before the dissolution of lamaism may not have had much effect). For Arkhangai *aimag*, Rosenberg (1977) states "while out of wedlock births was [sic] not uncommon, the social system easily accommodates the mother". In the Gobi (Potkanski and Szynkiewicz 1993:24) parents often adopt the natural children of their daughters when the latter marry. Interviews in Övörkhangai suggested that premarital births were relatively common, but that the couple cohabited in another relative's ger until they could afford their own. Here, marriage currently appears to be an institution defined by residence and *ger* ownership rather than an institution for the organised production of children. This suggests that an examination of changes in marriage parameters will contribute little to an understanding of the proximate determinants of fertility.

Mortality

Gur's lifetables show an increase in expectation of life from 1955–6 to 1988–9 from 55 to 62.5 for men and from 56.7 to 64.1 for women. Given the substantial improvements in health care, medical facilities and education these improvements are not dramatic. The excess female mortality in reproductive years is maintained in 1988–9 although the duration of excess mortality is reduced to ages 20–44, probably related to the falls in fertility at older and younger ages (see Figure 5). From 1977 maternal mortality ratios were around 17 per thousand for rural areas and 10 per thousand for the cities (Purevsurem personal communication) with substantial annual fluctuations especially in the cities.

Infant mortality

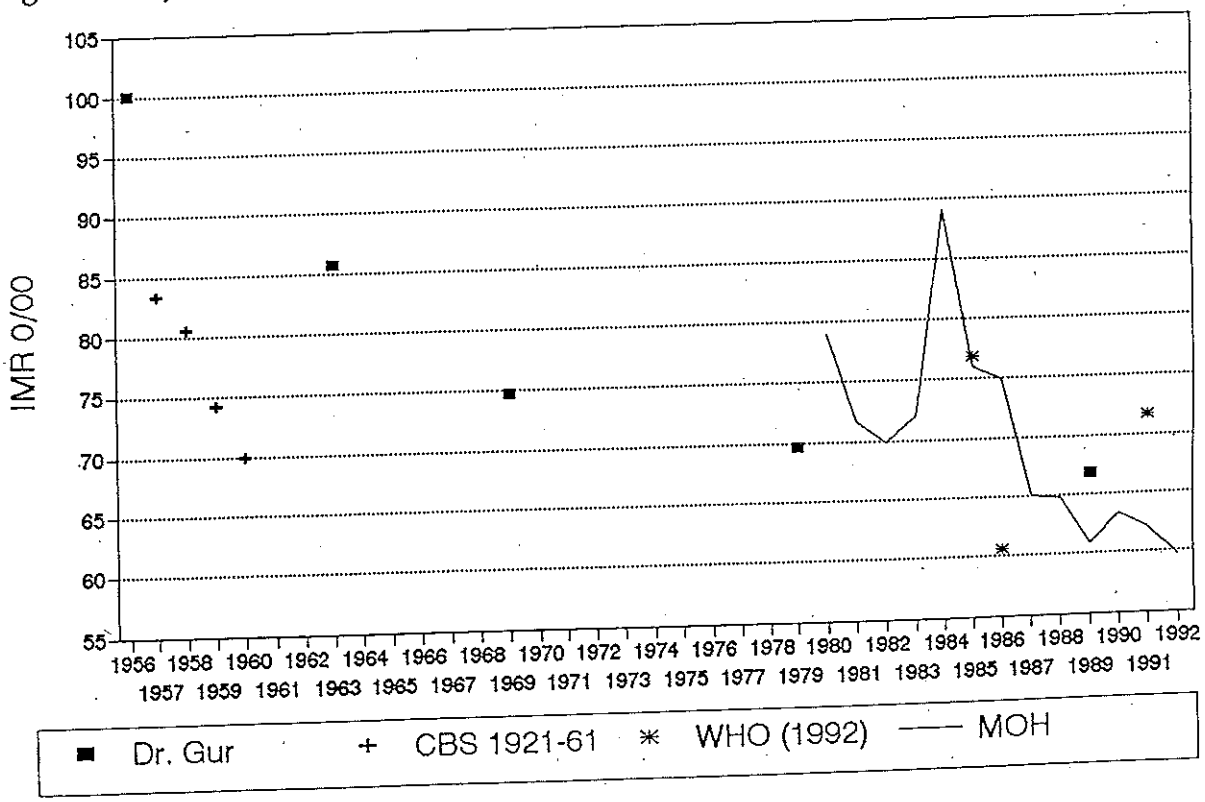
From the different estimates of infant mortality (Figure 11), Gur's lifetables suggest a prolonged and regular fall in infant mortality and his later data tie in fairly well with unpublished figures available from the Ministry of Health[4]. Goverment published infant mortality for the late 1950s (CSB 21-61) show a rapid fall over four years from 1957–60 with no decline since then, but these figures, obtained early in the period of vital registration, are probably incomplete. The Ministry of Health series (provided by Dr Orsoo) differ slightly from those in the WHO Health Sector Review, which were obtained from the State Statistical Office.

Whether infant mortality declined during the collectivisation period depends on which data one accepts. Without access to the original numbers it is difficult to judge, but in terms of knowledge about increase in health services, immunisation, education of mothers, improved maternity services and probably improved food security, Gur's estimates seem the most plausible.

Breastfeeding

One unknown factor which influences both fertility and mortality is breastfeeding. The 1992 Breastfeeding Survey (UNICEF 1993) shows breastfeeding is both widespread and prolonged (61% still breasfeeding at 20–23 months), but since this survey was a response to an initiative to increase breastfeeding, it may just reflect recent changes[5]. Discussions with women in Övörkhangai *aimag* showed that prolonged breastfeeding up to three or four years was known and practised by well educated secondary teachers, and in the pastoralist households, breastfeeding of up to two years was standard, with supplementation using animal milks and a meat based gruel (*bantan*). Such prolonged periods of breastfeeding and its acceptance by a variety of types of women do not suggest a resurgence, but rather that breastfeeding has remained popular. It seems unlikely that the slow fall in infant mortality can be explained by a decline in breastfeeding, although further work is needed.

Figure 11. *Infant mortality 1956–92*



Source: compiled from various sources.

Ecological factors versus health services

Given the investment in health infrastructure, the recent high educational levels of women and the focus on preventative health care (in theory at least) infant mortality is surprisingly high, and the evidence is that ecological factors may play a role. The MOH data available by *aimag* for single years since 1980 are remarkable largely for their heterogeneity over space and time (see Figure 7) with none of the regular decline shown for fertility. Although some *aimags* appear to show fairly consistently high infant mortality (Dornod, Khövsgöl, Bayankhongor) and some consistently low (Dundgov', Bulgan and Khovd) others show large changes with peaks in different years. This suggests that local climatic conditions may be a stronger determinant of infant mortality than either ecological zone or health service availability.

The lack of differences in infant mortality between cities and *aimags* may just reflect the adequacy of health care provision at *sum* level, in contrast to most countries where cities are much better provided. On the other hand, in determining infant mortality levels other factors such as climate may be important. ARI is the major cause of death for children under 5 (53% deaths to under 1s and 63.7% of deaths 1–4 in 1991—data provided by Dr Orsoo) which suggests a combination of climate and living accommodation. Diarrhoeal disease is also important (about 12 % deaths under 5).

For pastoral nomads in areas of very low population density lack of sanitation is not generally a problem provided the water supply is clean, which is currently the case in Mongolia. However, the lack of urban rural differentials may reflect the inadaquacy of sanitation facilities in urban areas, especially the *ger* quarters around the towns. Although most compounds have pit latrines, in 1993 many of those observed were in poor condition. Even though all urban flats seem to have electricity and heating, not all have toilets and an individual water supply. The low population density for the pastoral nomads may thefore be conferring some health advantages over the cities. The nutritional consequences of city life with dependence on purchased food may be disadvantageous for children. It would be interesting to examine the causes of infant and child deaths by urban rural residence within *aimags* to examine this hypothesis further.

Impact of collectivisation on demography

Although infant and child mortality is high given the health facilities and levels of education, it is low enough in combination with the rapid rise in fertility to have changed the population from one which had a relatively low proportion under 15 to a very young population (Table 1).

Yet, although the collectivised period caused major changes in the lifestyle of the Mongolian nomadic population, leading towards sedentarisation, increasing the cost of children because of compulsory schooling (and therefore decreased domestic labour), changing the household economics, there is little evidence of a substantial direct impact on mortality. Similarly, although fertility rose and fell during the collectivisation period, the spatial patterns of the fertility decline and the lack of synchronicity with the major socio-economic changes suggest that collectivisation per se and the changes it wrought on domestic structure and domestic economic organisation played only a small role as a fertility determinant.

Privatisation onwards (1990–)

For the pastoral nomad, privatisation has led to an increased control over domestic resources, and the expectation of decreased buffering of both immediate and long term crises by the state. The rural population has probably increased because of urban-rural

Table 1. *Proportions under 15 and child–woman ratios**

	1950	1956	1963	1969	1979	1989
<15 National	.286	.304	.390	.445	.443	.419
Child-woman ratios						
National	483	583	911	964	852	727
Cities			764	771	617	556
Aimags			960	1042	985	835

*(the number of children aged 0–4, for every 1000 women of reproductive age)

migration; there is more potential for nomadic movement, yet decreased mechanised help with this and overall an increase in self-reliance. Although the demographic implications are significant they are unlikely to be reflected in immediate observable changes in the available measures.

Health services and mortality

There has been a concern that mortality rates will increase (or have increased—although the identified increases seem to be largely statistical artefacts rather than real). A financial crisis in the health service has led to the unavailability of many drugs. Many maternity waiting homes have closed (reduced from 287 in 1989 to 52 in 1992, Purevsurem, personal communication) and it was feared that this might have caused a rise in maternal mortality[6]. The referral system with planes and ambulances, critical for emergencies in rural areas, has disintegrated with potentially serious consequences especially for maternal mortality. There is evidence that inceased dependence on women's work, coupled with decreased state control is leading to pastoralist women choosing to have home births and return to work quickly. This too could have repercussions for maternal mortality. But maternal mortality is unusual in that technology and rapid response are the major causes of deaths averted. Also the numbers of deaths are very small at around 150 per year.

Mortality at other ages and from other causes is much more dependent on socio-economic status, education, ability to control one's life as well as ecological and nutritional constraints. So long as the education system remains intact and food continues to be available—even if variety is reduced, changes in health service provision will probably have little effect at a population level. The above discussion has suggested health services may not have had a particularly significant effect on mortality since collectivisation and therefore their temporary decline may also have little effect. The longterm is a different matter, but cannot be predicted.

Rural pastoral households are probably those best protected against the current economic crisis in Mongolia; they have the potential to become self-sufficient in food, although this would mean an almost total dependence on animal products; gers are designed to withstand the winters, urban flats will only do so with technology.

Fertility

Whereas the prospects for mortality are inconclusive and mortality could rise or fall, the evidence is that fertility will probably continue to fall fast. Abortion was legalised in 1989 and in 1990 there was 39 abortions for every 100 live births (SSO 1992), with around one abortion for every live birth for women over 35. Although IUDs had been legal under some extremely strict criteria since 1976, general controls on contraceptive availability were removed in 1989. This led to a threefold increase in IUD

insertions (SSO 1992, Table 4), although supply did not meet demand. Since then the Ministry of Health, through the Safe Motherhood Initiative has started a national programme of training doctors in contraceptive techniques and soon this programme will move into the outreach phase. Simultaneously contraceptive availability (particularly IUDs) should increase at all levels. Thus although current contraceptive use is quite low, the number of new acceptors is increasing annually and appears to be constrained more by lack of information and supplies rather than reluctance on the part of women. Although for some categories of women contraception and abortion are free (medical risk, no husband, poor or 5+ children) most women have to pay a nominal sum but at 62 tögrög for an IUD and 20 tögrög for insertion (from Purevsurem), this should not prove a major constraint.

Although the means for fertility control should be generally available soon (and here the high levels of literacy plus the decentralised health service will be very advantageous), it remains to be seen to what degree the rural pastoralists will use them. There are various aspects to be considered. The move away from state support and wages may well increase people's insecurity, to which one response may be an increase in fertility. An increase in dependence on family labour may also increase the value of children. On the other hand assuming that schools are maintained and education continues to be compulsory, children may be a net expense to their parents if the balance is taken between their labour contributions, the child benefits received, and the expenses linked with prolonged schooling.

Conclusions

Although many more detailed studies are needed before the different contributory roles of ecological and socio-political factors to the demography of Mongolian nomadic pastoralists can be determined, there are some clear themes which emerge from this review.

Firstly, the patterns of fertility and infant mortality change in Mongolia differ from those found elswhere in the developing world. Our understanding of these as they apply specifically to nomadic pastoralists is rather inadequate, because of lack of appropriate disaggregation of the data, but it is clear that the structure of the Mongolian population changed dramatically starting around 1950, when probably a rise in fertility coupled with a fall in child mortality led to a rapid rejuvenation of the population. This occurred simultaneously with the expansion in education and health services, but was seemingly little affected by changes in economic organisation. It is as though there had been a substantial constraint on fertility before that time which, when released, led to what amounted to an explosion in numbers of children.

Those who argue that nomadic pastoralists have low fertility by the nature of being nomadic (Henin; 1968, 1969) or pastoralist (Swift 1977), may like to interpret these changes as being a consequence of increased urbanisation and sedentarisation of the population. Two factors suggest that this is not so. Firstly the timing—the change in population structure was BEFORE the collectivisation programme and therefore cannot be seen as a response to it—and secondly, by 1975 it was clear that the cities had LOWER fertility than the rural areas rather than higher. The fact that the timing of the change in structure ties in with the expansion of medical services and the availability of treatment for venereal disease, which we know to have been a problem, is convincing evidence that this was the cause of the rise.

The subsequent fertility decline in the absence of any family planning programme and modern contraception, and the presence of an extremely positive pronatalist policy is remarkable, and suggests that a few years of experiencing high fertility were enough for Mongolians to realise that it was incompatible with their lifestyle—and at this stage the relationship of low fertility with pastoral nomadism seems to return. The strong regional patterns in the decline, although all the regions are dominated by a pastoral nomadic production system, implies that it is pointless to look for a single determinant of Mongolian fertility, but that future research should aim to dis-aggregate the trends and various determinants.

Ironically, Mongolian social and economic policies backfired uncomfortably on their pronatalist stance. By designing an education system that catered for even the most isolated nomad, and by changing the domestic economy, providing salaries and pensions, key motives for large numbers of children were removed. Literacy almost certainly contributed to the dissemination of knowledge about 'traditional' birth control methods such as rhythm and calendar. Thus the failure of their pro-natalist policy was ensured.

One issue that needs further work is a detailed examination of the patterns of decline within *aimags*, and the degree to which fertility control is universal or there is increased heterogeneity with some very small families balanced by a continuing high fertility sub-population. Such information collected in conjunction with household economic data, and ecological variables would enable a much deeper understanding of the heterogeniety of fertility decline.

Given the huge effort that Mongolia has made to provide health services to the whole population irrespective of isolation or nomadic lifestyle, the overall high mortality levels are surprising. Perhaps one clue is in the lack of differentials between the cities and the rest of the country. The very efforts made to provide health care to the rural areas may have paid off and destroyed the differentials that are observed elsewhere in the world. Also it is possible that the ecological constraints in Mongolia may be largely connected with climate -which does not differ between urban and rural, and that low population density (and the advantages that confers in terms of water and faecal borne disease) annuls any slight advantage urban dwellers may have in terms of services.

Again more detailed examinations of disaggregated data will provide much more detail on the role of the different ecological factors, but the evidence suggests that they are very important.

Finally there is the issue of the role of women in Mongolian demography. The rapid fluctuations in fertility, the high maternal mortality and continuing high mortality during the reproductive years suggests that basic ecological constraints are being substantially modified by other socio-cultural or economic factors. Female education is now at the same level as male, women participate in the labour force and there is (relatively) good pre-school child-care provision. Despite all of this excess mortality in reproductive years persists and is another avenue for further research which may well throw light on the determinants of fertility change, both in the past and present.

Notes

[1] Policies affect demographic data both through deliberate manipulation of published statistics and as a consequence of people evading or exaggerating declaration of vital events or ages because of perceived benefits.

[2] For example the 1950 population count and the 1956 census both show a serious deficit of children aged 9 to 13. This pattern of age misreporting is almost certainly a consequence of "the campaign against illiteracy [which] was not started until 1947, and only the Second Five year plan (1953–57) aimed at compulsory elementary education from the ages of 8 to 11 years in the countryside and [from] 8 to 14 in the towns" (Murphy 1966:144). When schooling is still relatively optional, age misreporting can effectively render children ineligible. Once schooling is compulsory and controlled, the age misreporting disappears because it is no longer effective.

[3] All these figures are reproduced from Gur's unpublished manuscripts and I thank him for his permission to reproduce them. It is not clear whether he has corrected for underreporting of deaths, and how he has coped with the vagaries of the age misreporting in the 1956 census. I assume that underreporting is similar for males and females.

[4] There are two systems of data collection and production of vital statistics, via the Ministry of Health, and the civil administration. Theoretically both start with the same form, they appear to produce different results; it is not always clear from which source the data are obtained. This problem of two seemingly contradictory data sources needs to be examined further.

[5] The very rapid changes cited in the breastfeeding promotion magazine make one suspect the quality of the data.

[6] In fact the rise in the MMR is largely a consequence of change in defininiton to include deaths to all pregnant women rather than just those of 28 weeks gestation onwards.

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Sara Randall has a BA in Anthropology from Durham University and a PhD in Demography from the London School of Hygiene and Tropical Medicine. She has mainly worked in Mali, West Africa, researching the determinants of demographic differences in rural populations, with a particular interest in demography and health behaviour of Twareg nomadic pastoralists. She is currently lecturer in Biological Anthropology at University College London.