

Population and Family in Crisis: A Study of North-eastern Japan in the Late Eighteenth Century

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INTRODUCTION AND POPULATION TRENDS

In 1721, the Tokugawa government decided to carry out a population survey throughout Japan, by collecting population reports that had been investigated by every local lord and magistrate in their respective administrative area. The second survey was conducted in 1726 and after that it was carried out every six years. The last survey was undertaken in 1846. Among these 22 surveys, 12 have the figures for each province (kuni), and 10 have the population in each province by sex.

This was the first national population survey in Japan for which there is an available record. However, as with almost all pre-modern statistics, the population records were not at all accurate. There are several weakness including the lack of the warrior class population, the lack of children in certain local domains, and the intentional reporting of incorrect data. The national population was recorded as stagnating between 24 and 28 million, however, we now know that this number is an underestimate by about 5 million. Still these shortcomings can be ignored when we utilize it for drawing the population trends for each province or area.

Dividing Japan into three, according to the survey the population of north-east part was in decline, the central part was stagnat, and the south-west part was increasing. [Fig. 1] When we look at Japan in detail, the population trends of the 14 districts were as follows. On the Pacific side of Ou, Kanto, Kinai and Surrounding Kinki districts, population had decreased, and in the Hokuriku, Chugoku, Shikoku and Kyushu districts, population had increased. The decrease in Ou and northern Kanto were due to bad weather, the resulting poor harvests continued throughout the late eighteenth century. The decrease in southern Kanto, Kinai and Surrounding Kinki districts was the result of the over-urbanization of these areas. In Kanto, Edo had a population of one million, and in Kinai, Kyoto's and Osaka's respective populations were 400 to 500 thousand. These "megalopolis" were the product of the developing economic activities that Tokugawa Japan experienced. But more importantly they also had their urban network, with the middle- and small-size urban communities that were located in the same area.

By pre-modern standards, such huge urban populations create an urban

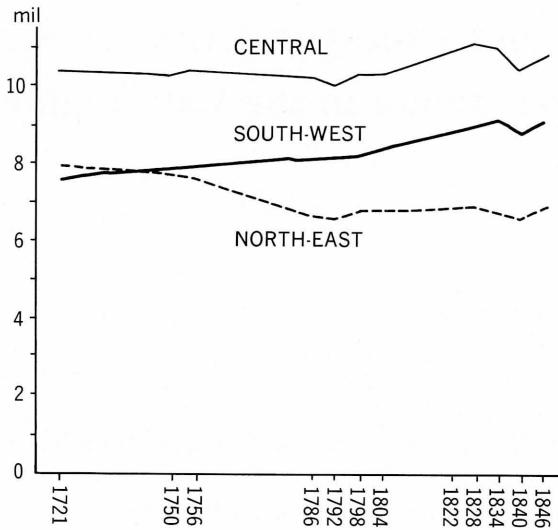


Fig. 1. Population Trend of Japan 1721-1846.

“graveyard” effect, or a negative feedback function between economic development and population growth in the area, so that population stagnated or even declined. Since the crowded urban conditions were very vulnerable to famine, epidemics and disasters, the natural growth rate for an urban population was negative before modern technology was adapted to urban living conditions. In the western part of Japan, on the contrary, where population growth was obvious, there were no huge cities and the urbanization ratio was low. There was no “graveyard.” The situation of the Ou district was similar to the western part, however, its population also declined. There must be some particular reason: the deterioration of the natural environment.

In the 1750s and 1780s, the climate of northern Japan was unusual. Both the summer temperature and the hours of sunlight were insufficient for rice cropping. In 1783, Mt. Asama erupted and the Kanto Plain was covered by volcanic ash. Agricultural production fell drastically, and coupled with the lack of food storage, ineffective administrative relief, and poor transportation led northern Japan to the great Tenmei famine. The severest ever recorded.

The author does not know if these unusual climatic conditions were peculiar to Japan or not. In the seventeenth century, when Europe was hit by a climatic crisis, Japan and North-east Asia enjoyed very high population growth which had never previously occurred. Perhaps the natural environment was suitable for such a development. The population of Japan increased from 12 million to 30 million and was accompanied by a huge amount of land reclamation for cultivation, which resulted in the extension of agricultural undertakings into marginal land. The eighteenth century crisis affected such marginal lands, particularly those in northern or high altitude parts of Japan. Under pax Tokugawa, everybody enjoyed prosperous economic development, and did not prepare for such a disaster.

We can trace the population trends in Mutsu and Dewa provinces, which consisted of Ou district, and also in the territories of 6 local lords. In Mutsu and Dewa, [Fig. 2] population declined throughout the eighteenth century, though it began to recover in the 1790s. The sharp decline of 1830s was the result of epidemics and famine, but we will not examine it in this paper. Mutsu had the more serious decline, between 1721 and 1786 there was a 20% loss. In Dewa it was milder with a 8% loss, and its recovery was quicker than in Mutsu. Mutsu had the higher initial population, but Dewa's population recovered the quicker and by 1822 it had returned to its initial population level. Because Mutsu is mostly on the Pacific coast and Dewa is on the Japan Sea coast, the crisis seems to be much serious on the Pacific side.

Six local lords population records are available. [Fig. 3] Setting the population in 1750 at 100, we can see that all the population was declining in the eighteenth century, with particularly sharp declines in the 1750s and 1780s. All initial population levels were higher than the last recorded populations. At the same time there were local variations. Soma decreased most drastically, as the 1780s population was at 60% of the 1750s. It was located on the Pacific sea coast and we can imagine that the cold summer weather hit this area most severely. In contrast, the population of Yonezawa was not affected so seriously, and again we should mention that Yonezawa was located in the Japan sea side.

The population decrease in 1750s can be seen in every domain but Nihonmatsu. These population declines are attributed to the so-called "Horeki famine," but the author would call attention to the fact that the decline occurred well before the 1750s and had continued for several decades. The "Horeki famine" hit during the long term trend of decrease and the subsequent "Tenmei famine" of 1780s visited here when the people were exhausted by a long series of continued disasters.

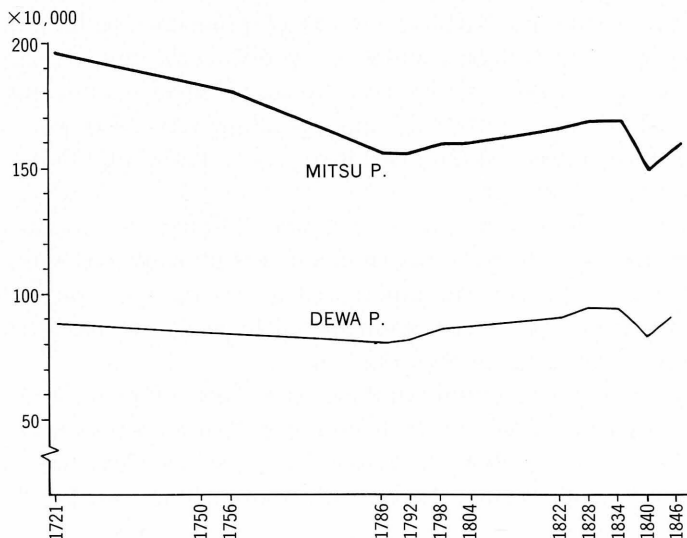


Fig. 2. Population Trends of Mutsu and Dewa Provinces —1721–1846—

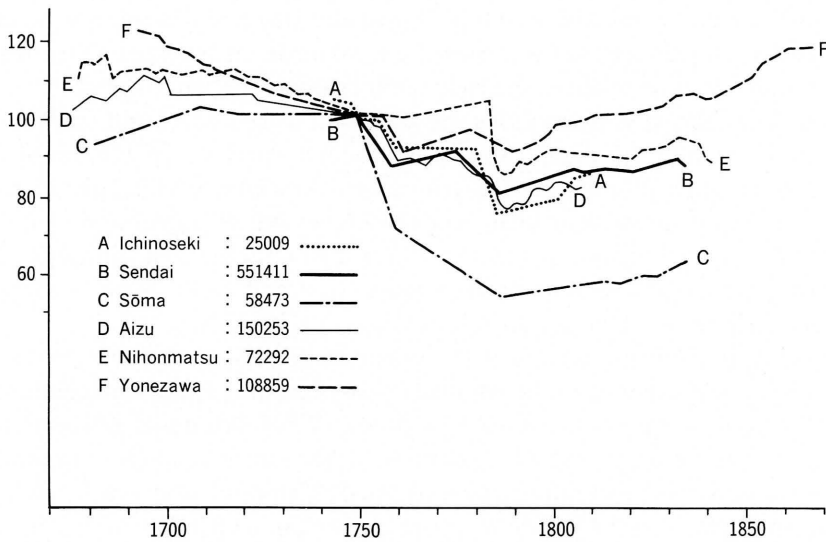


Fig. 3. Population Trends in 6 Daimyo Territories.

The famine in the northern part of Japan takes place because of cool summers caused by cold and wet wind from the Okhotsk high pressure system. Temperature does not rise to the required degree for rice growing and the misty weather causes a shortage of sunshine. These phenomena are much harder on the Pacific coast.

Next we will look at the population trends of an individual town and some villages in the Nihonmatsu domain. There are a very good series of population registers for the town of Koriyama-kamimachi, and the three villages of Shimomoriya, Hidenoyama and Niita. Koriyama was growing very rapidly into the local town. (the total population reached over 5,000 at the end of Tokugawa period). Shimomoriya was located at the foot of high land and would probably be the most directly affected by the bad climate. Hidenoyama was a neighboring village of Koriyama, and when Koriyama was urbanizing it became a suburban community. Niita was located in the flat area between Koriyama and the castle town Nihonmatsu, and thus had relatively good conditions for agriculture.

Thus the nature of these four communities were different, but we can assume that these are representative of the Nihonmatsu domain. The population survey began as early as the 1680s, compiled every year, and recording very minute items, perhaps one of the best population registers in Tokugawa Japan. Recently two monographic studies have been published for Shimomoriya and Niita.

According to the population trend of the three villages, [Fig. 4], Shimomoriya and Niita were almost synchronized, but Hidenoyama declined in the early eighteenth century and recovered quickly. The most severe decline was in Shimomoriya, at its bottom in the late eighteenth century its population was around two thirds of its 1740s peak.

Niita was similar, but its population began to decline in the 1770s and continued to

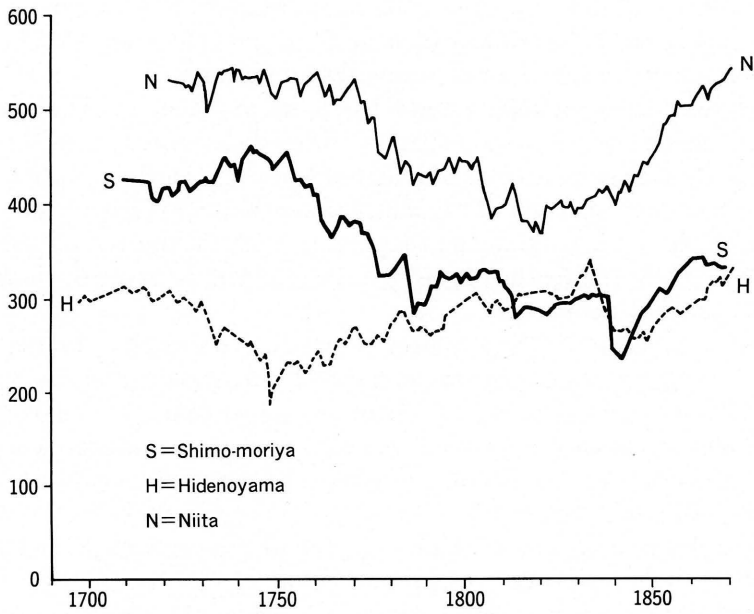


Fig. 4. Population Trends of 3 Villages (Shimo-moriya, Hidenoyama and Niita).

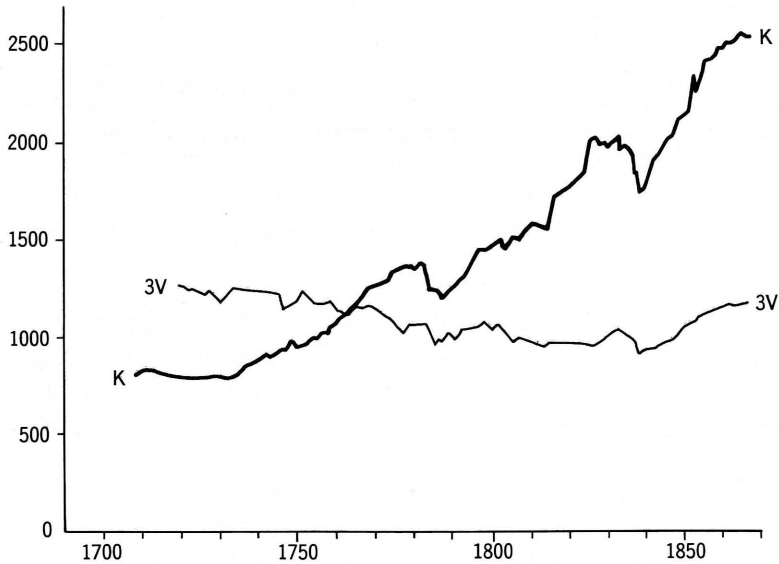


Fig. 5. Population Trends. (Kōriyama-Kamimachi and 3 Villages).

the 1820s, which was followed by a remarkable recovery that rapidly attained its population peak of the 1740s. Hidenoyama declined just before the "Horeki famine," but after that the population grew continuously for 90 years.

Thus the three villages population trends had different shapes, but as we can assume them as representing the trends of population in the Nihonmatsu domain, we can combine these trends and compare them with that of Koriyama-kamimachi. [Fig. 5] It obviously clear that the population of Koriyama grew remarkably, apart from two drops in 1780s and 1830s. At the beginning of register in 1709, the population was 799, but in the last year of 1868, it reached 2,462; 3.1 times larger, on in other words, the annual growth rate was around 1%.

On the other hand, in the three villages population continued to decline until the 1830s, which is the bottom of population trend of the period concerned. If we compare the population trends with that of the Nihonmatsu domain, the trend of the three villages was almost similar. In this area, the ratio of urban population was not high, possibly under 10%, thus the population growth of the towns would not explicitly affect the domain population trend.

As the Nihonmatsu domain was located at the southernmost area of the Ou district, it was probably not representative the population of Ou district. But, it is very remarkable that in spite of population decline as a whole, the urban population continued to increase. Such population increase would not occur if the economic activity stagnated.

POPULATION BY SEX AND SEX RATIO

Age and sex are the fundamental component of population. However, we can refer only to sex here, because age structure must be discussed after long time consuming project examining registers that is now in progress. Here I will investigate the trend of population by sex followed by sex ratio.

The population surveys of the Tokugawa government left us 10 records of the results of population survey in each province by sex. In Mutsu and Dewa, the population of both sexes can be seen as follows. [Fig. 6] In both provinces, the difference of population by sex became closer towards the end of the survey. In Mutsu, where the population decline was sharp, the female population was rather stable and population size seems to be controlled through the male population. Especially in the crisis years, the decline of male population was much greater than female population decline. In Dewa, although the whole population almost stagnated, if anything there was an increase in the female population.

Only for the Yonezawa domain do we have population trend by sex. During 170 years, the difference between male and female populations was also diminishing. [Fig. 7] The female population started to grow from 1750, much earlier than the post 1830 increase of the male population. In Yonezawa, there was no serious decline after 1750, so that its decline seems to have taken place without the influence of the environmental crisis.

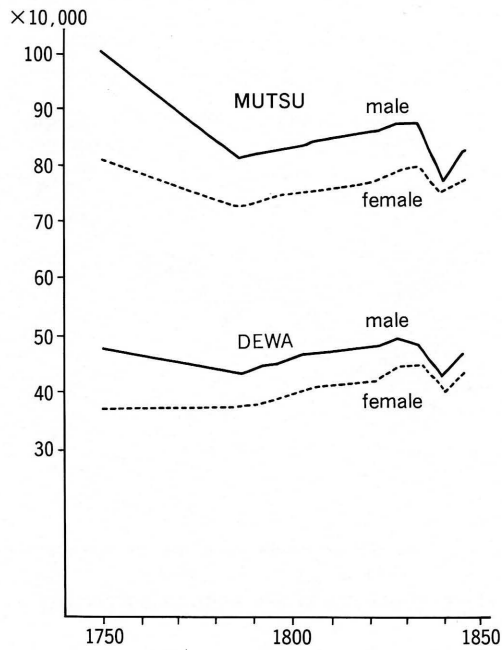


Fig. 6. Population by Sex in Mutsu and Dewa.

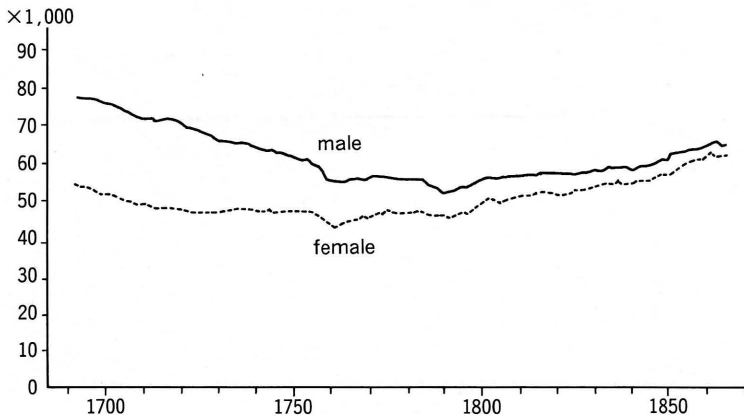


Fig. 7. Population by Sex in Yonezawa-han Territory.

In the Nihonmatsu domain, Koriyama had a large initial male population, by the 1770s there was no difference between both sexes, and after 1810, female population overtook the male population. [Fig. 8] In the combined three villages [Fig. 9], the difference was also disappearing. But it was only in 1820s that both sexes reached the same level. In the crisis years of the 1750s, 1780s and 1830s, the decline of the male population was much larger than that of the female population, but since in other

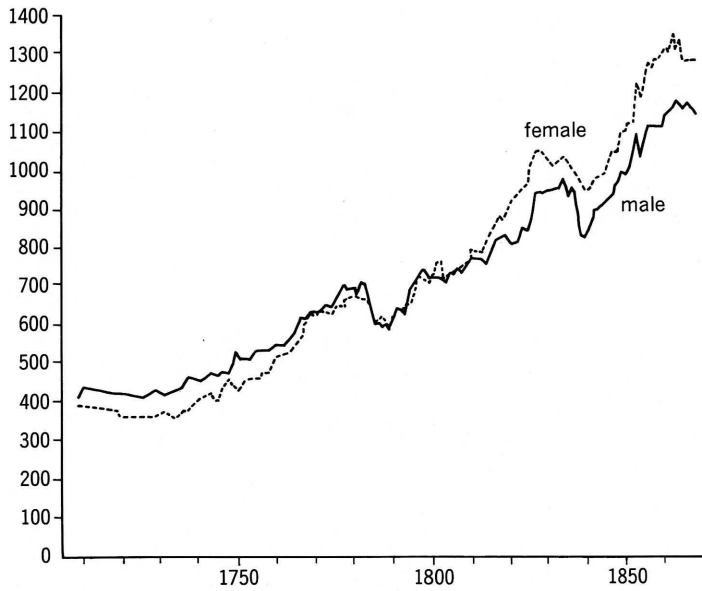


Fig. 8. Population by Sex. (Kōriyama-Kamimachi).

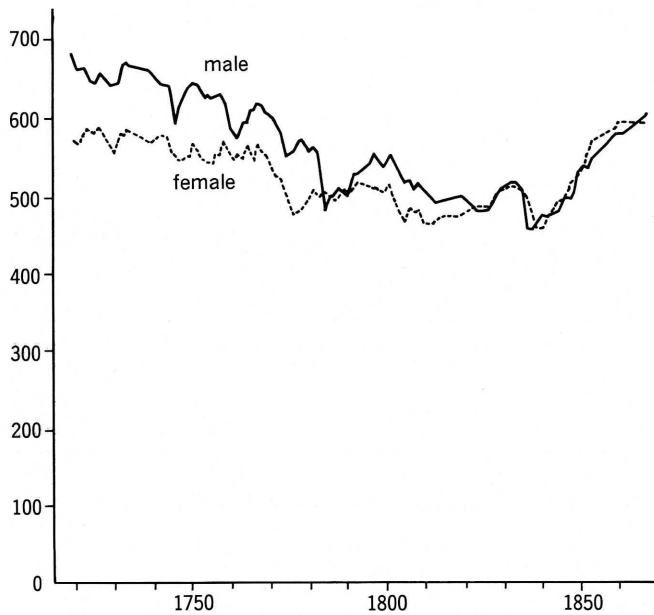


Fig. 9. Population by Sex in Three Villages.

periods there were minimal differences there is no direct relationship between the crisis periods and the change in the population structure by sex.

Regardless of population size, the component of population by sex can be described by the sex ratio. Here I express the sex ratio as the male index number when the female number is 100. Through the population survey conducted by Tokugawa government [Fig. 10], the sex ratio trend of Mutsu and Dewa paralleled each other beautifully. In the domain population, the case of Yonezawa [Fig. 11] indicates a drop from 150 in the initial period to 110 in the mid-nineteenth century. When this is juxtaposed with the provincial trend, they indicate a splendid synchronization. This tendency must be the common feature of the Ou district.

The decline of sex ratio can be seen in Koriyama and the three surrounding villages. It parallels Mutsu, but to a lower degree.

In any rate, as previously indicated, there was a significant reduction in the population difference by sex, and a decline of sex ratio in this district. The female population was rather stable, but the male population experienced wider fluctuations.

Several factors determine the decline of sex ratio. The first is the possible vanishing of the underregistration of the female population. However, according to a careful investigation of the population register in Nihonmatsu domain, there was no such underregistration. If such kind of underregistration was usual, there has to be numerous new entries of female population in the register that have no clear reason, but almost all entries appear to have peculiar reasons. We can discard underregistration as an explanation of the decline of sex ratio in this domain.

Secondly, there is the decline of female mortality or extension of life expectancy.

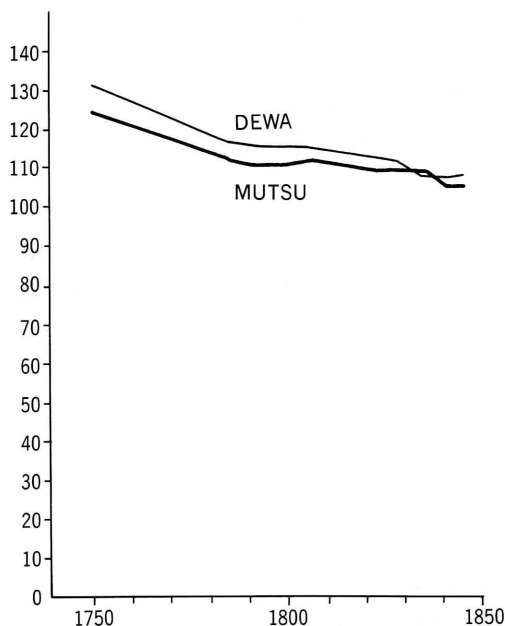


Fig. 10. Sex Ratio in Mutsu and Dewa 1721-1846.



Fig. 11. Sex Ratio in Yonezawa-han Territory.

There might be a differential mortality or life expectancy between the sexes, but before we can reach such a conclusion, we must calculate the mortality and life expectancy by sex from fairly large slice of population. The author is now undertaking this work using the population registers in Nihonmatsu and other domains in this district. At the moment, the differential mortality and life expectancy rate appear to be fairly small, and if they had any function their effect to the sex ratio would be slight. But this is a very important issue because it is connected with the changing position of females in society.

Thirdly, female infanticide was practised in Tokugawa Japan as a means of population control. Much has been spoken about this and the author does not deny its existence. However, there should be some reservations. Through the investigation of the registers of Nihonmatsu domain, the sex ratio at birth was rather normal: 102.7 in Shimomoriya and 109.2 in Niita. This contradicts the myth of the custom of female infanticide. If infanticide was undertaken, it was not done sex-selectively.

Lastly, we should take note of migration. If the difference by sex in out-migration and in-migration is large enough to affect to the existing sex ratio, migration can be a factor in dividing the sex ratio. But it seems that in terms of population drain there was no large sex bias. However, we should wait for the result of the investigation of the registers. It is true that a considerably large number of the male population once went to Edo or other urban districts from the villages of the Nihonmatsu domain, but at least half of them later returned to the village: Nihonmatsu domain was located with easy access to Edo.

At the moment, with the first reason already discarded, we have not found any decisive reason to explain the changing population by sex or sex ratio. As a whole, in Tokugawa Japan, in the middle of the eighteenth century, the sex ratio was very high in the northern and westernmost areas, but it was normalizing during the late eighteenth and early nineteenth centuries. Perhaps a combination of the second factor and a decline in the third factor would push the ratio down to the normal rate.

CRUDE DEATH RATE

The fundamental factor to determine population dynamics are birth, death and migration. Among them, birth and migration in the concerned districts can be only obtained through the investigation of the registers. Here we will observe death by the year end record of each register, and through them we will calculate a crude death rate (hereafter simply expressed as "death rate"). The accurate rate can be calculated only after a careful study of the registers.

The death rate in Koriyama and the three villages [Fig. 12] can be seen on the graph, calculated on a ten year moving average. These figures are far too low to accept as the mortality level for a pre-modern society. This occurs because of a weakness of the register which lacks infant deaths between birth and the first investigation. The number of infant deaths must have been high. A study which investigated pregnancy in the early-nineteenth century near to Nihonmatsu estimated that about 20% of babies died before the first register was compiled after their birth. Using this study we should add 20% more deaths (and births) to the number on the register. The original

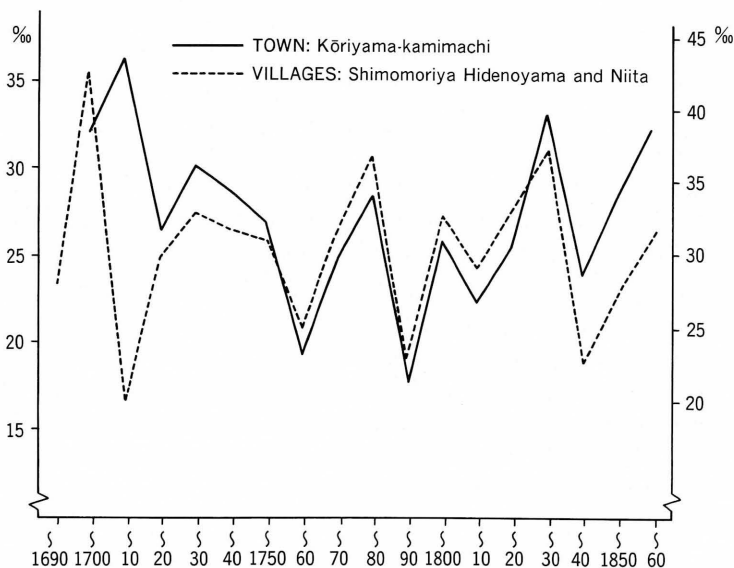


Fig. 12. Crude Death Rate.

figure can be estimated using the left hand scale, and the revised figure uses the right handscale.

At any rate, there is a strong correspondence between the mortality in Koriyama and its surrounding villages. The degree of fluctuation is rather high, between 20 and 40‰, in spite of being averaged on a 10 year period. But the decades having low death rate came just after the decades having high rates. This enables us to assume that in the decades with high death rates can be called mortality crisis years, the physically weak, the old and sick died, and in next decades their numbers would shrink. But again we badly need to obtain more accurate figures from further investigations of the register.

In Koriyama, the average death rate in whole period was 32.2‰, and in the three villages 29.9‰. The sample size is as follows: the number of deaths in whole period for Koriyama was 5,353, and for the three villages it was 3,739. Can we consider this slight difference as the "urban graveyard" effect? The answer is yes and no. Considering that the population of this town consisted of more age groups which had a low age specific mortality, even such a slight difference may make sense. On the other hand, on the graph, there are several crossings of the rate between Koriyama and the villages, so that the author will reserve judgement on the decisive answer to this question. We should examine the age composition and age specific mortality in Koriyama and the three villages.

The differential death rate by sex has no significance. The synchronization is impressive again. The residents of Koriyama and neighboring villages seemed to behave demographically in a similar fashion. The sex ratio of the death rate is generally higher for males than for females. Koriyama fluctuated in a wider range, and this might reflect the characteristics of an urbanizing population.

CONCLUSION

These observations are just the starting remarks of a historical demography of the district now being undertaken by the author, and there can be no definite conclusion. This same proviso applies to the relation with the change in environment. However, we can say that we should examine with great care the respective local data, because in the Ou district, there were numerous variations in population tendency, sex ratio, and so on. Even in the 1780s Tenmei famine, frequently regarded as a nationwide disaster, while some places were affected, some were not. Population in this district, generally speaking, declined in the late-eighteenth century. Still this contrast with the urban population growth in a town such as Koriyama, a flourishing market town, in which the residents were engaged in numerous economic activities. Population did not increase as a result of the inflow of displaced persons. Considering such variation, the preconception we might have that the Ou district was backward and poverty-stricken should be discarded.

Finally, this paper refers to just the southern half of Ou district. If the good records of the northern counterpart are found, it could alter the picture significantly.

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