Population and Family in Early-modern Central Japan

Chapter 5

Population Statistics from a Village in East Mino Province: Iinuma-mura, Ena-gun

1. The Village

Iinuma-mura, Ena-gun is located in a narrow valley in the northernmost part of Mino province, surrounded by mountains, in an area that falls under the old Iwamura domain. The objective of this chapter is an analysis of the classification and fluctuations of the population of the village, using SACs from the 157 years spanning 1712 to 1868. An account of the geographic profile of this area is necessary before beginning the analysis.

First of all, with regard to the population trends of four villages in Ena-gun, there was a 58% increase in the population of this *gun* (district) between 1656 and the Bunka/Bunsei eras (1804–1830). This is rather high compared with the 32% increase for the mountainous regions of Mino province or the 45% increase for Mino province as a whole.

Furthermore, it is worth noting that the average household size of 5.5 people was higher than the lowland mean even in the nineteenth century. In addition, although this is not in itself a demographic issue, examination of agricultural production in Ena-gun reveals no major reduction in the numbers of cattle and horses, as occurred on the Nōbi plain in the eighteenth century. The scale of the reduction in husbandry in the various districts in the mountains was small compared with other districts, but in this district, contrary to expectations, husbandry actually increased slightly. The visible features of household sizes and changes in the number of cattle and horses can be taken as evidence of how, in this region, the development of land- and labor-intensive management did not reach its full potential, unlike in the lowlands. The topographical conditions of the mountains may well be responsible for these features.

2. Sources and Methods of Analysis

A. Character and Treatment of the Sources

As regards the format for entries in the SACs for this village, those for Kami-mura, Ena-gun, which belonged to the same Iwamura domain, have already been published, so there

is no need to repeat the format here.[1] Residents of this village enter the data from age two until 1827, and then in some cases from age one until 1856. Adjustments were made by pasting slips of paper to the registers, permitting detailed knowledge of increases and decreases in population size, and the migrations in and out of the village so long as the slips of paper remain affixed to the registers. The volume of sources remaining is 71% of the possible total, or 112 of the above-mentioned 157 years.

The period of extant sources is comparatively concentrated, such that after several years, or even several scores of years of unbroken series of annual registers, there are breaks when the registers for several years are missing. If the period is divided into 25-year intervals, the period between 1801 and 1825 has the lowest data survival rate at 44%, and the period between 1776 and 1800 has the highest at 88%. From the long-term perspective, there is no great imbalance in the percentage of surviving sources between periods. The longest single continuous period for which years are missing from the sources is the seven years from 1747 to 1753, besides which there is one case of a missing span of six years, and one case of a missing span of five years. The registers are remarkably accurate with few mistakes such as missing entries, duplications, or record of age. There were only ten erroneous entries of age, a common problem in registers of this sort, and there were no missing records for the age of infants and young children with the exception of the age one entries.

Taken together, the accuracy of the entries, the format of the documents, and the number of extant sources make the SACs for this village excellent material for demographic research. However, researchers face the following problems: (1) No sources other than SACs are available for this village, and (2) this village lies close to the border with Shinano and Mikawa provinces in eastern Mino province in the far corner of the Nōbi region, and with the exception of Kami-mura in the same province, there are no other surviving sources known. Consequently, we lack the resources to determine how representative this village was for the region overall. Furthermore, one should probably cite another problem: (3) the population of the village is small—373 people at its peak and 266 people at its low point—so that random fluctuations may arise in the rates.

However, problems (1) and (2) may prove soluble on the basis of future survey results. Problem (3) cannot be avoided, and any analysis of a single village usually encounters this same problem. Nevertheless, as will be shown in this chapter, these problems can be kept to a minimum, and this research should be understood as constituting a single-case study within the context of the larger historical demographic research in the Nōbi region, which is the ultimate aim of the author.

Something that deserves attention in the records for this village is the presence of *kakae* (literally implies "dependents" as in "supported by the household;" one of several terms that may refer to hereditary servants, some of whom may be distant kin). In the

1 See *Gifu-ken shi, shiryōhen, kinsei* 4 (1968), pp. 405–424.

entries for individual households, certain members often appear whose relation to the head of the household is described as *kakae*. Moreover, *kakae* themselves often form dependent households within the larger family group, which migrate en bloc. The *Gifu-ken shi* (History of Gifu Prefecture) also records the existence of numerous *kakae* in the SACs for Kami-mura which belongs to the same Iwamura domain, and claims that "servants (both male and female) in the district of Ena-gun who came from other villages were *genin* and servants from the same village were *kakae*."[2]

However, in examining the *kakae* in this village, there are numerous cases in which taking this explanation at face value is fraught with problems. For example, someone may become a *kakae* because they are sick, or a *kakae* in any given year may become the head of the household the following year or, conversely, the family unit that was the core of the household supplying the household head one year may become a *kakae*, or dependent household, the next year. *Kakae* relationships can also exist between brothers and other such cases. What is inherent in the term for *kakae* is without a doubt the notion of people who are subordinate, or else people with the attributes of servants. Even if this is accepted generally, doubt still remains as to whether or not this system deserves such a denomination. Here, I would like to define the extent to which *kakae* has the meaning of "cohabiting kin." It is, of course, possible to estimate the difference in social status between the head of the household and the subordinate, but it is also essential to keep an open mind regarding both the nature and the extent of the subordination in this case.

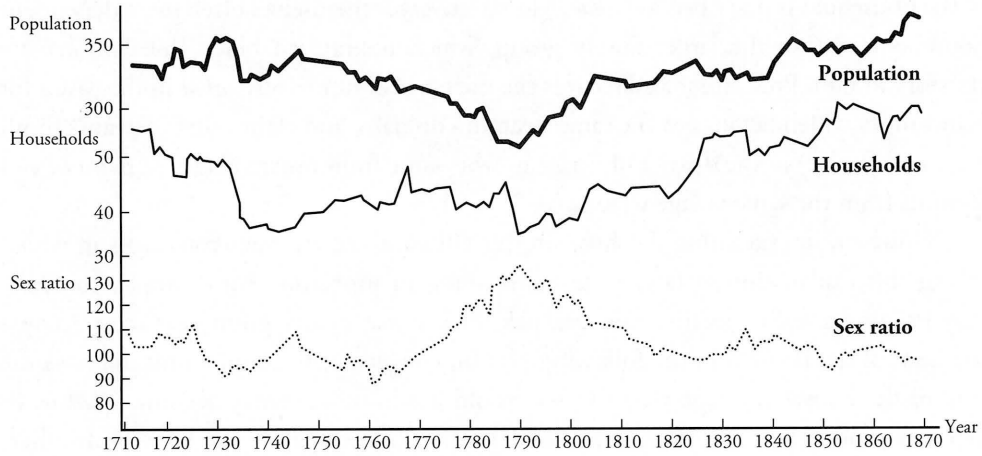
In this chapter, when compiling the statistics below, mean rates are often shown for a ten-year moving average. In other words, a decade according to the Western calendar (for example from 1751 to 1760) is taken as a single unit. This is because annual rates are based on only a small population, and are therefore extremely unstable. By adopting this method, short-term fluctuations occurring within any given ten-year period are rendered invisible. This in itself is a problem in that short-term fluctuations cannot be appreciated. Nevertheless, this problem is unavoidable when handling small populations, and, in the final analysis, can be solved only by collecting a large number of cases.

B. Population Trends

Fluctuations in both the village population and the number of households between 1712 and 1868 are shown in Figure 5-1. There are no major changes from start to finish in either the general population (333 in 1712, 369 in 1868) or the number of households (56 in 1712, 60 in 1868), but this does not mean that there was no fluctuation in the village population during this interval. According to the data shown in Figure 5-1, there was a sharp fall during the late 1780s, preceded by a period of stagnation and followed

2 Ibid., p. 20.

Fig. 5-1 Population, Households, and Sex Ratio



by a gradual rise in the latter period. The peak during the first half of the period was 355 in 1731, and in the latter half, the peak was 373 in 1869. If we divide the period at the lowest point of 266 in 1789, the mean rate of rise and fall per annum is −0.48% for the first half and +0.44% for the second half.

The latter figure is quite high for a premodern society, given that the mean annual fluctuation in population over such a long period of time, whether positive or negative, is 0.4 to 0.5%. Consequently, the extent of variation in population growth rates in this village can be said to be large. However, as can be seen in Figure 5-1, in the short-term, there is no drastic fluctuation in population trends. The largest fluctuation in the space of a single year is 16 people between 1727 and 1728 in the case of an increase (+4.9%), and 23 people between 1733 and 1734 in the case of a decrease (−6.7%).

The number of households shows almost the exact same trend as the population in the long-term, although there are exceptions, such as a drastic reduction during the Genbun era (1736–1741) and a rapid increase during the Bunsei era (1818–1830). The minimum number of households is 34 for 1789, as expected, and the maximum is 61 for 1867. On the basis of the number of households, there is a remarkable difference across the three periods: 1712–1732, 1733–1820, and 1820–1868.

If the abnormal intermediate period is excluded, the sex ratio is almost normal, as becomes clear from Figure 5-1, between 110–90 for the majority of years. However, for most of the twenty-five years from the 1780s to the early nineteenth century, it is 120 or more, and, in 1789, when the ratio was at its most gravely skewed, the figure reached 135. There was an overwhelming excess of men (the actual figures are, men: 153, women: 113). This also coincides with the year in which both the general population and the number of households were at their lowest. Taken overall, this epoch was an abnormal one for

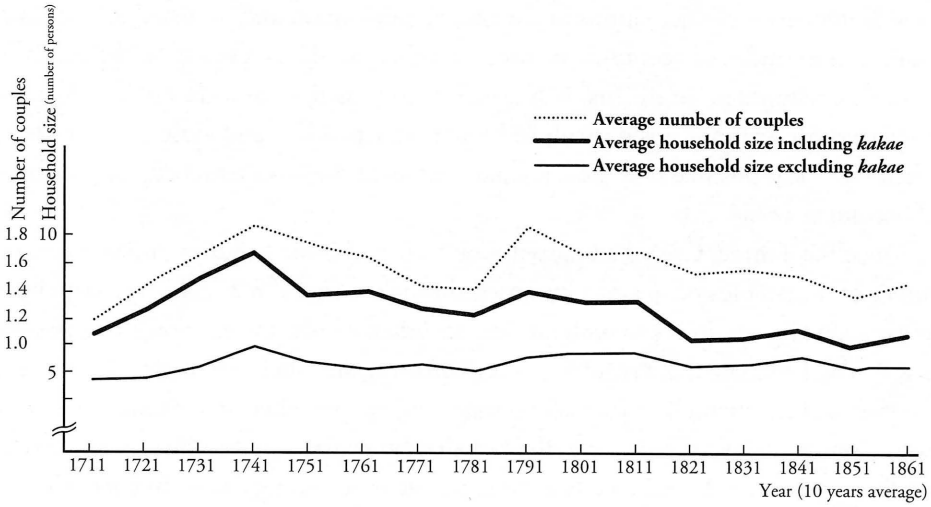
the population composition of the village, being an era that may be considered a time of population crisis. In this chapter, I will refer to this period as the "Tenmei Crisis" of the 1780s, after the name of the era in question.

Fluctuations in the size of the population were more striking for women than for men in the long-term, such that, whereas the maximum number of men was 183 in 1866 and 1867, and the minimum was 146 in 1760, the maximum number of women was 190 in 1866, but the minimum was only 113 in 1790. Although a correlation is visible between population fluctuations and sex ratio, it is difficult here to determine whether this is a random result due to the small sample size, or else whether there is some sort of direct cause and effect at work. I shall attempt to analyze this in later sections.

3. Household Size and Structure

As stated in the previous section, because there are almost perfectly parallel fluctuations between the general population figures and the number of households, there is no particularly great fluctuation in the mean size of households. Nor is it the case, however, that there is absolutely no fluctuation during these 150 years. Figure 5-2 shows the trend in the mean household size in ten-year intervals. Starting with 6.3 people in the first period (1710s), the figures rapidly increase to a maximum mean of 9.3 people in the fourth period (1740s), declining gradually thereafter to a minimum of 5.8 people in the fifteenth period (1850s). This trend reveals no particular relationship with the general population trend in the first half of the period. As regards the latter half, it is clear there

Fig. 5-2 Trends in Average Number of Married Couples per Household



is a correlation between the period of population growth after the ninth decade (1790s) trough and the period of reduction in the mean household size.

When all of the people who comprise a household are included in calculating the mean household size, the results are as shown above, but when this is calculated with the dependent households and servants excluded, the figures become comparatively stable at between 4.8 and 5.9 people, as shown in Figure 5-2. From the fifth decade onwards in particular, the range narrows even further to between 5.1 and 5.7 people. Consequently, there is almost no fluctuation whatsoever in the household composition when *kakae* and servants are excluded, and any fluctuations in the mean household size can be taken to have arisen exclusively from quantitative fluctuations in the number of these peripheral people.

In reality, the ratio of *kakae* and employed servants to the general population begins at 25.4% in the first decade and, after attaining a maximum of 38.2% in the third decade, declines to 35.6% in the sixth decade, 28.6% in the ninth decade, 15.6% in the twelfth decade (1820s), and reaches its lowest level of 13.3% in the fifteenth decade. This reduction is particularly striking between the sixth decade through the seventh, and from the eleventh decade through the twelfth. In the latter period, it is worth noting that the period of population increase coincides with reduction in the numbers of dependent households and employed servants. Moreover, with regard to the servants, their numbers were few from the outset (in the first decade, they comprised no more than approximately 6% of the total population). They tended to decrease still further thereafter, and by the ninth decade, had disappeared altogether.

With regard to *kakae*, as has already been stated, it is difficult to regard them as merely being a labor force in a subordinate social position. They increased both in absolute terms and as a proportion of the total population during the overall population decrease of the first half of the period and, the fact that they decreased during the latter half of the data period is interesting if fluctuations in the general population and in mean household size are taken as an index of economic fortune. In other words, as a result of changes in the economic environment in the first half of the period, there arose a class of people among the villagers for whom it was difficult to become independent and maintain a household of their own. It is possible that these people weathered the crisis by relying on nearby kin and becoming *kakae*.

Once the Tenmei Crisis had passed, however, economic fortunes improved and the number of households once again increased through such *kakae* becoming independent, thereby reducing the mean household size. In other words, the existence of *kakae* may possibly have functioned as a regulatory mechanism against such economic circumstances. Even if we assume that it is impossible to state explicitly whether or not *kakae* were, in the absolute sense, socially subordinate, the fact that both marriage and birth rates were low for *kakae* families can be reasonably assumed, so that becoming *kakae* thus acted as some

Table 5-1 Distribution of Household Size (%)

Household size	1712–1720	1761–1770	1811–1820	1861–1869
1	0.5	0.4	0	0.6
2	4.6	1.4	0.8	2.2
3	18.5	12.2	12.0	9.7
4	16.9	13.6	15.1	18.4
5	12.0	15.1	15.1	19.0
6	11.2	9.3	15.1	12.5
7	9.5	6.1	8.9	10.4
8	6.3	3.9	4.7	12.5
9	4.6	6.8	5.4	5.2
10	4.1	5.0	6.2	3.9
11	2.7	5.4	3.1	1.3
12	1.6	3.2	2.7	0.9
13	1.6	0	1.2	0.6
14	1.1	1.8	2.3	0.4
15	0.3	3.2	3.1	0.4
16	1.1	0.7		0.6
17	0.3	1.8		0.4
18	0.8	0.7		
19	0.8	0.7		
20	0.3			
Over 21	1.1	4.7	4.3	0.9

limitation on fertility.

These estimates assume a direct correlation between population and economic environment, but even if, hypothetically, population fluctuation and the economy are completely independent of one another, there is still no reason not to acknowledge the existence of *kakae* as a regulatory mechanism.

What then can be seen from looking at the distribution of household size? Table 5-1 shows the distribution of household size across four 50-year intervals. On the basis of this distribution, it becomes clear that small families were most prevalent in the initial and final periods. In other words, the number of households comprising three, four, or five people, which can be viewed as standard small families, reached 47% of the total in the first period, and thereafter, having declined to 41%, once again recovered to 47% in the final period. Although not shown in the table, in the short-term, this ratio is at its lowest during the 1790s, being no more than 22% of the total.

When, conversely, the proportion of large-scale households comprising ten or more people is examined, the trend moves through each period as follows: 16%–27%–23%–10%, and is at its highest across a short span at 28% during the Kansei era (1789–1801).

Fig. 5-3 Trends in the Ratio of Married Couples to Overall Household Composition

The largest household is one of 40 people, registered in the sources for 1733, which boasts 31 members of dependent households and 2 servants in addition to the 7 immediate blood kin, who are the husband and wife at the head of the house, their surviving mother, their son and his wife, another son, and one grandchild, making a total of 40. This large-scale household includes 8 married couples. Even supposing this case to be a rare one, this village in general boasts the special characteristic of a considerable number of large households that include a considerable number of dependent households.

Furthermore, there is no conspicuous peak in the distribution during the intermediate periods. This resembles the household distribution prior to 1800 of Suwa-gun, Shinano province, a village at the foot of Mt. Yatsugatake with topography similar to that of Iinuma-mura, which the author has observed previously.[3] But it is interesting to observe that the household distribution in this village resembles the distribution in the lowlands of the Suwa region during the first period, then shifts to copying the pattern of the mountains, before returning in the closing period to that of the lowlands.

Let us now examine the number of married couples per household. It is said that, in the Tokugawa period, stem families were the norm, and that this can be seen in the sources from every region. Figure 5-2 shows the trends in the mean number of married couples per household. In addition, Figure 5-3 shows the trends in the ratio of married couples to overall household composition. When this is viewed together with Figure 5-2, nearly parallel trends can be observed in the mean household size, but when the two are compared, it becomes clear that there is a relative difference in the level between the earlier and later periods, delineated by the cusp of the eighth decade. In other words, the mean

3 Hayami 1973, Chapter 3.

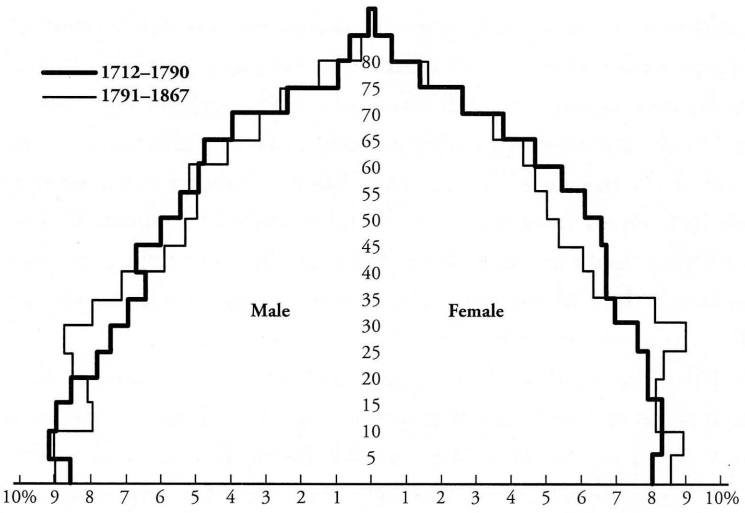
number of married couples increases *vis-à-vis* the mean household size more in the earlier half of the period than in the latter half.

What is the significance of this difference in level? Needless to say, the mean household size is lower in the latter half of the period than in the earlier half. However, the mean number of married couples does not fall proportionally. This fact is also reflected in the mean age at first marriage and the proportion of married, a topic which will be touched upon in a subsequent chapter. We must pay particular consideration to the fact that the average age at marriage falls and the nuptiality rate for young people rises. The mean rate of increase in the population of 0.4 to 0.5% during the latter half of the period, as shown in the previous section, can be explained by this fact.

4. Age Structure

To what extent is the age structure of a specific era significant in a village with a population of this size? As has already been stated, a remarkable difference can be seen in the population trends around the pivot year of 1789. Figure 5-4 shows the arithmetical mean for the ratios of each five-year age group to the overall population for both the earlier and later periods. Although the figure is uneven, this can be considered in part to be due to the fact that the extant sources are incomplete. The following features are evident from the figure. For the most part, the proportion of the population that is forty-one to seventy is higher in the earlier period, and the proportion that is under forty is higher in the later one. This contrast is more striking for women than for men. In the earlier period, the mortality

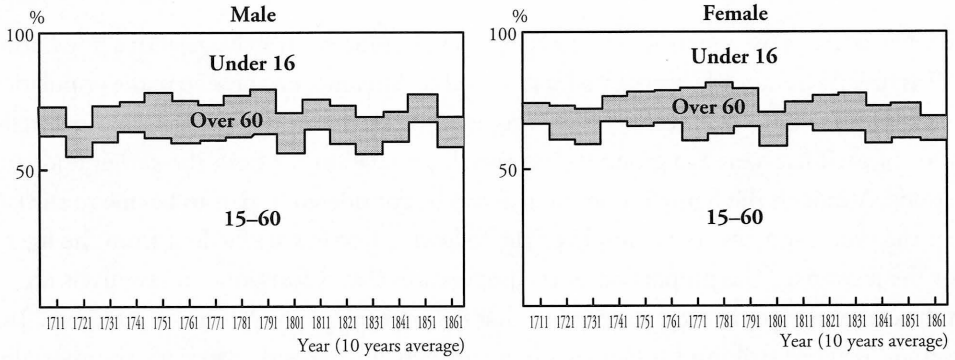
Fig. 5-4 Age Structure



rate among the young is comparatively high, but is higher in the later period among the middle-aged and elderly. This also fits theoretically with the fact that the latter half is a period of population growth. In addition, this pattern also tallies with the age structure of mortality, which is dealt with later.

Next, let us take the ratio of the population of productive age to the overall population by dividing the latter into three main groups: those under fifteen *sai*, those over sixty *sai*, and those in between. Figure 5-5 shows the ratio for men and women respectively taken at ten-year intervals. Those aged fifteen and below shrank in number until the ninth period (1790s), and thereafter an increase can be seen. Excluding the exceptional figures from the tenth period, this trend is particularly conspicuous among the women. However, it is difficult to divine long-term trends in the relationship between those of productive age and those of non-productive age.

Fig. 5-5 The Proportion of the Population of Productive Age



What is fascinating about the age structure of this village is the cyclical pattern of the fluctuations. Moreover, this cycle corresponds accurately to one generation. A small birth cohort at one point is due to a small marriage cohort in a previous era, with this small birth cohort leading to another small birth cohort a generation later and so on. If this phenomenon can be also observed both regionally and nationally, we shall have discovered an application of the so-called "Sund's Law." Table 5-2 shows trends in the ratio of the age structure in five-year intervals for men and women as a whole. Where the ratio is considerably higher than the mean, these places are shown in bold print within the table (up to fifth place in the ranking within the same age range); similarly, where they are low, in italics (ditto up to fifth place lowest).

It is clear that the trends faithfully repeat themselves. For example, decades one and two have high ratios of 1 to 5 year-olds, echoed up through the age pyramid until these children grow up to be the 31 to 40 year-olds in the fifth decade, where the ratio is still high. Conversely, decades seven and eight evidence a low proportion of 1 to 5 year-

Table 5-2 Age Structure (Male+Female: Age Groups 1–5 to 56–60) (%)

Periods	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI
1–5	**10.0**	**10.6**	8.0	8.6	*7.5*	8.3	*5.7*	*5.8*	**9.7**	**10.4**	*6.8*	8.6	9.1	*7.5*	*7.3*	**10.5**
6–10	**9.6**	**10.9**	9.4	8.3	*6.3*	*8.2*	8.7	*7.0*	*6.2*	**11.4**	*8.2*	9.3	8.9	**10.4**	*7.6*	**11.5**
11–15	*7.6*	**9.5**	**10.4**	*7.8*	8.2	*6.9*	8.8	8.6	*4.7*	7.9	**10.0**	*7.0*	8.8	**9.9**	**9.3**	8.8
16–20	*7.1*	*6.7*	**9.4**	**8.7**	8.6	*7.4*	8.8	**10.1**	*6.5*	*5.2*	**10.7**	7.6	8.4	8.3	**10.6**	7.7
21–25	**9.9**	*5.8*	**11.1**	9.1	*7.4*	*7.5*	9.2	8.5	**9.3**	*5.8*	**10.7**	8.2	*6.4*	7.8	**10.0**	9.1
26–30	**9.9**	*6.9*	7.0	**9.1**	7.6	*6.8*	*4.5*	8.6	**11.0**	6.5	*4.8*	**9.1**	*6.8*	7.8	7.4	**10.9**
31–35	6.9	8.7	5.9	7.3	**8.5**	7.0	*5.3*	*5.6*	**9.1**	**9.3**	*4.1*	**9.3**	**8.3**	*6.0*	7.7	7.9
36–40	*5.6*	**7.1**	6.4	6.6	**8.7**	7.0	6.9	*4.4*	**7.3**	**9.3**	6.9	*5.3*	**8.7**	*5.9*	**7.1**	*5.6*
41–45	*5.4*	5.5	**8.2**	*4.5*	**7.6**	**8.2**	6.4	6.3	5.8	**7.6**	7.3	*3.8*	**7.5**	7.1	*5.3*	5.6
46–50	**7.4**	4.9	*6.2*	6.6	**6.8**	**7.1**	6.0	6.7	*3.8*	6.2	**8.5**	*5.7*	*4.5*	**7.6**	*5.2*	5.9
51–55	**6.7**	5.5	*4.4*	**8.6**	*4.6*	**7.1**	6.6	5.9	5.4	*3.8*	**7.6**	**6.7**	*4.0*	6.4	5.6	*3.5*
56–60	5.1	**6.2**	*3.8*	*3.9*	4.0	5.1	**7.1**	**6.3**	**6.1**	*3.4*	5.1	**6.3**	5.3	*3.2*	5.8	*3.5*

Periods: I=1712–20, II=1721–30, III=1731–40, IV=1741–50, V=1751–60, VI=1761–70, VII=1771–80, VIII=1781–90, IX=1791–1800, X=1801–10, XI=1811–20, XII=1821–30, XIII=1831–40, XIV=1841–50, XV=1851–60, XVI=1861–69

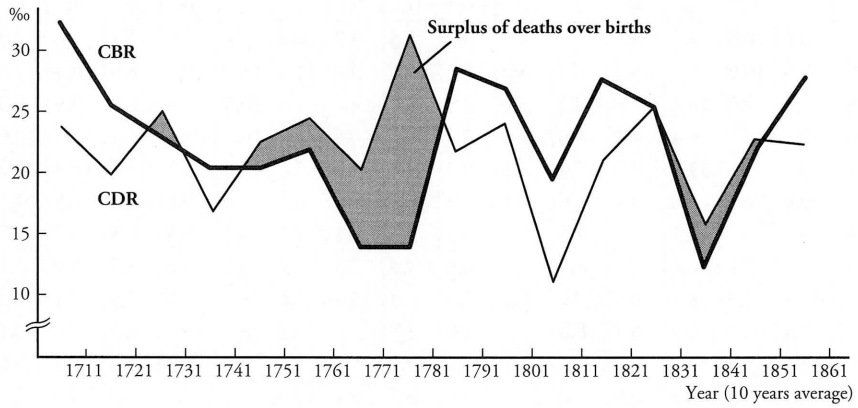
olds, but, by the twelfth period, it is the 36 to 45 year-olds who are comparatively few in number. When these ratios go through one complete cycle, this continues across an untold number of generations, provided there is no fluctuation due to a boost from the outside.

5. Births and Deaths

It is not possible to eradicate all inconsistencies from the information that can be gleaned from the SACs, but this does not mean that the observations regarding births and deaths are meaningless. Certainly, it is not possible to determine the number of births and the number of deaths in the strictest sense, but, nevertheless, sufficient observations can be made regarding survivors until the age of two and their subsequent deaths. Provided that the observational methodology is the same, it is possible to compare demographic measures for different regions for the same period, and, for this reason, the compilation of both birth and death statistics is, as might be expected, is an important basic task for historical demography.

Figure 5-6 shows the trends in both the crude birth and the crude death rates. As the population at risk is small, mean rates are shown for ten-year periods. The shaded area shows an excess of deaths over births. If this is compared with the population trends in Figure 5-1, it coincides with the periods when the population fell. Conversely, the period of expansion is the period in which the birth rate exceeds the death rate viewed in the

Fig. 5-6 Crude Birth and Death Rates



long-term. It is therefore clear that the rise and fall of the population in this village is entirely due to the rate of natural increase.

Although both crude birth and death rates fluctuate quite dramatically, the death rate fluctuates more. Famine and epidemics are the most likely causes of such patterns. Years in which the crude mortality rate exceeds 40‰ include 1712, 1722, 1733, 1756, 1768, 1783, 1784, 1800, and 1855. Of these, the mortality rate is abnormally high in 1733, with twenty-three deaths, or a mortality rate of 67‰, and 1783, with twenty deaths, or a mortality rate of 69‰. The year 1733 coincides with the Kyōho Famine, caused by locusts which attacked western Japan. 1783 marks the beginning of the notorious Tenmei Famine, with poor harvests nationally. The high mortality rates for both years within the village reflect these incidents. On the other hand, however, absolutely no effects whatsoever can be seen in the years of the Tenpo Crisis of 1837 to 1838. On the whole, attention should be paid to the fact that, in the first half of the period, there are many more years with high mortality rates than in the latter half.

When we examine the twenty-three deaths that occurred in 1733, ten of the victims are aged five or under, and two of them are aged between six and ten, so that these two age groups alone account for more than half the total figure. Deaths in this year can be understood to have been concentrated among the young. Nevertheless, in 1783, where the mortality rate was similarly high, of the twenty victims, only two were aged five *sai* or under, and only one was aged between six and ten, whereas four victims were in their twenties. Deaths in this year were mainly among young adults, rather than the very young. The mortality rate among people in their twenties is extremely low in normal years. Although one must be cautious not to extract too hasty a conclusion from such a sparse number of cases, the figures suggest that, even among age groups with high mortality, the rate varies dramatically depending upon the circumstances, so that the large volume of

deaths in both years cannot be considered as being due simply to both the Kyōho Famine and the Tenmei Famine. In all subsequent analyses, it is necessary to consider in detail the attendant causes of these deaths.

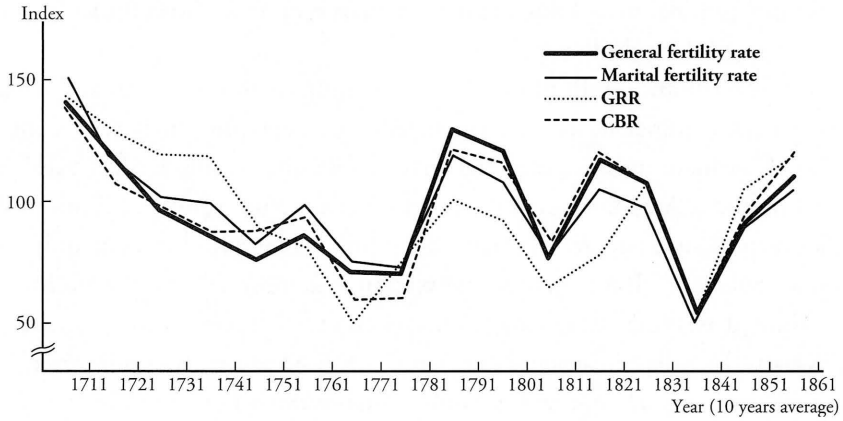
The crude birth and death rates give us the contours of both birth and death, but these alone are not sufficient indices. For detailed demographic analysis, it is necessary in the case of births to measure the total fertility rate, the marital fertility rate, and the gross or net reproduction rate and, in the case of deaths, to measure age-specific mortality, average life expectancy, and to construct life tables. These are, however, only possible with large populations. The larger the population, the more reliable the statistical rates obtained. Rates determined from small populations of only approximately three hundred people, as with this village, can only ever have very limited meaning. However, here let us discuss several measures not as rigorously accurate rates, but as indices suggestive of broader trends.

The total fertility rate, that is, the number of births to women of child-bearing age, is easy to determine. The same also holds true for the marital fertility rate, which is the number of births to married women of child-bearing age. When the mean rates are taken for the period as a whole, the total fertility rate is 92.7‰ and the marital fertility rate is 139.6‰.

On the other hand, the reproductive rate—that is, the number of girls passed on to the next generation by one woman, or the number of girls who reach adulthood—can be determined only approximately by cross-sectional analysis, both for the gross reproductive rate (GRR) and the net reproductive rate (NRR). In order to be more accurate, a time series analysis is required. As this chapter is mainly based on cross-sectional analysis, because of the many gaps in the sources we are examining, time series analysis will have to wait for later consideration. However, it is possible to derive an approximate rate of 2.3 for the gross reproductive rate, by subtracting female births from the marital fertility rate and supposing that all the married women remained married between the ages of sixteen and fifty.

Figure 5-7 shows a comparison of the trends in these three indices and the crude birth rate in ten-year intervals. Excluding the crude reproductive rate, the indices fluctuate almost in parallel. Of these, the marital fertility rate is considerably higher than the total fertility rate during the first half of the period, but in the latter half, it drops considerably below it, which can be taken as an indication of long-term trends. It is best to think of this difference as the result of changes in the relationship between the proportion married and the mean age at marriage, which is discussed later. In other words, it is a result of the mean age at marriage falling, whilst the proportion married rises. Furthermore, no matter which rate is used to show reproductive capability, attention should be paid to the fact that they all bottom out in the seventh and eighth decades (1770s and 1780s). From then on, such low rates are not seen, with the exception of the fourteenth decade.

Fig. 5-7 Composition of Fertility Rates



As has already been stated, 1789 was the lowest point in the fluctuation of population. However, the various fertility rates reached their lowest points somewhat earlier than this, in the seventh and eighth decades, then saw a welcome increase in the ninth decade. This pattern reflects the influence of external factors such as famine and epidemic disease, which magnified the number of deaths during the eighth decade, thereby affecting total population size. Even taking such strong influences into consideration in the short term, in the long term it has been shown that these influenced neither the population structure nor fertility itself.

As a result, population recovery was rapid. This may be because, as stated earlier, few of the victims were infants. In contrast, in 1733, many of those who died were infants, which, combined with a period of reduced fertility, meant that no recovery can be seen in the general population, and this downward trend continued long term.

Let us start here to make more detailed observations on death. Firstly, if we group the deceased by age, we can determine age-specific mortality rates, survival rates, and mean life expectancy. However, this gives rise to specific problems as to whether to base figures on the death cohort (taking deaths within a given fixed period as one unit) or on the birth cohort (taking births within a given fixed period as one unit). If the death cohort is chosen, the number of cases will be affected by any major fluctuation in the age structure of the population, and the reliability of the results thereby obtained falls. If the birth cohort is chosen, however, the rates are reliable, but the number of cases is small, because all of the people born in a given year do not necessarily spend their entire lives in the one village. Women in particular must be considered carefully, as their migration due to marriage can often be extreme.

First of all, let us take the birth cohort as the standard, with its excellent degree of reliability. Here, the birth cohort is determined not by individual time series analysis, but

Fig. 5-8 Survival Rates

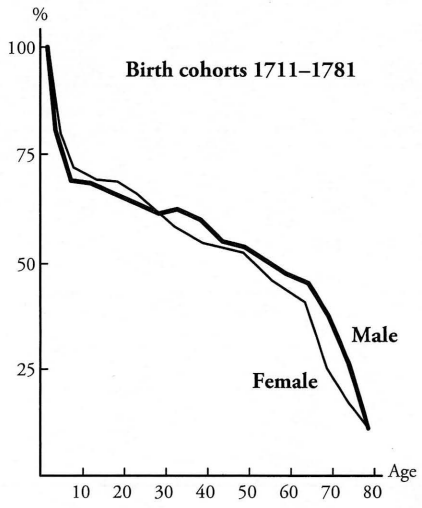
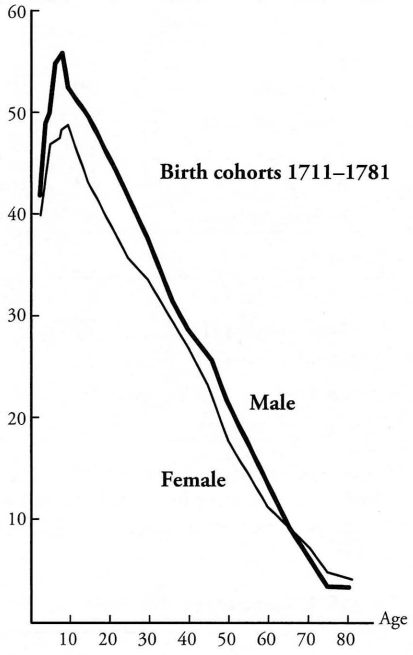


Fig. 5-9 Life Table



from the age and date of death. For example, a woman who died at age thirty in 1753 is taken as having been born in 1724, regardless of the fact that she might have been born outside the village. Here, one cohort is taken to be one hundred each of both men and women born between 1711 and 1781 by year of birth.

Figure 5-8 shows the survival curve for this cohort, and Figure 5-9 is the generation life table. The former shows that the survival rate drops remarkably among children under the age of ten and adults aged sixty or over. Furthermore, a comparison between the men and women reveals that there are far more women than men in their twenties, but that thereafter, the men are predominant. This is probably due to the death of mothers during childbirth. However, the age at which the survival rate cuts off at 50% is fifty-five *sai* for the men and fifty *sai* for the women, which would seem rather to support the tradition that "a person's lifespan is fifty years."

The mean life expectancy can be compared over three periods of roughly forty to fifty years. The gap between 1801 and 1825 is because the number of surviving documents from this period is low. Deaths occurring during these three periods are labeled death cohorts I, II, and II, respectively.

The age-specific survival rate is shown in Table 5-3 and the mean life expectancy is shown in Table 5-4. For comparison, rates based on birth cohorts have been included as well. From these tables, the fluctuations by era, which cannot be measured using the birth

Table 5-3 Survival Rates by Age (%)

Male \ Age	3	15	30	45	60
Death cohort I	90	69	56	48	33
Death cohort II	92	76	72	61	47
Death cohort III	95	80	71	60	42
Average	93	75	67	57	41
By birth cohorts	89	66	62	54	47
Female					
Death cohort I	89	70	58	49	34
Death cohort II	95	77	67	55	45
Death cohort III	97	84	68	54	41
Average	94	77	65	53	41
By birth cohorts	92	70	60	52	41

Death cohort I=died between 1712 and 1750
Death cohort II=died between 1751 and 1800
Death cohort III=died between 1821 and 1869

Table 5-4 Life Expectancy by Age (*sai*)

Male \ Age	2	5	10	15	30	45	60
Death cohort I	39.4	48.8	54.2	55.4	63.2	68.1	73.7
Death cohort II	47.6	55.6	61.2	61.2	63.3	68.2	72.6
Death cohort III	46.4	52.9	56.6	57.1	61.4	66.0	72.1
Average	44.8	52.7	57.6	58.1	62.6	67.4	72.7
By birth cohorts	43.8	55.4	62.0	64.2	67.0	71.0	76.7
Female							
Death cohort I	39.4	50.4	53.8	54.9	61.4	66.1	71.5
Death cohort II	45.8	54.6	58.6	58.6	63.8	69.8	72.9
Death cohort III	46.9	50.2	54.3	54.6	62.1	68.7	73.2
Average	44.3	51.9	55.7	56.2	62.6	68.4	72.7
By birth cohorts	41.7	51.9	57.8	57.8	63.6	67.7	71.5

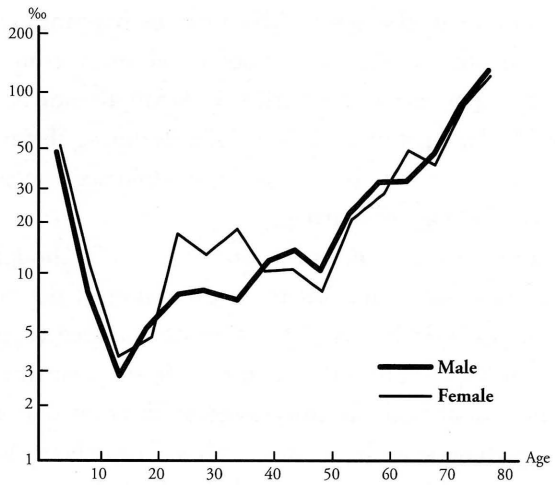
Death cohort I=died between 1712 and 1750 (m=104, f=112)
Death cohort II=died between 1751 and 1800 (m=127, f=141)
Death cohort III=died between 1826 and 1868 (m=128, f=128)
Birth cohorts=those born between 1711 and 1780 (m=100, f=100)

cohort, become clear. The mean life expectancy improves considerably among the young, but, for those aged thirty or over, there is no major improvement and, indeed, there are occasions when the reverse is true. This is also expressed in the survival rate. From these observations, the first evident point is that there is a considerable reduction in child mortality. Among the middle-aged, the results are most likely evidence of an increase in tuberculosis and measles, which affected adult mortality. On the other hand, when we

attempt a comparison of these figures with those obtained from the birth cohort, they are almost identical, with the exception of a considerable difference for men aged fifteen to thirty.

Finally, age-specific mortality is shown in Figure 5-10. The death cases are the total of death cohorts I, II, and III, which are then juxtaposed with the classification by age of the population of the period to which they belong. Since the totals are given in five-year intervals, any major fluctuations within the same age band, as in ages one to five, are obscured. From this figure, mortality rises after reaching its lowest point in the early teens, for both men and women, but, for women in particular, it is notoriously high in the twenties and early thirties, namely, during their most fecund period, being almost double that of the men. As has been repeated many times, this is due to death during pregnancy and childbirth. In addition, mortality for both men and women rises rapidly from the age of fifty onwards.

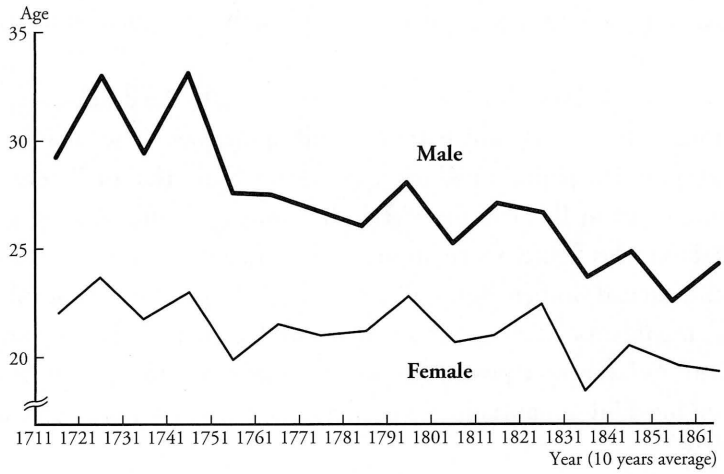
Fig. 5-10 Age-specific Mortality Rates



6. Marriage

As indices of marital behavior, we can determine the mean age at marriage and the nuptiality rate. Figure 5-11 shows the mean rates for marriage age in ten-year intervals for marriages considered to be first marriages. It is not always possible, however, to be sure that a marriage was indeed the first. From this figure we can see a clear fall in the age at marriage. This is particularly striking for the men. Over one hundred and fifty years the age falls by eight years for the men and four years for the women. This decreasing trend in the age at marriage is the exact opposite of that obtained in research to date on agricultural

Fig. 5-11 Average Age at First Marriage



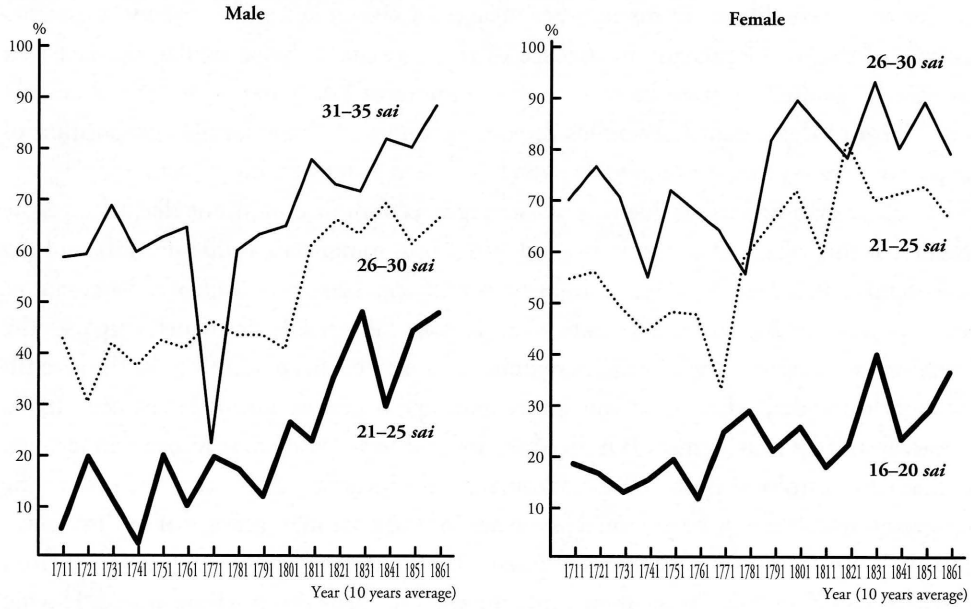
villages during the Tokugawa period.[4] The relationship between age at marriage and the village's economic environment, changes in which can be hypothesized from changes in the total population and other factors, is not so simple to determine. One reason for this that must be cited is that marriage practices in Japan are not necessarily correlated with economic factors. In Japan, and in farming villages during this period in particular, the existence of the "*ie*" system may be said to have weakened the correlation between economic fluctuations and the age at marriage.

Impediments to a reduction in the age at marriage can be thought of as generating an increased birthrate, which in turn leads to an expansion of the population. In spite of this, the fact that a reduction in the population can be seen suggests some kind of force operating against an expansion in the birth rate. In this case, the "force" is artificial birth control. Some method of birth control was most likely introduced into this village, probably around the eighth decade (the 1780s). As has already been shown in Figure 5-2, the relative numbers of married couples and the relative mean size of the household differed strikingly around this time. In other words, the number of children per couple clearly shrank. Nevertheless, fertility rates actually rose. Even supposing infant mortality improved, such an improvement would still be insufficient to explain the rise in these rates.

This fact becomes even more evident when the nuptiality is broken down by age. Figure 5-12 shows the number of people married in ten-year intervals, in age groups of 21 to 25 *sai*, 26 to 30 *sai*, and 31 to 35 *sai* for the men, and 16 to 20 *sai*, 21 to 25 *sai*, and 26 to 30 *sai* for the women. No matter which group is chosen, the tendency towards increase over the long term is striking. For example, in the male 26 to 30 *sai* group, the nuptiality

4 Ibid., Chapter 2.

Fig. 5-12 Trends in Proportions Married in Different Age Groups



rate prior to the tenth decade (the 1800s) was approximately 40%, but this rises to between 60 and 70% from the eleventh decade onwards. For women also, in the 21 to 25 *sai* group, the figures fell to less than 50% from time to time in the first half of the data period, but in the latter half, 65% or more became the norm. The figures begin to climb conspicuously for men from the tenth decade onwards, and for women, between the seventh and ninth decades. Otherwise, a sharp reduction can be seen for men aged between 31 and 35 in the seventh decade, but this is no more than a temporary blip.

7. Conclusion

What do the above statistics compiled from SACs from this village tell us? As has been stated repeatedly, the statistics are not yet all in place, yet, even so, various interesting facts can be pointed out.

The various population indices from this village for the first half of the period for which sources are still in existence appear to show the typical characteristics of the peasant population of Japan found during the latter half of the Tokugawa period. In other words, households are small, and the age at marriage is comparatively high. Throughout the

eighth and ninth decades (1780–1799), however, the various indices are in fact running counter to the conditions in many other villages in several key ways. The most extreme example of this is the increase in the size of the household. In particular, the fact that this mostly resulted from an increase in the number of kin living under the same roof in the form of dependent households directly counters the basic family composition of Tokugawa period peasant households, which followed a stem-family pattern.

In all probability, this is due to a worsening in economic conditions that affected the peasants in this village. As a result, nuptiality declines somewhat, as does fertility and the total population is thereby reduced. Infant mortality can be seen to improve, concomitant with a slight extension of life expectancy, but fertility falls to a degree which surpasses the reduction in mortality. The nuptiality switches tack and begins to climb from the seventh and eighth decades, whereupon the age at marriage begins to fall. A latent capacity to increase fertility is thus formed. But this does not lead to an immediate recovery in fertility. Population control was probably spreading around this time. The natural increase in the population which might be expected as a result of the potential increase of fertility never took place. Far from rising, we see a sharp reduction in the general population in the latter half of the eighth decade. At the same time, the sex ratio also becomes imbalanced. Having passed through this period of what can be called a population crisis, the population begins a gradual recovery and increases thereafter at a standard annual rate of 0.4 to 0.5%.

For this reason, the fall in the latter half of the eighth decade is only short-term, before which the population had already equipped itself with the power to recover. The periods of expansion in the village population were evidence of the capacity for recovery possessed by the peasants of the Tokugawa period. Consequently, this period can be called not the gradual establishment of an early modern order, but the recovery of such an order. Demographically, however, it is necessary to pay attention to the major difference between the two periods. This is undoubtedly because population limitation was practiced in the second period. Since infant mortality rates experienced widespread improvements, as the age at marriage fell and the number of married people between the ages of twenty-one and thirty, which is the most fertile period, rose conspicuously, fertility levels were also maintained at their highest.

For example, under the same conditions, the mean normal fertility rate reached 40‰ in the Suwa-gun, Shinano province from the seventeenth through the beginning of the eighteenth century,[5] and also reached 35‰ in the new settlement development region of Owari province, as seen in Chapter 2. This hints at there probably being no birth control, and it is thought to be one standard measure of fertility for women in agricultural villages for whom the mean age at marriage is around twenty *sai*. Consequently, the fact that the fertility is lower than this here suggests that there was some additional form of artificial

5 Ibid.

birth control being carried out.

This, in turn, gives rise to the problem of what conditions cause major changes in these various population indices? Certain factors can be understood as autonomous effects within the population itself. However, when external conditions are taken into consideration, the possible range of factors expands infinitely. It is not just social and economic conditions that affect the population. Natural changes are also at work, be they short-term or long-term. In order to solve these problems, it is necessary to widen the sphere of observations even further.

Changes in household size also accurately reflect these conditions. Normally, the tendency is for size in the initial period to be high, and gradually decrease thereafter, but here there are two phases of rise and fall, with the peak in eighth decade. This suggests that peasant families who were unable to become independent and leave the nest weathered the periods of crisis by gathering even closer together.