Demographic Observations of Reclaimed Farming Land on Ise Bay in Owari Province: Kando-shinden, Kaisai-gun

1. Kando-shinden

In this chapter, I will analyze the historical demography of Kando-shinden, Kaisai-gun, Owari province, which has SACs for 89 years in an almost unbroken sequence spanning the 94-year period from 1778 to 1871.[1]

Kando-shinden lies approximately ten kilometers west of the border with Nagoya in what is today Yatomi city, Aichi prefecture. This locality is a typical delta, where the Kiso, Nikkō, and Shōnai rivers flow into the Ise bay, the land of which was reclaimed rapidly from the beginning of the Tokugawa period. This village was developed during the Hōei era (1704–1711) by the Nagoya lumber merchant Kandoya Bunzaemon, and is therefore an example of *chōnin-ukeoi-shinden* (land newly reclaimed by contracting with a merchant). Ōishi Shinzaburō and Kikuchi Toshio have already published research regarding the development of these new settlements.[2] Let us here examine exclusively demographic indices.

This *shinden* (new settlement), to which 19 peasant families were transplanted, was initially named Taihōmae-shinden, but this was changed to Kando-shinden from 1814. In addition, at the start of this year, we have been able to identify an important difference in the content of the SAC entries. The first SAC still in existence dates from 1778, and the number of households at that time according to the records was 29. This number scarcely changes at all until 1813, but in 1814, there is a sudden increase to 47 households. Furthermore, prior to 1813 no consistent rule was followed for recording infants and in many cases children under eight or nine were not entered into the individual peasant records. From 1814 onwards, however, children are entered consistently from the age of two or even one, excluding what were probably cases of simple oversight. Consequently, the credibility of the sources from this year onwards increases as a result.

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1   The sources are stored in the National Archives of Japan.
2   Ōishi 1951; Kikuchi 1954.

Although the total population increased, the number of households decreased, so that in 1813, there are even appearances in the records of a single household whose members exceed 20. This, however, does not reflect the reality, and was likely for form's sake. These circumstances can be explained by the emergence of new hamlets that had broken away from Kando-shinden. In addition to the original village, SACs dating from 1826 onwards record names of new settlements developed by the peasants from Kando-shinden, such as Fukuoka-shinden, (encompassing Sasano-gō, Kodai-gō, Shimono-gō, Izumi-gō),[3] Masanari-shinden, Hachiho-shinden, Asahi-shinden, and Yokomakura-shimoshinkai. These settlements and hamlets were named once the land reclamation was completed and people took up residence there. In the SACs of Kando-shinden it was recorded that people were living in these places (for example, "Gone to live in a cottage built in Fukuoka-shinden, Sasano-gō"). According to the sources, all of these cases were branch households established simultaneously in 1814.

In addition, the origins of each individual house are recorded in SACs dating from 1831 onwards, for example, "Moved from Higashi Fukuda-mura, Kaitō-gun in 1708," or "Went to live in a cottage built in Fukuoka-shinden, Sasano-gō, as a branch family of Shinzaemon, in 1803." The former note refers to one of the peasants who developed the new village and the latter refers to a later branch family. Moreover, branch families who went to live in cottages built in new settlements after the founding of Fukuoka-shinden were not established overnight in 1814 as suggested previously, but clearly developed gradually from 1803 onwards. If the records are taken to be accurate and we trace the branch family lineages backwards, the large-scale households that appear in the sources up till 1814 disappear, and it becomes evident that several small families had already become independent and were living elsewhere in reality, but were entered in the sources as if they were still living together.

Here, the circumstances surrounding the name change of the village in 1814 are relevant. Fukuoka-shinden, which had not been officially recognized previously, gained official recognition in this year, and people who had been living there hitherto and had been entered in the records as they were before the family branched were henceforth entered as independent peasants. Thereafter, new settlements gained official recognition when new land was reclaimed for settlement and permanently habitable villages established.

Incidentally, because this village was a *chōnin-ukeoi-shinden*, a newly reclaimed village by merchant investment, the SACs were submitted to the merchant landowner Kandoya Bunzaemon, who kept the records himself, rather than directly to the bureaucrats of the territorial lord, as was generally the case with the SACs from other villages. However, the academic uniqueness of these sources should be set aside for the moment, and the SACs from this village accepted as good examples of just how much the population grew along

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3 The suffix "gō" means in this case a hamlet.

with progress in the development of new settlements over a long period of time. In short, population increased when the expansion of arable land was able to progress comparatively smoothly. All the information on individuals in the registers has been recorded on the basic data sheet (BDS): name, sex, age, lineage, and so on, and the cause of changes if known. As a register exists for almost every year, observations and statistical processing could be carried out on a yearly basis. Since the registers in this village were compiled on a particular date each year, usually in the early part of year, there are extremely few entries in the sources for people aged one.

2. Fluctuations in Households and Population

Figure 4-1 shows fluctuations in the sex ratios and number of houses when corrections have been made, according to the following principles. First, the number of houses is not the number ascribed in the sources. Those households for which later records indicate the time at which they branched off from a main house have been included retrospectively. Second, when an entry appears in the sources for the first time several years after the birth of the individual in question, he or she is added into the total population by working backwards to the year of birth. However, because there are incomplete entries for infants before 1814, a certain degree of under-estimation cannot be avoided. Furthermore, it is impossible to determine the number of people who were born but then died before their first SAC could be compiled. These are estimated in Table 4-8.

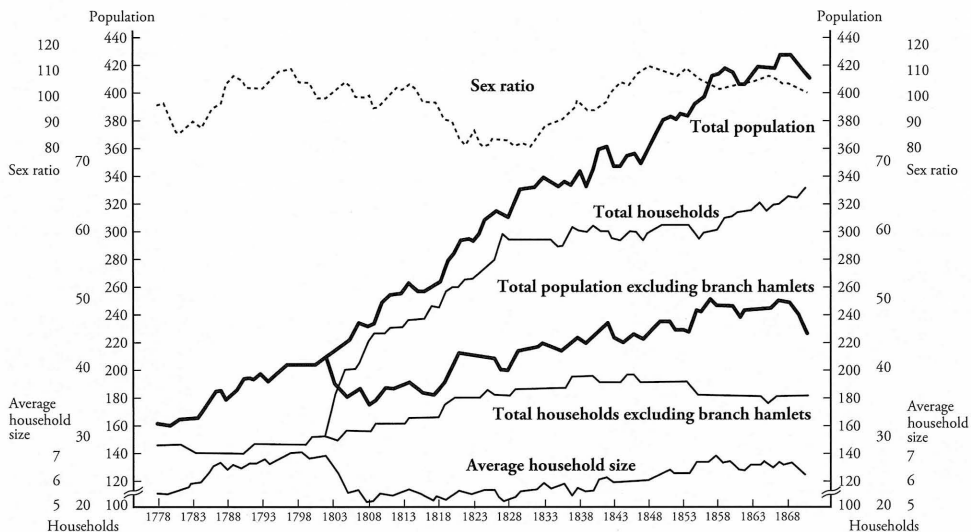**Fig. 4-1 Trends in Population and Numbers of Households**

Figure 4-1 shows that for the village as a whole, both the number of households and population more than doubled in these ninety-four years. When the scale of population growth is examined, there is an increase from 162 to 410 people between 1778 and 1872, with a mean annual rate of increase of 1.1% during these ninety-four years. However, this trend falls off, relatively speaking, in the 1830s and after, and, if we take 1833 as a pivot, the annual rate of increase of 1.4% until then falls to 0.5% thereafter. Population stagnation in the main village is a major factor in this fall in the rate of increase.

Table 4-1 Population Changes by Reasons

Years	Births			Marriages and adoptions			Returned after divorce			Other			Unknown			Total			Deaths		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
1837	12	5	17		5	5										12	10	22	4	4	8
1838		6	6	1	1	2				1		1				2	7	9	9	6	15
1839	7	7	14		2	2	1	2	3							8	11	19	3	2	5
1840	11	6	17	2	6	8					1	1				13	13	26	2	3	5
1841	6	4	10					2	2							6	6	12	1	4	5
1842	5	8	13		2	2										5	10	15	8	8	16
1843	5	6	11		1	1		1	1							5	8	13	3	3	6
1844	5	5	10		1	1		1	1	1		1				6	7	13	2	1	3
1845	7	3	10		2	2	1	1	2	1		1				9	6	15	4	3	7
1846	4	6	10	1	1	2		1	1				1		1	6	8	14	4	4	8
1847	8	5	13		4	4										8	9	17	2	4	6
1848	3	6	9	1	4	5				1	2	3				5	12	17	2	3	5
1849	8	9	17		7	7		1	1							8	17	25	2	6	8
1850	6	6	12	1	3	4										7	9	16	6	2	8
1851	2	6	8		1	1										2	7	9	4	5	9
1852	8	7	15		2	2							1		1	9	9	18	4	8	12
1853	4	8	12		5	5										4	13	17	6	8	14
1854	10	7	17		2	2										10	9	19	4	2	6
1855	5	8	13		2	2	2	2	4					1	1	7	13	20	5	9	14
1856	10	8	18		3	3		2	2							10	13	23	4		4
1857	6	8	14				1	2	3							7	10	17	5	5	10
1858	7	5	12		1	1										7	6	13	5	3	8
1859	4	6	10	2		2										6	6	12	5	5	10
1860	4	2	6		2	2										4	4	8	8	4	12
1861	6	9	15													6	9	15	6	6	12
1862	3	3	6	1	1	2	3	2	5							7	6	13	2	2	4
1863	7	2	9		3	3										7	5	12	3	2	5
1864	7	7	14		1	1										7	8	15	5	7	12
1865	6	4	10		3	3										6	7	13	5	4	9
1866	8	14	22	1	5	6										9	19	28	3	5	8
1867	5	5	10													5	5	10	5	4	9
1868	4	6	10		3	3										4	9	13	6	6	12
1869	8	8	16		2	2								2	2	8	12	20	5	2	7
1870	6	4	10		1	1										6	5	11	10	10	20
Total	207	209	416	10	76	86	8	17	25	4	3	7	2	3	5	231	308	539	152	150	302

The average size of a single household was seven people immediately before the village division, but falls to five people thereafter, rising again to six people during the late 1830s. An interesting phenomenon can be seen in the sex ratio, which oscillates over a cycle of thirty years. The ratio of men to women is most skewed in 1825, when the sex ratio reached a startling 80.8.

In order to clarify the causes of these changes, Table 4-1 shows the fluctuations in the population according to the "Zōgen-chō" (ZGC), registers of population increases

Decrease																					Difference		
Marriages and adoptions			Returned after divorce			Expulsion			Moved out			Other			Unknown			Total					
Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
	3	3				1		1										5	7	12	+7	+3	+10
	4	4																9	10	19	-7	-3	-10
	2	2	1	1	2													4	5	9	+4	+6	+10
1	3	4																3	6	9	+10	+7	+17
	4	4																1	8	9	+5	-2	+3
2	6	8		1	1	1		1					1	1		5	5	11	21	32	-6	-11	-17
	6	6																3	9	12	+2	-1	+1
	2	2													1		1	3	3	6	+3	+4	+7
	4	4				1	1	2							1		1	6	8	14	+3	-2	+1
1	9	10										2		2				7	13	20	-1	-5	-6
	2	2																2	6	8	+6	+3	+9
															4		4	2	7	9	+3	+5	+8
	2	2								1	1				2		2	2	11	13	+6	+6	+12
	5	5																6	7	13	+1	+2	+3
1	1	2																5	6	11	-3	+1	-2
	2	2																4	10	14	+5	-1	+4
	4	4														1	1	6	13	19	-2	0	-2
2		2																6	2	8	+4	+7	+11
1		1										1		1				7	9	16	0	+4	+4
	2	2							1	2	3							5	4	9	+5	+9	+14
1	3	4													1		1	7	8	15	0	+2	+2
	1	1																5	4	9	+2	+2	+4
	4	4				1		1										6	9	15	0	-3	-3
	3	3							1	2	3							9	9	18	-5	-5	-10
	2	2																6	8	14	0	+1	+1
	4	4																2	6	8	+5	0	+5
1	1	2																4	3	7	+3	+2	+5
1	1	2		1	1													6	9	15	+1	-1	0
1	1	2																6	5	11	0	-2	-2
	6	6							2	1	3	1	1	2				6	13	19	+3	+6	+9
	1	1																5	5	10	0	0	0
	1	1		1	1													6	8	14	-2	+1	-1
															8	10	18	13	12	25	-5	0	-5
1	1	2																11	11	22	-5	-6	-11
13	90	103	1	4	5	4	1	5	4	6	10	4	2	6	11	22	33	189	275	464	+42	+29	+71

and decreases that were appended to the SACs from 1837 onwards. People for whom the reason is unclear are those for whom the reason was not entered in the records. These numbers are extremely few and far between before 1869, however. In order to prove just how few, I have intentionally included all of these numbers in a table. From Table 4-1, it can be understood that the increase of 75 people in the overall population during this period is chiefly a natural increase, that is, it is due to a surplus of 114 births over deaths. As regards the period up to and including 1869, we can see that natural increase is offset by the drain in people leaving the village through marriage, and that the sex ratio fluctuates in line with this. There is no great migration of individuals who permanently moved away. However, this does not necessarily mean that movement of the labor force was small. The reason for this is that the SACs for this village were compiled according to the "registered population" in the same way as other Owari domains.[4]

Figure 4-2 shows the distribution of household size for five periods. It would be extremely complicated to show all figures for the ninety-four years. Furthermore, because an enormous deviation would be generated by taking a single fixed year, the mean was determined over a given ten-year period. Whereas seven people per household was the maximum prior to the branching of the villages, immediately thereafter the number shrank to five. Generally, the size of a household was concentrated within the range of four to seven persons, and a household of ten or more was very rare. This is because non-kin members (male and female servants) are seldom recorded in the SACs for this village, but household size is also greatly influenced by the fact that families branched with comparative ease as a result of the development of new settlements.

Figure 4-3 shows the age structure of the population in five-year age groups. This is shown as an average for each group in ten-year intervals based upon Figure 4-2. The fact that, in many years, the number of children aged five or under is relatively small compared with those aged six to ten is because the children's ages are calculated according to the Japanese method, which almost totally precludes the inclusion of age one children. The initially striking imbalance gradually normalizes in distribution. This is due to such limitations as the initial population itself being small, the lack of correct entries in the sources, that the new village settlement had only just been developed, and that the statistics are limited to a single village only.

Figure 4-4 gives the proportion of the productive population within the overall population, calculated according to the statistical average in ten-year cycles, as before. There is, however, a problem in taking the productive population in the Tokugawa period to be made up of those between the ages of 16 and 60. As in Chapter 3, taking people between the ages of 11 and 50 probably reflects the truth more accurately, but here I have decided to follow custom. According to this figure, there tends to be a gradual decrease in the

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4   As I pointed out in Chapter 1, there are two principles for compiling SACs: the "registered" principle and the "resident" principle.
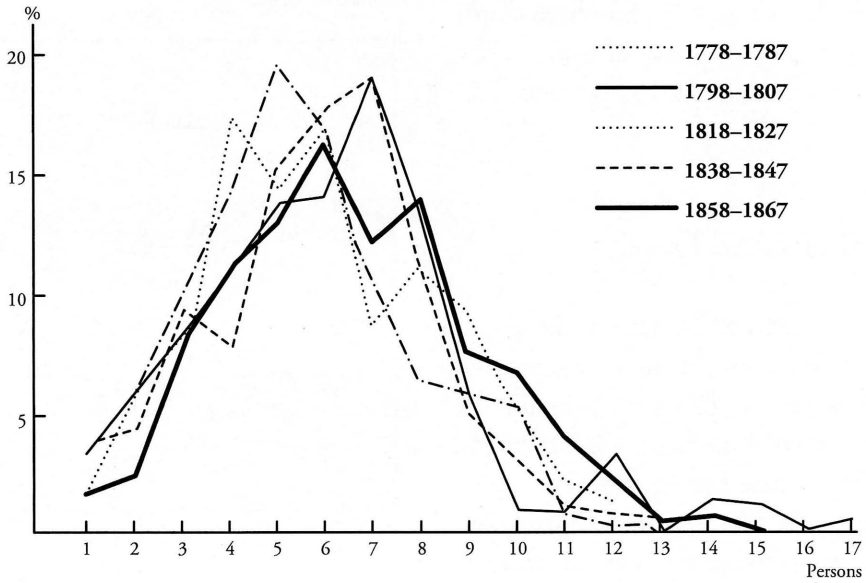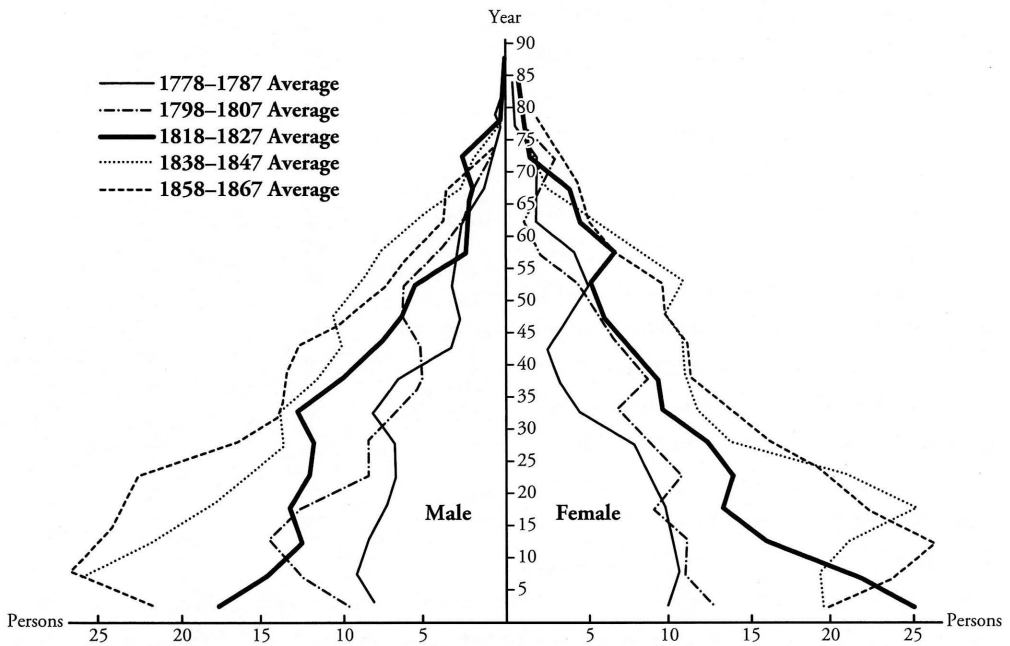
Fig. 4-2 Distribution of Household Size

Fig. 4-3 Age Structure

proportion of the productive population from at least before 1837, but this is clearly due to a proportionate increase in the number of children aged 15 or under.

3. Births and Deaths

As was noted earlier, among the population fluctuations in the village, natural increases and decreases account for the largest proportion. From 1837 onwards, the total increase of 77% and the total decrease of 65% are due to births and deaths respectively. Because the contents of the sources permit relatively detailed analysis, we may investigate this further.

Table 4-2 shows the average annual birth rate in five-year blocks from 1778 onwards. The number of births, which forms the basis of the calculations, represents the births from the preceding year, following their first entry at age one or two in all the SACs for the year in question, plus people who first appear in the sources later, at age three upwards, added in retrospectively at the age of two. Consequently, for births prior to 1813, where infant entries are deficient, a large number have been included retrospectively by this method, so that the actual number of births should be viewed as substantially greater than the figure actually yielded.

However, from 1838 onwards, nearly all births can be verified by the ZGCs and ambiguities are nearly absent, so these figures can be viewed as being as close to the actual numbers as possible. Furthermore, the high birth rate which continued unabated between 1813 and 1837 can probably
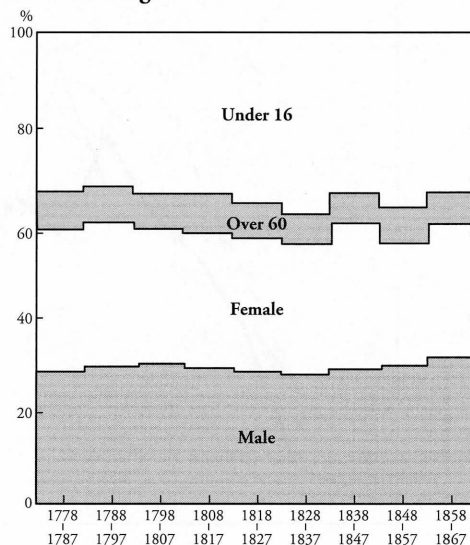
Fig. 4-4 Proportion of Population of Productive Age

Table 4-2 Birth Statistics

| Periods | Births | | | Birth rates |
	Male	Female	Total	CBR
1778–1782	11	13	24	29.7
1783–1787	15	9	24	27.6
1788–1792	21	15	36	38.5
1793–1797	12	10	22	22.5
1798–1802	13	16	29	28.4
1803–1807	14	19	33	36.2
1808–1812	19	18	37	30.4
1813–1817	28	23	51	39.6
1818–1822	26	32	58	40.0
1823–1827	24	35	59	38.5
1828–1832	33	29	62	37.9
1833–1837	32	19	51	30.2
1838–1842	29	31	60	34.4
1843–1847	29	25	54	30.6
1848–1852	27	34	61	32.5
1853–1857	35	39	74	37.5
1858–1862	24	25	49	24.2
1863–1867	33	32	65	31.1
1868–1870	18	18	36	28.7
Total	443	442	885	32.6
1778–1812				30.5
1813–1837				37.0
1838–1870				31.2

best be considered as showing the upper limit of the possible birth rate in agricultural villages throughout the Tokugawa period.

The fact that the birth rate for this village is more clearly known than for other farming villages in the Tokugawa period may reflect the fact that, from 1814 onwards, the method of entry in the sources improved, making birth records extremely accurate and, furthermore, the fact that corrections could be made. More than this, however, it may also be that in a village where new paddy land was being developed, there was no need artificially to suppress the population through the frequently discussed practices of abortion and infanticide.

Table 4-3 shows both the number of deaths from 1838 onwards and the mean death rate in five-year intervals. Although this calculation is based upon only those people entered in the ZGCs as clearly having died, it is possible that a considerable number of the unknown causes refer to deaths (see Table 4-1 for the number of unknowns).

Nevertheless, no matter what the case,
the actual fertility and mortality can definitely be said to be higher than those given in the table. These rates are, in the end, only as accurate as can be calculated from the SACs and ZGCs, and there can be no doubt that there were a considerable number of people who died after birth but before a record could be made for them and thus do not appear in any of the sources.

As shown in Table 4-4, child mortality is quite high. I have shown the number who

Table 4-3 Death Statistics

Periods	Deaths			Death rates
	Male	Female	Total	CDR
1838–42	23	23	46	26.2
1843–47	15	15	30	17.0
1848–52	18	24	42	22.4
1853–57	24	24	48	24.6
1858–62	26	20	46	22.8
1863–67	21	22	43	20.6
1868–70	21	18	39	31.2
Total	148	146	294	22.9

Table 4-4 Child Deaths

Periods	Births	Age at death					1–5 Total	1–5 Death rates	Age at death					1–10 Total	1–10 Death rates	Total deaths
		1	2	3	4	5			6	7	8	9	10			
1813–17	51	1	5	4	3	3	16	0.31	1	2	1			20	0.39	31
1818–22	58	1	2	2	6	2	13	0.23	1				1	15	0.27	43
1823–27	59		1	5	4	1	11	0.19		2			1	14	0.24	45
1828–32	62		4	4	2	2	12	0.19	2		1	2	1	18	0.29	44
1833–37	51		4	4	5	1	14	0.27	1	2				17	0.33	34
Sub-total	281	2	16	19	20	9	66	0.24	5	6	2	2	3	84	0.30	197
1838–42	60		3	5	1	1	10	0.17		1			1	12	0.20	48
1843–47	54		5	1	1	3	10	0.19	1		2		1	14	0.26	40
1848–52	61		3	2	2		7	0.11	1	1				9	0.15	52
1853–57	74	1	2	7	4	3	17	0.22	2	2	2			22	0.30	52
1858–62	49	1	6	3	3	2	15	0.31	1		2			18	0.37	31
Sub-total	298	2	19	18	11	9	59	0.19	5	4	6		2	75	0.25	223
Total	579	4	35	37	31	18	125	0.21	10	10	8	2	5	159	0.27	420

died at each age up to ten for 579 people born in the fifty-year span between 1813 and 1862. The number that died under age five accounts for 21% of the live births, and those who died before the age of ten account for 27%, both of which are high figures. If the age one fatalities, which are impossible to calculate directly, are added to this, the rate rises even further, and it can probably be presumed that the death rate before age five reaches 30% or more of all the live births. (In compiling this table, the migrant population of infants whose removal from the sources is due to factors other than death was ignored, but, because this is thought to be an extremely small number, its effect on the final calculations is negligible.)

Figure 4-5 is a life table by sex based upon the age-specific mortality of 137 men and 138 women who died in the thirty-two years between 1838 and 1869. (The data has been plotted directly without smoothing the graph. The same applies to Table 4-6.) The mortality rate for girls aged ten or under is high compared to that of boys, but generally speaking, the survival rate among women aged fifty or over is higher. The average life expectancy at age two is 33.2 years for men and 31.6 years for women. Compared to the figures from the time when modern statistics were first introduced at the end of the Meiji period (1868–1912), this is quite low, although some degree lower than expected.

Figure 4-6 shows the age-specific mortality curve on a logarithmic scale. Figures are given for each year to age five, and above this in five-year intervals. Because the number of cases is slight, the result is uneven, but it is possible to observe general trends. The lowest mortality for both men and women is in the 15 to 40 age bracket, being between 5‰ and 18‰, but it rises sharply thereafter. When the infant mortality curve is extended so that it crosses the one-year line, then even a conservative estimate renders figures of 130‰ for males and 150‰ for females. Since this is infant and child mortality, boys and girls may be more appropriate. If this is viewed as the mortality for Japanese-count age one children, who cannot be determined from the SACs, it becomes possible to correct the mortality rate shown previously.[5]

Figure 4-7 shows this mortality data in the form of a life table. Because this table, however, was not determined from the age specific mortality, it assumes no fluctuations in the age composition. The methods employed in measuring were different for Nishijo-mura, as shown in Chapter 7.

Finally, because the SACs for this village record both the births and deaths by month,

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5   I revised the births and deaths in light of this. The total of 389 births between 1838 and 1870 means an average of 11.8 births in one year, but the actual number of births is this figure plus the number of births at one *sai*. When this is calculated, the number of deaths at one *sai* is 0.9, and consequently the number of births is 12.7 per year, and the birth rate also rises to 33.6 ‰ (as opposed to 31.6‰ before revision). Similarly, the mortality rate is 8.9 per annum, becoming 9.8 after revision, which yields a mortality rate of 25.9 ‰ (as opposed to 22.9‰ before revision). As these are only estimates, they should be taken as no more than references.
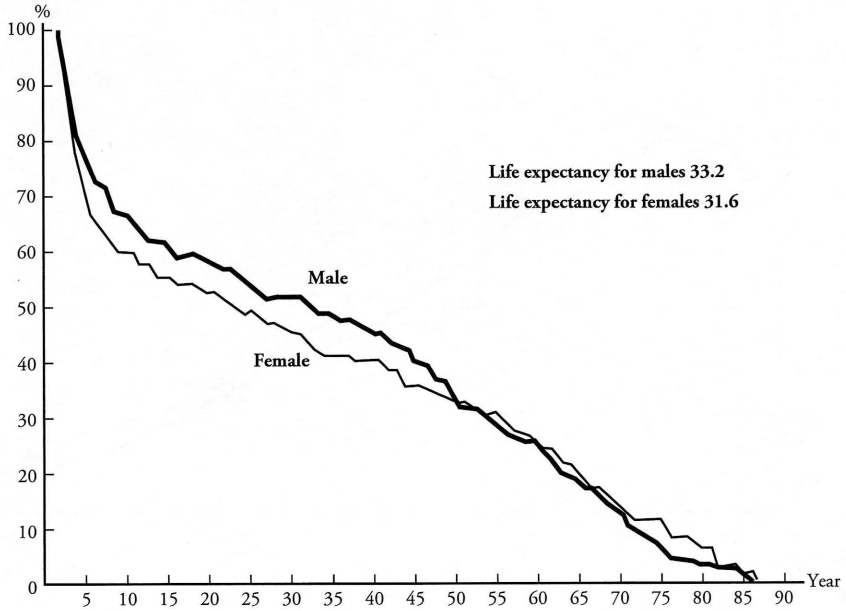
Fig. 4-5 Survival Rates

Life expectancy for males 33.2
Life expectancy for females 31.6

Male

Female

%

Year

Fig. 4-6 Age-specific Mortality Rates

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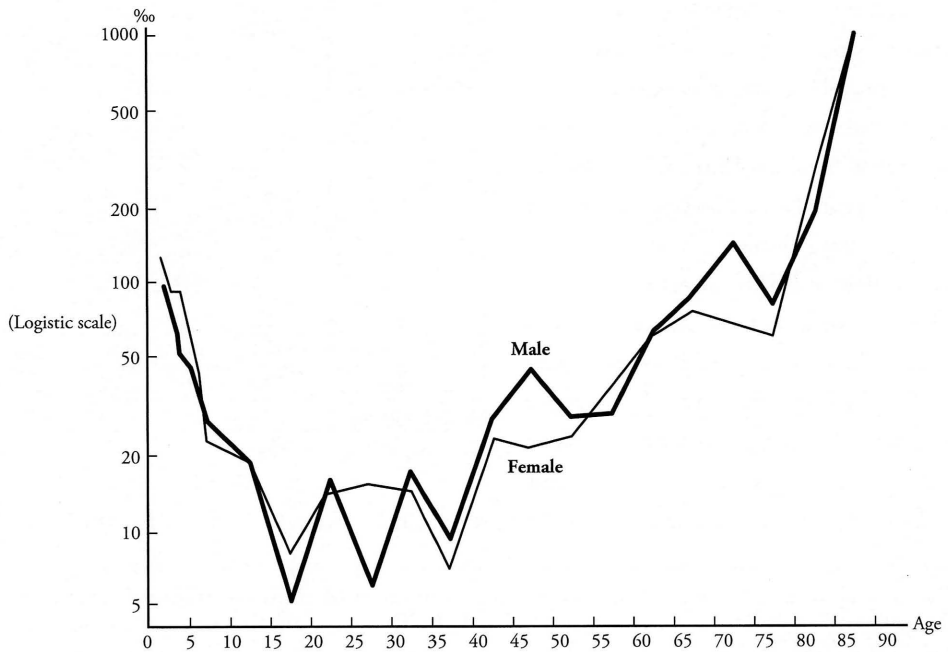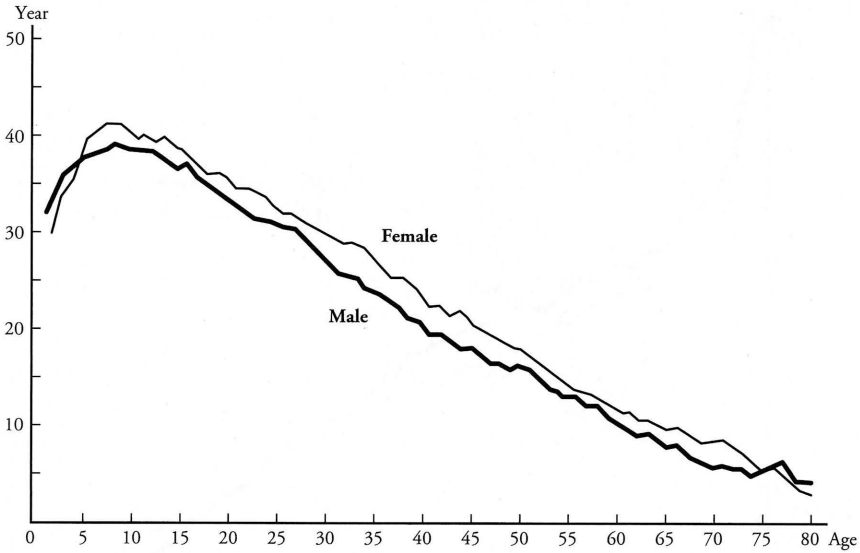
(Logistic scale)

Male

Female

Age

Fig. 4-7 Life Table (based on deaths from 1838–1869; Males-137, Females-138)

it is possible to compile monthly birth and death statistics.[6] However, as was stated earlier, these are according to the months of the solar-lunar calendar, including the troublesome problem of leap years that have rotating leap months every two or three years. In order to simplify the calculations, all leap months were included in the month that preceded them. There are a total of thirteen leap months in the thirty-four years from 1837 to 1870, and this occurs three times each, in particular for the fourth and fifth months.

Unless these factors are considered, it is not possible to compile completely accurate statistics on birth by season. Here, I have chosen to ignore them, so the statistics are only rough. As can be seen from Table 4-5, there are major seasonal variations in both births and deaths. Births are

Table 4-5 Distribution of Births and Deaths by Month (1837–1870)

Months	Births	Deaths		
		Male	Female	Total
1*	28	17	13	30
2*	14	10	4	14
3*	22	6	7	13
4***	54	15	26	41
5***	39	7	14	21
6	36	9	6	15
7*	22	30	13	43
8*	44	17	19	36
9*	22	7	9	16
10*	20	6	7	13
11	22	11	10	21
12	16	7	6	13
Total	339	142	134	276
Max. 4 months	173	79	72	150
Min. 4 months	72	26	23	53

*=number of leap months

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6   The fact that the actual number of cases are few when compared with the numbers of births and deaths shown in Tables 4-2 and 4-3 is because the month of the birth or death is unclear for 50 of the 389 births and 18 of the 294 deaths.

concentrated between the fourth and eighth months, accounting for more than half of the total, whereas, conversely, there are few births in the second and third months, or in the period between the ninth and twelfth months. Deaths show even greater variation, with the added element of a sex differential. Attention should be paid to the fact that more men die in the seventh month and more women in the fourth, which may be attributable to such factors as climate, agricultural work, and in the case of women, childbirth.

4. Marriage and Fertility

Table 4-6 shows the distribution of age at marriage by sex. Cases in which the person in question left the village in order to get married are not recorded, and therefore they are not included. However, from 1838 onwards we know whether women migrating from the village did so for the purpose of marriage, so this data is shown separately. Only the cases where one or the other of the spouses are adjudged to be marrying for the first time were taken. However, because of problems in the entries in the sources between 1778 and 1807, these may possibly include remarriages. A marriage is viewed as having taken place in the year prior to the one in which a new couple was recognized in the SACs, and the age at that time is taken.

There is no conspicuous fluctuation in the age at marriage, but the male age at marriage does fall, albeit only very slightly. Generally, men marry late in life, but the mean age of women at marriage remains stable at around twenty-two. This is related to the lifelong fertility of the wife, as shown in the next table.

Table 4-7 shows the number of children born (regardless of whether a child died in infancy or not) by age of the wife at marriage, for couples married from 1808 onwards whose members lived to at least age forty-five. According to this, although the number of cases is hardly adequate, a clear relationship can be seen between the age of the woman at marriage and the number of births. The mean age of women at marriage in this table is twenty-one, with a mean of 6.3 births during a woman's fertile period, but, in reality, the number of births would rise to between seven and eight if infants of less than one year who died, and who cannot be apprehended from the sources, were included.

When the geographical range across which people traveled to find marriage partners is examined, it becomes clear that nearly all of the villages fall within approximately an eight-kilometer radius of the village in question, and, when the nearby urban areas such as Nagoya, Miya (Atsuta), and Kuwana are included, the marriage market is surprisingly wide. At least with regard to this point, Tokugawa-period villages cannot be described as "closed."

Table 4-6 Age at Marriage

Age	Male				Female				Marriages to outside (female)
	1778–1807	1808–1837	1838–1870	Total	1778–1807	1808–1837	1838–1870	Total	
14							1	1	
15									1
16					1		4	5	2
17					2	1	3	6	4
18		1		1	3	7	5	15	6
19					5	5	6	16	7
20		1	3	4	8	6	7	21	3
21	1	1	2	4	3	5	11	19	11
22		2	4	6	2	7	11	20	13
23	2	2	4	8	2	8	12	22	7
24	2	4	5	11	4	5	3	12	9
25	3	6	4	13	2	6	5	13	6
26	3	8	8	19	2	3	3	8	3
27	2	2	7	11	1	1		2	4
28	2	3	7	12		2		2	3
29		2	9	11			1	1	
30	2	7	4	13					2
31	7	6	4	17		3	1	4	
32	4	5	4	13					
33		3	1	4		1	1	2	1
34	3		1	4					
35	2	3		5					
36			2	2					
37	2	1		3					
38		1	2	3					
39		1	1	2					
40		1		1					
41			1	1					
42									
43									
44									
45			1	1					
Total	35	60	74	169	35	60	74	169	82
Average	29.4	28.5	27.9	28.4	21.6	22.6	21.5	21.8	22.2

Table 4-7 Number of Births by Age at Marriage (1808–1871)

Age at marriage	Number of births													Average
	0	1	2	3	4	5	6	7	8	9	10	11	13	
16							1							6.0
18						2			2			1		7.4
19				1					1	1	1	1		7.5
20					2	1	1	1					1	7.8
21						1	2	2	1					6.5
22			1			1		4	1					6.1
23				2	1		2		1					5.0
24									1	1				8.5
25						1		1	1					6.7
26							2	1						6.3
28					1		1							5.0
31		1				1			1					4.3
33		1												1.0
Total		2	1	3	5	6	9	9	9	2	1	2	1	6.3

Average births: Age at marriage 16–20: 7.5/ Age at marriage 21–25: 6.2/ Age at marriage 26–30: 4.8

5. Family Reconstitution

A. Family Reconstitution and the Sources

Because family reconstitution has already been explained several times, there is no need to repeat the explanation here.[7] However, when taking a continuous run of SACs across several years as data, the research methods differ from those in the West, because in Japan, the family unit (in actuality, the husband and wife) is already clear in the sources, so that figures for the total regional population can also be estimated. Because births, deaths, marriages, and, on occasion, migration are entered, it may even be said that there is no need to work on "reconstituting" a family.

It is true that, since SACs are compiled by religious denomination, there are times when family members are recorded separately, making reconstitution inevitable in such cases, but this work is not very great compared with the difficulties in reconstructing families from parish registers in the Christian world. Consequently, SACs, if they can be used unbroken across a long period of years, ought to be analyzed in this manner in order to examine the demographic behavior of husbands and wives, and to work out indices of marriage and fertility. Furthermore, by employing the same methods as those developed in Europe, there is the added merit of making comparisons possible.

In terms of the accuracy of their entries, are SACs valuable data for analysis using these methods? As one might expect, no matter how good their quality is, SAC entries are never 100% accurate. Because they date from a society with no legal system of registration of births, deaths, marriages, and movement, it is only natural that they are flawed. In addition, as has often been pointed out, it is true that there exist both segments of the population who are not actually resident but appear in the records, and resident segments that are not included. However, it would be illogical to say that, just because there are these flaws, we should refuse to use the sources. No matter what the nature of the source, it is impossible to demand 100% accuracy. In the end, the reliability of all sources is relative. What is necessary is to know in what ways, and to what extent, a source is not accurate, and how this may affect the observations and results.

Of course, the SACs from Kando-shinden are also flawed. The areas that need to be corrected have been, but the greatest deficiency is that entries for marriage lag behind the actual event. As a result, births may be recorded before the marriage, thereby affecting the reliability of the statistics pertaining to births and marriages. In this chapter, because marriages were assumed to have taken place the year before they were first entered in the records, we end up with some instances of birth recorded prior to marriage.[8] If we divide the whole span into two periods before and after the year 1800, following the year of birth

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7   Hayami 1973, Chapter 12; Shinbo et al. 1975, pp. 81–90.
8   To be strictly accurate, there may be doubts as to whether the wife gave birth or not, but, since a marriage definitely took place immediately after this case, it is taken to be a birth by the wife.

Table 4-8 Trends of Population and Households

Years	Population			Population of main villages	Households										Total	Average household size	Sex ratio
	Male	Female	Total		Kando-shinden	Fukuoka-shinden				Masanari-shinden	Hachiho-shinden	Asahi-shinden	Yokomakura-shimoshinkai				
						Sasano-gō	Kodai-gō	Shimono-gō	Izumi-gō								
1778	79	83	162		29										29	5.59	95.2
1779	79	82	161		29										29	5.55	96.3
1780	75	85	160		29										29	5.52	88.2
1781	75	88	163		29										29	5.62	85.2
1782		N.A.															
1783	78	87	165		28										28	5.89	89.7
1784	77	88	165		28										28	5.89	87.5
1785	82	91	173		28										28	6.18	90.1
1786	88	93	181		28										28	6.46	94.6
1787	91	95	186		28										28	6.64	95.8
1788	90	87	177		28										28	6.32	103.4
1789	95	88	183		28										28	6.54	108.0
1790	98	94	192		28										28	6.86	104.3
1791	97	96	193		29										29	6.66	101.0
1792	97	95	192		29										29	6.62	102.1
1793	98	97	195		29										29	6.72	101.0
1794	97	93	190		29										29	6.55	104.3
1795	100	93	193		29										29	6.66	107.5
1796		N.A.															
1797	105	97	202		29										29	6.97	108.2
1798	103	99	202		29										29	6.97	104.0
1799	103	99	202		29										29	6.97	104.0
1800	103	100	203		30										30	6.77	103.0
1801	102	103	205		30										30	6.83	99.0
1802	104	106	210		30										30	7.00	98.1
1803	106	106	212	193	30	3	2								35	6.06	100.0
1804		N.A.															
1805	112	108	220	180	31	4	4		1						40	5.50	103.7
1806	112	112	224	182	31	4	4		1						40	5.60	100.0

1807	115	117	232	186	31	4	4		2				41	5.66	98.3
1808	114	116	230	174	31	6	5		2				44	5.23	98.3
1809	115	121	236	177	32	6	5		2				45	5.24	95.0
1810	122	126	248	186	32	6	5		2				45	5.52	96.8
1811	125	126	251	185	32	7	5		2				46	5.46	99.2
1812	127	125	252	187	32	7	5		2				46	5.48	101.6
1813	128	126	254	187	32	7	5		2				46	5.52	101.6
1814	133	129	262	190	33	7	5		2				47	5.57	103.1
1815	130	128	258	186	33	7	5		2				47	5.49	101.6
1816	126	130	256	182	33	7	5		2				47	5.45	96.9
1817	127	132	259	181	33	9	5		2				49	5.28	96.2
1818	129	134	263	183	33	9	5		2				49	5.37	96.3
1819	128	142	270	189	35	9	5		2				51	5.30	90.1
1820	133	149	282	198	36	9	5		2				52	5.42	89.3
1821	134	159	293	211	36	9	5		2				52	5.63	84.3
1822	132	162	294	210	36	9	6		2				53	5.55	81.5
1823	135	157	292	209	36	9	6		2				53	5.51	86.0
1824	135	165	300	207	36	10	6		2				54	5.56	81.8
1825	139	172	311	208	37	10	6		2				55	5.65	80.8
1826	144	171	315	207	36	12	6		2				56	5.63	84.2
1827	143	172	315	199	36	12	6		2	3		1	60	5.25	83.1
1828	141	171	312	200	36	12	6		2	3			59	5.29	82.5
1829	145	178	323	209	37	12	6		2	2			59	5.47	81.5
1830	150	183	333	214	37	12	6		2	2			59	5.64	82.0
1831	149	184	333	215	37	12	6		2	2			59	5.64	81.0
1832	153	181	334	215	37	12	6		2	2			59	5.66	84.5
1833	160	182	342	220	37	12	6		2	2			59	5.80	87.9
1834	159	179	338	215	37	12	6		2	2			59	5.73	88.8
1835	158	176	334	212	37	11	6		2	2			58	5.76	89.8
1836	162	176	338	213	37	11	6		2	2			58	5.83	92.0
1837	163	172	335	218	39	11	6		1	2	2		61	5.49	94.8
1838	170	175	345	222	39	11	5		1	2	2		60	5.75	97.1
1839	163	172	335	218	39	11	5		1	2	2		60	5.58	94.8
1840	167	178	345	223	39	11	5	1	1	2	2		61	5.66	93.8

Years	Population			Population of main villages	Households										Total	Average household size	Sex ratio
	Male	Female	Total		Kando-shinden	Fukuoka-shinden				Masanari-shinden	Hachiho-shinden	Asahi-shinden	Yokomakura-shimoshinkai				
						Sasano-gō	Kodai-gō	Shimono-gō	Izumi-gō								
1841	177	185	362	228	38	11	5	1	1	2	2				60	6.03	95.7
1842	182	183	365	233	38	11	5	1	1	2	2				60	6.08	99.5
1843	176	172	348	221	38	10	5	1	1	2	2				59	5.90	102.3
1844	178	171	349	219	38	10	5	1	1	2	2				59	5.92	104.1
1845	181	175	356	222	39	10	5	1	1	2	2				60	5.93	103.4
1846	184	173	357	224	39	10	5	1	1	2	2				60	5.95	106.4
1847	183	168	351	220	38	10	5	1	1	2	2				59	5.95	108.9
1848	189	171	360	224	38	10	6	1	1	2	2				60	6.00	110.5
1849		N.A.															
1850	198	182	380	234	38	11	6	1	1	2	2				61	6.23	108.8
1851	199	184	383	233	38	11	6	1	1	2	2				61	6.28	108.2
1852	196	185	381	229	38	11	6	1	1	2	2				61	6.25	105.9
1853	201	184	385	229	38	11	6	1	1	2	2				61	6.31	109.2
1854	199	184	383	227	38	11	6	1	1	2	2				61	6.28	108.2
1855	203	191	394	241	36	11	6	1		2	2	1			59	6.68	106.3
1856	203	195	398	239	36	11	7	1		2	2	1			60	6.63	104.1
1857	208	204	412	250	36	11	7	1		2	2	1			60	6.87	102.0
1858	208	206	414	246	36	11	7	1		2	2	1			60	6.90	101.0
1859	210	208	418	246	36	12	8	1		2	2	1			62	6.74	101.0
1860	210	205	415	245	36	12	8	1		2	2	1			62	6.69	102.4
1861	205	200	405	237	36	13	8	1		2	2	1			63	6.43	102.5
1862	205	201	406	241	36	13	8	1		2	2	1			63	6.44	102.0
1863	210	201	411	241	36	13	8	1		2	2	1			63	6.52	104.5
1864	213	203	416	242	36	13	9	1		2	2	1			64	6.50	104.9
1865	214	202	416	243	35	13	9	1		2	2	1			63	6.50	105.9
1866	214	204	418	245	36	13	9	1		2	2	1			64	6.53	104.9
1867	217	210	427	249	36	13	9	1		2	2	1			64	6.67	103.3
1868	217	210	427	248	36	14	9	1		2	2	1			65	6.57	103.3
1869	215	211	426	241	36	14	9	1		2	2	1			65	6.55	101.9
1870		N.A.															
1871	205	205	410	225	36	15	9	1		2	2	1			66	6.21	100.0

Fig. 4-8 Indices of Births, Deaths, Marriages, and Household Size
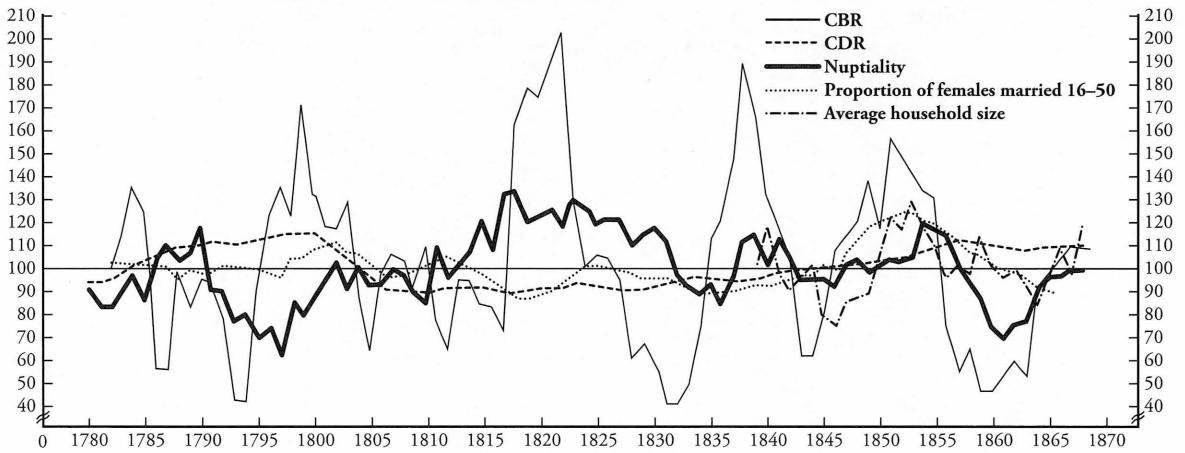
of the wife, we find that among a total of 341 births in the former period, 31 births or over 9% are cases of this type, and in the latter period, 23 out of 483 births, or just under 5%, fall into this category. As it is difficult to establish a standard for handling this data, I have ignored it when dealing with the relationship between marriage and childbirth.

B. Basic Indices

Table 4-8 shows numerical changes in the households in Kando-shinden. This is also shown graphically in Figure 4-1. Since the sources for this village do not include entries for out-migrant or in-migrant workers, the figures for the households can basically be taken to be the resident population.

As can be seen from this table, the population in Kando-shinden for the period in question increased approximately 2.5 times, and the number of households increases approximately 2.3 times. The rate of population increase was greater in the first half of the period, but calculating the mean reveals a steady 1.1% increase per annum. As this increase is clearly due to natural causes, at least as far as this particular village is concerned, it can only be because births exceeded deaths. Fluctuations in fertility and mortality, as well as in the age at marriage and the proportion of women of childbearing age (16–50) who married—two factors that strongly affect fertility—are shown plotted in the graph in Figure 4-8.

Here, the rates shown are a five-year moving average. The arithmetical mean from the period in question for all of the rates is taken as standard. In other words, the crude birth rate (CBR)=32.5‰, the crude death rate (CDR)=22.2‰, the nuptiality rate (the number obtained by subtracting the cases of marriage from the general population)=7.4‰, the proportion with spouses (the number obtained by subtracting the women with spouses

Table 4-9 Age-specific Proportions Married (%)

Male				
Age	1778–1800	1801–1825	1826–1850	1851–1871
16–20	0	0.6	0	0
21–25	2.6	8.2	8.5	7.7
26–30	24.7	38.6	34.5	34.1
31–35	56.9	63.4	68.1	69.6
36–40	85.1	77.0	81.2	85.5
41–45	95.8	81.3	86.9	87.1
46–50	98.9	86.2	83.9	90.4
Total	45.3	42.0	46.3	43.5
21–50 Total	55.8	52.4	57.1	54.9
Female				
16–20	6.2	7.1	3.2	9.5
21–25	37.2	46.9	34.4	42.6
26–30	67.9	72.0	78.1	75.4
31–35	82.9	72.9	86.0	84.5
36–40	92.3	72.1	83.0	70.0
41–45	80.7	64.8	77.0	69.0
46–50	77.0	56.6	65.2	71.9
Total	56.0	52.8	53.0	54.6

Table 4-10 Distribution of the Number of Couples in a Household (%)

Number of couples	1778–1800	1801–1825	1826–1850	1851–1871
0	12.0	20.4	19.8	13.8
1	67.3	66.1	59.8	64.0
2	19.0	10.4	10.2	20.9
3	1.5	1.0	0.6	1.1
4				0.2
Average	1.10	0.90	0.82	1.10

from the total number of women of the same age)=55.0%, and the mean number of people to a household=6.05, are each taken to represent 100.

From this graph, it is possible to read the following characteristics. All of the rates repeat the same wave pattern cyclically. However, as regards the synchronization between these waves, a lagged relationship can be seen between the fertility and marriage rates. What is most clear in the relationship between the mean number of people in a household and fertility is that fertility rises when the former is low, and conversely falls when the mean number per household is high. When the mean number of people in a household is low, it means that the family has branched, under conditions in which the small family is standard. Thereafter, fertility remains high for a while, and when a certain period of

time has elapsed, the mean number of people in a household rises, making the conditions ripe for creating another branch. The marriage rate peaks every fifteen to twenty years, repeating almost the same cyclical rhythm as the waves in fertility.

Table 4-9 shows the age-specific proportion of spouses for both men and women, and Table 4-10 shows the total number of married couples per household. In both cases, the rates are proportions shown as percentage of the whole. The arithmetical mean for the period is also shown for approximately twenty-five-year intervals.

C. Analysis

Let us examine the demographic behavior of couples through an analysis of the family reconstitution data. The number of FRFs compiled from the SACs for Kando-shinden, that is, the number of husband and wife couples appearing in the sources, totals 237, a classification of which is shown in Table 4-11. With such a small number of cases, it can be expected that random fluctuations will have a major influence on the results. I have divided the data according to the wife's birth cohort, into 108 cases where the wife was born in or before 1800, and 129 cases where she was born in or after 1801, labeling these the early and late periods. As stated previously, the sources for the latter period for this

Table 4-11 Classification of FRFs

Marriage cohorts	A	XA	CF	U	XU	Z	XZ	Total
1778–1800			12	17				29
1801–1825			26	32				58
1826–1850			21	34		7		62
After 1851				14		39		53
Uncertain	24	6			4		1	35
Total	24	6	59	97	4	46	1	237
Birth cohorts of wives								
1701–1725		1						1
1726–1750	14	5						19
1751–1775	10		11	13				34
1776–1800			23	30	1			54
1801–1825			25	36	3	4		68
1826–1850				18		39	1	58
After 1851						3		3
Total	24	6	59	97	4	46	1	237

A: Married in the first register (1778)
XA: Wife is over 51 years old in the first register (1778)
CF: Marriage year is verified and the marriage continues to a year when wife's age is over 50
U: Marriage year is verified but the marriage ends before wife reaches age 50
XU: Marriage year is uncertain
Z: Marriage year is verified, but wife's age is under 50 in the last register (1871)
XZ: Z, but marriage year is uncertain

village are more reliable, so we should keep in mind that the rates for the later period are likely to be more accurate in the discussion below.

Table 4-12 shows the reasons for the end of a marriage while the wife is still of child-bearing age (sixteen to fifty), in the 184 cases remaining of all the cases above, excluding those subjects classified as XA, Z, or XZ following the system used in Table 4-11.

Table 4-12 Termination of Marriages

Reasons	Earlier	Later	Total
Continued to wife's age 50	53	26	79
Wife's death	10	20	30
Husband's death	28	20	48
Divorce	0	7	7
Moved out	0	2	2
Uncertain	11	7	18
Total	102	82	184

Further, Table 4-13 shows the extent of remarriage by the husband, and Table 4-14 by the wife, following the death of a spouse. Whereas the husband remarries if he is still young (with forty taken to be the upper age limit), it is evident that for the wife, this was extremely difficult.

In demographic terms, the wife's behavior is central, so this shall be the focus in all subsequent observations herein.

Table 4-13 Husband's Behavior after Wife Left

Husband's age when wife left	Earlier				Later				Total			
	Not remarried	Remarried	Uncertain	Total	Not remarried	Remarried	Uncertain	Total	Not remarried	Remarried	Uncertain	Total
21–25						2	2	4		2	2	4
26–30		4	1	5	1	2		3	1	6	1	8
31–35	1	2		3	1	5	2	8	2	7	2	11
36–40	1	2		3	1	2	1	4	2	4	1	7
41–45	2	1		3	2	2		4	4	3		7
46–50	1	1		2		1		1	1	2		3
Over 51	4			4	3		2	5	7		2	9
Total	9	10	1	20	8	14	7	29	17	24	8	49

Table 4-14 Wife's Behavior after Husband Left

Wife's age when husband left	Earlier			Later						Total					
	Not remarried	Died	Total	Not remarried	Remarried	Died	Returned to parents' home	Uncertain	Total	Not remarried	Remarried	Died	Returned to parents' home	Uncertain	Total
21–25		1	1		1			1		2				2
26–30	2		2		2				2	2	2				4
31–35	3		3	1		1	1	3	4			1	1	6
36–40	6	1	7	5			6	11	11		1		6	18
41–45	9	1	10	2		1	3	11		1		1	13
46–50	3	2	5	1			1	2	4		2		1	7
Total	23	5	28	9	2	1	1	9	22	32	2	6	1	9	50

Fertility

First of all, let us examine fertility according to the age of the mother. Table 4-15 shows both the number of births and the age-specific fertility in groups of five years. Births before the mother married are excluded. Figures in the Total Years column indicate the sum total years of continuous marriage for all of the wives in each age group. The years in which a marriage both started and ended have given rise to fractions because they are each taken to be 0.5 of a year. The fertility rate is derived by dividing the number of births by the total years of marriage, showing the average number of births per wife per year.

Table 4-15 Age-specific Fertility Rates (‰)

	Earlier			Later			Total		
Age	Total Years	Births	Fertility	Total Years	Births	Fertility	Total Years	Births	Fertility
16–20	45.0	18	0.400	69.0	26	0.377	114.0	44	0.386
21–25	225.5	70	0.310	334.0	142	0.425	559.5	212	0.379
26–30	328.5	84	0.256	459.0	129	0.281	787.5	213	0.270
31–35	352.5	85	0.241	396.0	85	0.215	748.5	170	0.227
36–40	338.5	66	0.195	295.0	53	0.180	633.5	119	0.188
41–45	306.0	28	0.092	200.0	22	0.110	506.0	50	0.099
46–50	273.5	2	0.007	150.5	2	0.013	424.0	4	0.009
Total	1869.5	353	0.189	1903.5	459	0.241	3773.0	812	0.215

The fact that there is a fixed pattern in the age-specific fertility rate is made clear in Figure 4-9, which is a graphical representation of the results in Table 4-15. The gradient between the earlier and later periods is somewhat different, but, assuming that the reliability of the sources is better in the later period, the fertility by age is highest between the ages of twenty-one and twenty-five, declining rapidly thereafter. Fertility is, contrary to expectation, low for women under twenty, a trend which can also be seen elsewhere. The rates for the early period appear high because of insufficient entries for married women for this particular age group. Since the total years at risk to marry are in actuality larger than shown in the table, the fertility rates end up being higher than in reality.

Fig. 4-9 Age-specific Fertility Rates

Table 4-16 shows the fertility distribution by age in five-year intervals. Here I have limited the data to marriages that continued throughout the full five years of a given cohort. Figure 4-10 depicts this in graphical form, showing the proportions for each.

Next, what are the effects on the age-specific fertility rates of the age at marriage?
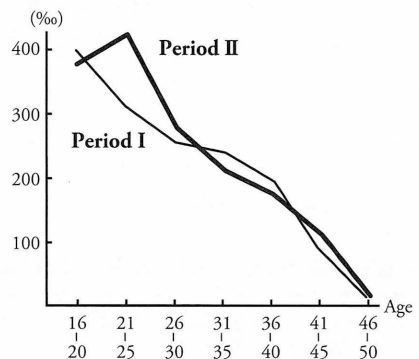
Fig. 4-10 Distribution of Number of Births According to the Wife's Age
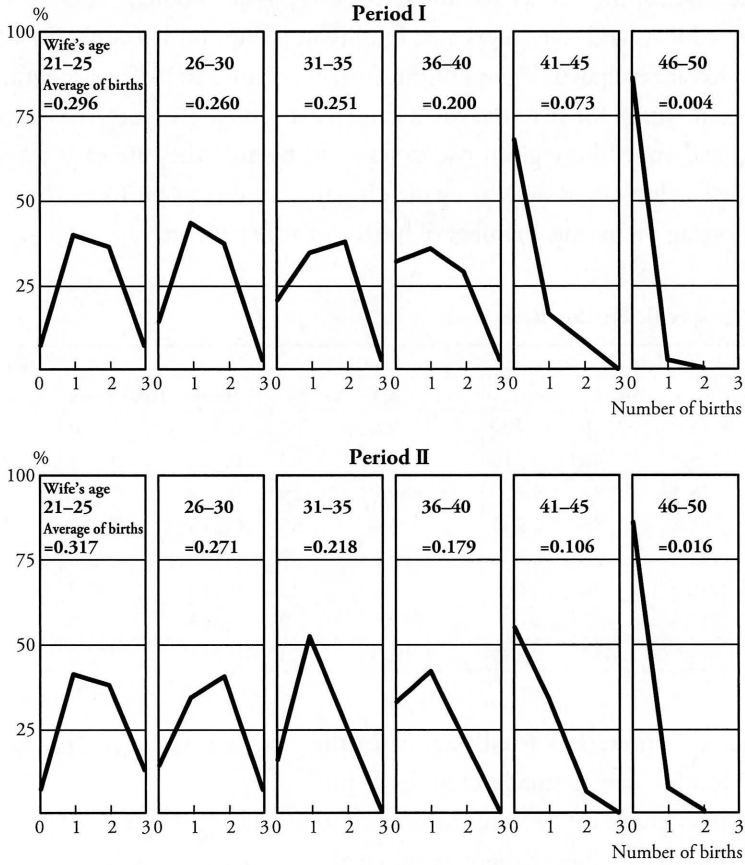
Table 4-16 Number of Births by Wife's Year-Age Groups

Age groups	Earlier					Later					Total				
	0	1	2	3	Total	0	1	2	3	Total	0	1	2	3	Total
16–20						0	0	1	0	1	0	0	1	0	1
21–25	3	10	9	3	25	2	12	11	4	29	5	22	20	7	54
26–30	8	23	20	2	53	14	26	31	5	76	22	49	51	7	129
31–35	14	22	24	3	63	13	36	17	1	67	27	58	41	4	130
36–40	20	22	18	1	61	16	20	11	0	47	36	42	29	1	108
41–45	38	9	5	0	52	20	13	3	0	36	58	22	8	0	88
46–50	48	1	0	0	49	23	2	0	0	25	71	3	0	0	74
Total	131	87	76	9	303	88	109	74	10	281	219	196	150	19	584

Fig. 4-11 Age-specific Marital Fertility Rates by Age at Marriage

Period I

(‰)

- Age at marriage 16–20
- Age at marriage 21–25
- Age at marriage 26–30
- Age at marriage 31–35

Age at birth

Period II

(‰)

- Age at marriage 16–20
- Age at marriage 21–25
- Age at marriage 26–30
- Age at marriage 31–35

Age at birth
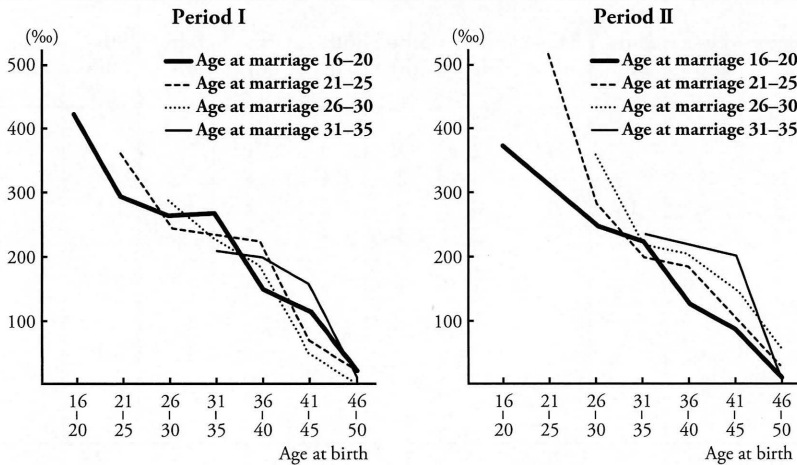
Table 4-17 Duration of Marriages and Number of Births

Duration of marriages*	Earlier			Later		
	Couples	Total births	Average births	Couples	Total births	Average births
0–5	18	8	0.44	32	33	1.03
5.5–10	11	21	1.91	20	49	2.45
10.5–15	17	53	3.12	23	84	3.65
15.5–20	30	137	4.57	41	193	4.71
20.5–25	18	105	5.83	13	77	5.92
Total	94	324	3.45	129	436	3.38

* Years between 16 and 40 of wife's age

Figure 4-11 shows age-specific marital fertility grouped in five-year intervals by age at marriage. In the former period, we have to make allowances for the powerful effects of flaws in the source entries, but it can be clearly seen that the later the age at marriage, the higher the age-specific fertility, generally regardless of the age group concerned. This tells us that the number of births does not fall in proportion to the rise in the age at marriage; indeed, it increases, albeit only slightly.

Finally, let us examine the relationship between the length of marriage and the number of births. According to the tables and figures thus far, it is manifestly evident that at age forty-one and over, fertility falls rapidly, so that here, it was decided to examine the relationship between the duration of marriage and the number of births to married women aged between sixteen and forty. As shown in Table 4-17, the relationship between the two is very clear. For every five years of marriage, the number of births rises by between 1.2 and 1.4.

Table 4-18 Birth Intervals

A. Earlier Period

Intervals (years) / Birth order	Marriage-1st	1st–2nd	2nd–3rd	3rd–4th	4th–5th	5th–6th	6th–7th	7th–8th	8th–9th	9th–10th	10th–11th	Total
0	12											12
1	4	1	2	4	2	1		1				15
2	10	8	7	6	8	2	4	4	2			51
3	4	8	14	8	6	9	2	2	2	1		56
4	1	7	5	6	2	3	2	1				27
5		4		1	1							6
6		1				1	1					3
7					1		1					2
8										1		1
9												
10						1						1
11				1								1
Total	31	29	28	26	21	16	10	8	4	2		175
Average (years)	1.3	3.3	3.0	3.1	3.1	3.3	3.5	2.4	2.5	5.5		2.8

B. Later Period

Intervals (years) / Birth order	Marriage-1st	1st–2nd	2nd–3rd	3rd–4th	4th–5th	5th–6th	6th–7th	7th–8th	8th–9th	9th–10th	10th–11th	Total
0	6											6
1	14	2	2	1		1		1				21
2	2	9	9	8	6	4	4	2	2	1		47
3	1	5	7	7	3	4	5	1		1	1	35
4	1	6	4	2	4	2	1					20
5	1	2	1		3	1	1					9
6						1		2				3
7						1		1				2
Total	25	24	23	18	16	14	11	7	2	2	1	143
Average (years)	1.2	2.9	2.7	2.4	2.9	3.4	2.9	3.9	2	2.5	3	2.7

Birth Intervals

Next, let us look at the interval between births. In this instance, only the cases in which a marriage continues at least until the end of the wife's potential child-bearing period were included, in other words, those in the CF classification in Table 4-10. The fifty-nine cases examined are shown in Table 4-18. Of the thirty-four cases in the early period, because three had no births whatsoever, the number considered here was reduced to thirty-one. The birth interval was treated as zero when the births happened in the same year. The interval from marriage to the birth of the first child was handled likewise. The fact that, in the early period, there are a large number of instances of these zero intervals between marriage and first child is, as I have mentioned previously, due to the fact that marriages were often entered in the sources late.

As far as can be seen from this table, excluding the birth of the first child, there is no particularly special relationship between birth interval and birth order. In both cases, the interval is approximately three years, with the interval between all children being nearly

Table 4-19 Wife's Age at Last Birth

Wife's age \ Birth order	1	2	3	4	5	6	7	8	9	10	11	13	Total
27		1											1
29				1									1
30		1											1
31		1		1									2
33				1		1							2
34				1									1
35			1		1	1							3
36	1												1
37	1		1	1	3		1						7
38							1		1	1	1		4
39					1	4	2						7
40					1	1		2					4
41					1	2		1				1	5
42						1	2						3
43			1					3					4
44			1					1					2
45					1			2		1			4
46										1			1
47								1					1
48							1				1		2
Total	2	3	4	5	8	10	7	10	1	3	2	1	56
Average age	36.5	29.3	39.8	32.8	38.9	38.8	40.7	43.1	43.0	43.0	38.0	41.0	39.2

equal, betraying expectations of longer intervals for higher order of births. From this fact I deduce that there was no change in birth intervals for higher order of births. The fact that fertility declines with age is due both to the difference in the age at which childbearing stops, and to the decrease in the number of women who continue to have children as they grow older.

Table 4-19 shows the age distribution at the time of last birth. Because the number of available cases is small, it is difficult to see a definite trend, but, as expected, the greater the number of births, the higher the age at which childbearing ceases. On average, there is a mean difference of 1.5 years per each step up the ladder in the number of children.

Child Mortality

As has been demonstrated in the previous section, child mortality in this village reaches 20% or more for children under age five *sai* among those for whom there is an entry in the records. Here, let us examine the relationship between the birth order, the age of the mother at birth, and child deaths. Table 4-20 shows deaths among the under-fives

Table 4-20 Birth Order and Child Mortality

A. Earlier Period

Number of births / Number of couples	Birth order 1	2	3	4	5	6	7	8	9	10	11	Total	Mortality (‰)	Couples without child deaths	Rates (%)
1 / 10	2											2	200.0	8	80.0
2 / 8	1	1										2	125.0	6	75.0
3 / 8	1	2	3									6	250.0	3	37.5
4 / 6		1	1	1								3	125.0	3	50.0
5 / 11	2	1		2	1							6	109.0	8	72.7
6 / 10	3	1		1	1	2						8	133.0	5	50.0
7 / 3	1		1	1	2	2						7	333.0	0	0
8 / 8	3	3	1	1	1	2						11	171.9	1	12.5
9 / 4		1	1		1			1	2			6	166.7	1	25.0
10 / 2		2	1	1	1	1	1		1	1		9	450.0	0	0
Sub-total 70	13	12	8	7	7	7	1	1	3	1		60		35	50.0
Mortality (‰)	185.7	200	153.8	151	184.2	259.3	58.8	71.4	500	500			181.8		

B. Later Period

Number of births / Number of couples	1	2	3	4	5	6	7	8	9	10	11	Total	Mortality (‰)	Couples without child deaths	Rates (%)
1 / 17	5											5	294.1	12	70.6
2 / 18	4	2										6	166.7	13	72.2
3 / 17	5	4	4									13	254.9	9	52.9
4 / 16	4	3	4	3								14	218.8	6	37.9
5 / 14	3	2	6		5							16	228.6	6	37.5
6 / 14		5	4	1	5	5						20	238.1	2	42.9
7 / 11	2	2	4	2	2	2	2					16	207.8	4	14.3
8 / 6	1			1	2	2	1					7	145.8	2	36.4
9 / 1		1	1				1					3	333.3	0	33.3
11 / 1		1							1			2	181.8	0	0
13 / 1			1			1					1	3	230.8	0	0
Sub-total 116	24	20	24	7	14	9	5		1		1	105		54	46.6
Mortality (‰)	206.9	202	296.3	109.4	291.7	264.7	250		333.3		500		218.8		
Total 186	37	32	32	14	21	16	6	1	4	1	1	165		89	47.8
Mortality (‰)	198.9	201.3	240.6	129.6	244.2	262.3	162.2	43.4	333.3	166.7	500		203.7		

according to their birth order.

Figure 4-12 shows the mean child mortality for each birth ranking in the bottommost column. As far as can be ascertained from the tables and figures, there is a single visible trend in the mortality by birth order. Excluding cases of seven children or more, which are far too few in number, child mortality rises to some extent the later the birth ranking, apart from the fourth child. The 20% line among the first- and second-born children rises to 25% among the fifth- and sixth-born children. However, these cases are also few in number, and it may be better to avoid drawing any conclusions from the case of this village alone. Let us stop by merely pointing out here that such a possibility at least exists.

Finally, let us look at the relationship between the age of the wife at birth and child mortality. Table 4-21 shows child mortality by the age of the mother at five-year intervals, and Figure 4-13 represents totals for both the former and latter periods. In the same way as shown in the previous table, it

Fig. 4-12 Child Deaths by Birth Order

Fig. 4-13 Child Deaths by Mother's Age at Birth

seems that, the higher the age of the mother at the birth of the child, the higher the risk of the child dying, but again, this cannot be stated unequivocally because of the scarcity of cases. The fact that the risk is visibly low when the mother is aged twenty or younger merely hints, as expected, that there may well indeed be a fixed effect on the mortality rate by age.
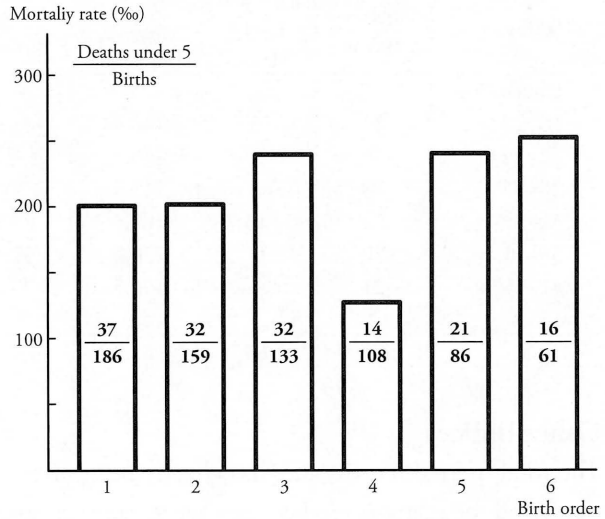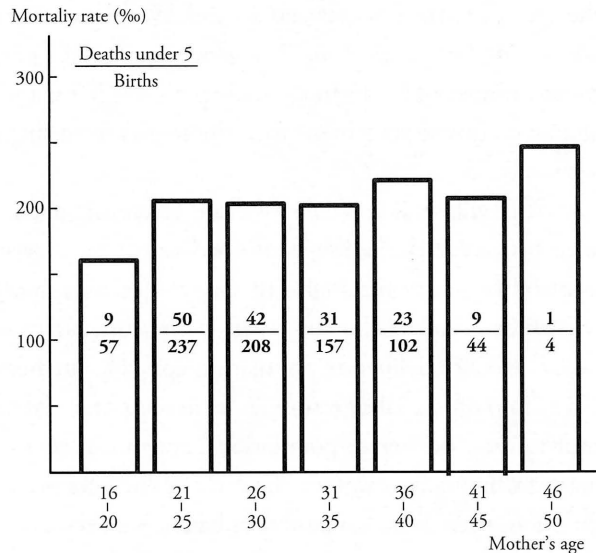
Table 4-21 Wife's Age at Giving Birth and Child Mortality

Wife's age	Earlier period			Later period			Total
	Births	Child deaths	Mortality (‰)	Births	Child deaths	Mortality (‰)	Mortality (‰)
Under 15				1			
16–20	22	3	136.4	35	6	171.4	157.9
21–25	85	20	235.3	152	30	197.4	211.0
26–30	78	9	115.4	130	33	253.8	201.9
31–35	72	13	180.6	85	18	211.8	197.5
36–40	50	11	220.0	52	12	230.8	225.5
41–45	21	4	190.5	23	5	217.4	204.5
46–50	2			2	1	500.0	250.0
Total	330	60	181.8	480	105	218.8	203.7

Other Indices

The total marital fertility rate has already been discussed in the previous section. There I examined the relationship between age at marriage and the number of births. I attempted a kind of survey of behavioral patterns to do so. The results obtained by the method employed in this chapter are as follows. When the age at marriage is between 16 and 20, the mean number of births in the early period is 7.42, and in the later period, 7.29; when the age at marriage is between 21 and 25, the number of births in the early period is 4.62 and in the later period, 6.27; and when the age at marriage is between 26 and 30, the mean number of births in the early period is 3.75, and in the later period, 4.00. This is in almost complete agreement with the results from the observations made in the preceding section.

This village is a *shinden* village (established on newly reclaimed land and fields), and, because reclamation continued until the very end of the Tokugawa period, land availability was rather high. That is, the relationship between population and resources was exceptionally good for Japan at the time. It is readily understandable that there is no evidence of deliberate population control. Furthermore, it also appears that there was little drain on the labor resources from temporary labor migration. The fact that there was probably no deliberate population control can be shown by the sex ratios at birth. No matter whether we examine the early or the later period, or the birth order of the child in question, there is no unnatural imbalance, or trace of control having been carried out.

6. Summary

Although one cannot claim that the single case of this village is representative of rural populations during the Tokugawa period as a whole, it has significance as an example from a region of new settlement where production for the market is presumed to have been growing. As has been stated before, research into this period, for which national statistics are lacking, requires continual perseverance in accumulating individual cases such as these.

The factors that determine fluctuations in the scale of the population are many and varied, but, when limited to one region which was open to the outside, it is only natural that so-called social factors have a major influence. In the case of this village, given the limitations of the sources, detailed information on migration cannot be obtained and we are left with only a partial picture. Consequently, it is a serious matter to draw conclusions concerning the reasons for these fluctuations. However, reclamation was actually continuing in these new settlement villages, and, if we consider that demand for labor within the village was great, the population that emigrated to other villages was probably extremely small and it can be fairly posited that the majority of the fluctuation was due to internal factors such as births and deaths.

With this premise, let us try simply recounting the story that emerges from analysis of the population statistics for Kando-shinden. The characteristics of this village revealed by the statistics are that fertility was high, far surpassing mortality. It reaches its highest peak in the five years between 1818 and 1822, with a mean of 40‰, but the periods immediately preceding and following this period are also ones of high fertility, and the rate of population increase is also at its maximum. However, these results cause fluctuations in the ratio between the productive population and the dependent population, such that the former decreases year by year. Nevertheless, this condition is reversed towards the end of the Tokugawa period, and fertility falls, comparatively speaking.

What determines the actual number of births is the age of the woman at marriage. However, because the number of cases that can be taken is small, no fixed trend can be discerned across the eras. In Japan, because it is believed that there are few instances whereby the age of the woman at marriage is influenced more greatly by the economic environment than that of the man, it seems reasonable to say that there is no direct relation between economic development and fluctuations in the population scale based on age at marriage.[9]

Even supposing that, because of the sparse availability of cases, the average life expectancy, life table, and mortality curves cannot be said to be sufficiently persuasive, they still show the patterns of an early modern society. The fact that nearly 30% of all children

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9   For information on the role of age at marriage, see Saitō 1985, p. 244.

died in infancy—and this figure was in reality even higher—and that the population still increased led to an extremely broad-based pyramid of age structure, thereby heightening the proportion of dependents in the population.

"Natural" adjustment through infectious disease and famine, as well as artificial adjustment by abortion and infanticide, suppressed the population growth that might have occurred without them, but looking at the number of births in the lifetime of a single couple, it does not appear that artificial birth control was practiced all that frequently. Essentially, the statistics for this village can be said to present us with one experimental case of how population changed in premodern society under conditions in which population limitation was not practiced.