CONSTRUCTING A DEMOGRAPHIC DATABASE SYSTEM FOR ANALYZING THE JAPANESE RELIGIOUS INVESTIGATION REGISTERS

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ABSTRACT

The source data for historical demography in the pre-modern Japan is the religious investigation registers generally called Shumon-Aratame-Cho (SAC). They were recorded annually for over 150 years from the end of the 17th century in villages and towns in most areas in Japan. If we find the cases where annual SAC documents have been well preserved, we can obtain a great deal of information about the real life of common people including not only population statistics but also indices concerning family status. I have been developing a database system to calculate demographic statistics from SAC documents. I named this system DANJURO. DANJURO ver.2.0 is composed of six parts: the image database of SAC documents, application programs for outputting demographic statistics, the manual for users, links to the related site, the bulletin board for questions and answers and the discussion window for the technology of how to recognize old hand writing characters in SAC documents. I have stored up approximately 100 thousand personal data and 23 thousand household data of seven villages. With DANJURO ver.2.0, I can improve the following four points: cutting down working hours to output demographic statistics, assurance of the reproducibility of the data processing, preservation of historical hand writing documents as digital images and sharing the data and its analysis system with researchers in the world through the internet.

1. INTRODUCTION

The total population in Japan was stable during the 18th century and started to increase from around the 1840's (Sekiyama, 1958). Especially the population in northeastern Japan started to decrease from early in the 18th century. The lowest population level was from 1780 to 1840, and started to increase afterward (Kawaguchi, 1998). In northeastern Japan, structural change probably came out at the beginning of the 19th century. The beginning of population increase from the 1840's is thought to be one of the significant signs which means an approach run leading to the modern industrial society.

At present, it is not clear the reason why the population started to increase from the 1840's. On the other hand, some historical demographers pointed out that the regional differences of life courses of peasants (Hayami, 2001). Therefore it is necessary to find historical demographic data from all over the country and to place the micro study of each village under the nationwide view. In order to collect, store and analyze historical documents for historical demography

methodically, it is the first step to construct a database system and share the system with scholars.

In this paper, I would report on a database system for analyzing the Japanese religious investigation registers. I have been developing a system, which I named DANJURO, to output demographic statistics and indicators from the Japanese religious investigation registers. DANJURO ver.1.0 was composed of a character database of the registers and application programs outputting demographic statistics (Kawaguchi, 1990). With this system, it has become much easier and faster to retrieve demographic information and to output demographic statistics than the past handwork method. With DANJURO ver.2.0, I attempt to improve the following four points: cutting down working hours to output demographic statistics and indicators, assurance of the reproducibility of the data processing, preservation of historical documents as digital images and sharing the data and its analyzing system with researchers in the world.

2. DATA: JAPANESE RELIGIOUS INVESTIGATION REGISTERS

The source data for historical demography in the pre-industrial Japan is the religious investigation registers generally called *Shumon-Aratame-Cho* (SAC). As a general rule, they were recorded annually for over 150 years from the end of the 17th century in villages and towns in most areas in Japan. In these registers, the following information for each person is given: name, age, relation with the household head, and change in family status. For each household the following items are recorded: number of cattle and horses, size of the house, roofing material, cultivated acreage, religious sect, parish temple, place of the parish temple and household size. If we find the cases where annual SAC documents have been well preserved, we can obtain a great deal of information about the real life of peasants including not only population statistics such as sex ratio, crude death rate, age at first marriage, etc., but also indices concerning family status such as household structure, inheritance patterns, adoption system and so on.

I understand that some western scholars called Japan a treasure island for historical demography because of the existence of the SAC. At present, I would estimate the total amount of the SAC data in whole Japan by applying the examples of *Minamiyama-Okurairi-Ryo,* which is my study area about 100 miles north of the Tokugawa Shogunate capital Edo, now Tokyo.

There were 271 villages in *Minamiyama-Okurairi-Ryo* during Tokugawa Era (1600-1868). In this area, I can confirm annual SAC documents over 50 years in ten villages. This indicates that SAC documents have been well preserved in 3.7 percent of all villages in this area. I can assume that the percentage of villages where annual SAC documents were well kept is about 3.7 percent in all over Japan. There were 63,562 villages in 1834. Therefore I can guess that there is a possibility to find well-preserved SAC series in 2,300 villages in Japan. The average population of a village was 420 in 1834. Then approximately 48,300,000 persons are probably recorded in these SAC documents. I can estimate that the total amount of these SAC data is about 4,800,000 pages, if it is possible to record ten persons in one page.

3. STRUCTURE OF THE SYSTEM

The URL of DANJURO ver.2.0 is http://kawaguchi.tezukayama-u.ac.jp. I constructed DANJURO ver.2.0 with Oracle 8.05 and Oracle Web Application Server 4.07. DANJURO users

need to install browsers such as Microsoft Explore 4.0 or Netscape navigator 4.0 in their personal computers. This system is composed of six parts: the image database of SAC documents, application programs for outputting demographic statistics and indicators, the manual, links to the related site, the bulletin board for questions and answers and the discussion window for the technology of how to recognize hand writing characters in SAC documents.

4. IMAGE DATABASE OF SAC DOCUMENTS

Image database of SAC documents is composed of four tables: personal information, household information, digital images and bibliography. Items of each table are as follows. Digital image data are shown with under line. Items in italic are of numerical values. Other items are Chinese character data.

1) Personal information table
   Village/county/province, ***year***, ***household ID number***, ***personal ID number***, name in roman letters, name in Chinese characters, sex, ***age***, relationship with the head of the household, marital status, religion/religious sect, village of the temple, temple of the person, change, detail of the change, post in the village
2) Household information table
   Village/county/province, ***year***, ***household ID number***, name of the head in roman letters, name of the head in Chinese letters, ***number of the male family members***, ***number of the female family members***, ***number of hereditary male servants***, ***number of hereditary female servants***, ***number of male servants***, ***number of female servants***, ***number of male lodgers***, ***number of female lodgers***, household size, type of the family, existence of persons in addition to the family members, generation, ***number of cattle***, ***number of horses***, cultivated acreage, size of the house, roofing material
3) Digital image table
   Village/county/province, ***year***, ***household ID number***, **digital image of a SAC by each household**
4) Bibliography table
   Village/county/province, ***year***, date in Japanese old lunar calendar, title, the name of a person in charge of the religious investigation, owner of the SAC, facility which keeps the SAC, **digital image of the cover**, **digital image of the colophon**

If a user clicks 'image database of *Shumon-Aratame-Cho'* on the 'index window', then the 'image database of SAC documents' will open. Users have to choose 'personal information table', 'household information table', 'digital image table' or 'bibliography table'. If a user clicks 'personal information table', the 'input window for retrieve conditions' will appear. A user should choose or input retrieve conditions in this page. After that, if a user clicks 'search button' at the bottom of the 'input window for retrieval conditions', the retrieval program will be executed and a 'browsing window' will be shown. In this window, users can confirm key words of the retrieval, number of hit data and 20 cases of retrieval results per page.

If a user clicks 'ID' at the left side of the 'browsing window', a 'personal information form' will open. Users can look at the 'household information form', 'digital image form' and 'bibliography form' by clicking buttons in the 'personal information form'. If a user wants to check on misreading of the SAC or would like to see some digital images which one can't record in character data such as a layout of a document, handwriting and seal impression, he/she will be

able to compare character data in ‘personal information form’ and ‘household information form’ with images of documents in ‘digital image form’ and ‘bibliography form’ on one screen.

If a user clicks ‘selection of download items button’ in the ‘browsing window’, he/she will reach the ‘selection of download items window’. If a user clicks ‘go to download window’ at the bottom of the ’selection of download items window’ and clicks ‘down load button’ in the ‘down load window’, a user will get the retrieval result in his/her computer as C.S.V. form data.

5. APPLICATION PROGRAMS

System users have to install Microsoft Excel 98 into their own computers to execute the application programs. With these application programs, I can provide the following 62 demographic statistics and indicators with graphs.

1) Indicators of population increase
   Population trend, number of households, periodic annual rate of growth, number of cattle, number of horses
2) Indicators of birth and death
   Number of births, crude birth rate, sex ratio at birth, general fertility rate, child-woman ratio, women’s age at birth, number of births per person (woman), number of deaths, crude death rate, sex ratio at death, age at death, crude rate of natural increase
3) Indicators of marriage and migration
   Number of married persons, age at marriage, age at first marriage, number of marriages per person, number of out-migrants, out-migration rate, number of in-migrants, in-migration rate, net migration rate
4) Other indicators of changes
   Number of servants, age of service, number of name changes, age at name change, number of name changes per person, number of adoption, age at adoption, number of household heads, age when becoming the household head
5) Indicators of composition of population
   Average age, population by five-year age groups, percentage of population by five-year age groups, age composition rate, dependency ratio, sex ratio, age specific sex ratio, population by marital status, proportion ever married, proportion never married, population by religion or religious sect, percentage of population by religion or religious sect
6) Indicators of composition of household
   Average household size, distribution of household size, percentage of households by household size, number of households by cultivated acreage, percentage of households by cultivated acreage, correlation between household size and cultivated acreage, number of households by family structure, percentage of households by family structure, number of households with servants or lodgers, percentage of households with servants or lodgers, number of households by generation living together, percentage of household by generation living together, number of households with cattle or horse, percentage of households with cattle or horses, number of couples per household

If a user clicks ‘application program’ on the index window, then an ‘application program window’ will appear. A user has to download a macro file and a data file into his/her computer

to execute the application program. First, a user should click the logo mark of the floppy disk, which is the left side of each indicator. Then the macro file will be downloaded to the user's drive. Secondly, the user should click an underlined indicator on the 'application program window' to open the 'input window for retrieval conditions'. If he/she clicks a 'search' button in the 'input window for retrieval conditions', the retrieval and the calculation will be executed and a 'data download window' will be shown. To get C.S.V. form data in a user's computer, he/she should click the 'download' button in the 'download window'. If a user executes the macro file in his/her computer and specify the data file, the demographic indicator will be shown as a graph.

6. REGIONAL DIFFERENCES OF MARRIAGE PATTERNS

I want to show the female average age at first marriage in six villages in Table one. Of course, the female average age at first marriage is an important indicator, which acts on the family type, family cycle, number of births etc. The female average ages at first marriage in four villages in *Minamiyama-Okurairi-Ryo* are nearly the same. The female average ages at first marriage in two villages on the outskirts of Osaka are also very close. But the female average age at first marriage in *Minamiyama-Okurairi-Ryo* is 4-8 years younger than the age in the hinterland of Osaka City. Therefore there were more households with three or four generations living together than households with two generations living together in *Minamiyama-Okurairi-Ryo*. Conversely, there were more households with two generations living together than households with three or four generations living together in villages near Osaka.

Table 1. Average age at first marriage (female)

Village	Period of births	Number of brides	Average age at first marriage
Ishibuse	1752-1771	13	16.4
Tounosu	1790-1809	21	19.3
	1810-1829	31	19.4
Komatsukawa	1792-1811	11	19.4
Kuwanohara	1750-1769	15	18.7
	1770-1789	10	21.5
	1790-1809	18	19.3
Kami-kawara-bayashi	1750-1769	38	22.4
	1770-1789	38	25.4
Hanakuma	1789-1808	27	26.4
	1809-1828	28	27.4

According to a national population statistics on marital status by age in 1886, it is clear that the regional differences of marriage ages: early marriage in northeastern Japan and late marriage in southwestern Japan (Figure 1). Although I can show the data only in six villages now, these data clearly reflect the regional differences of the marriage age and the family structure.

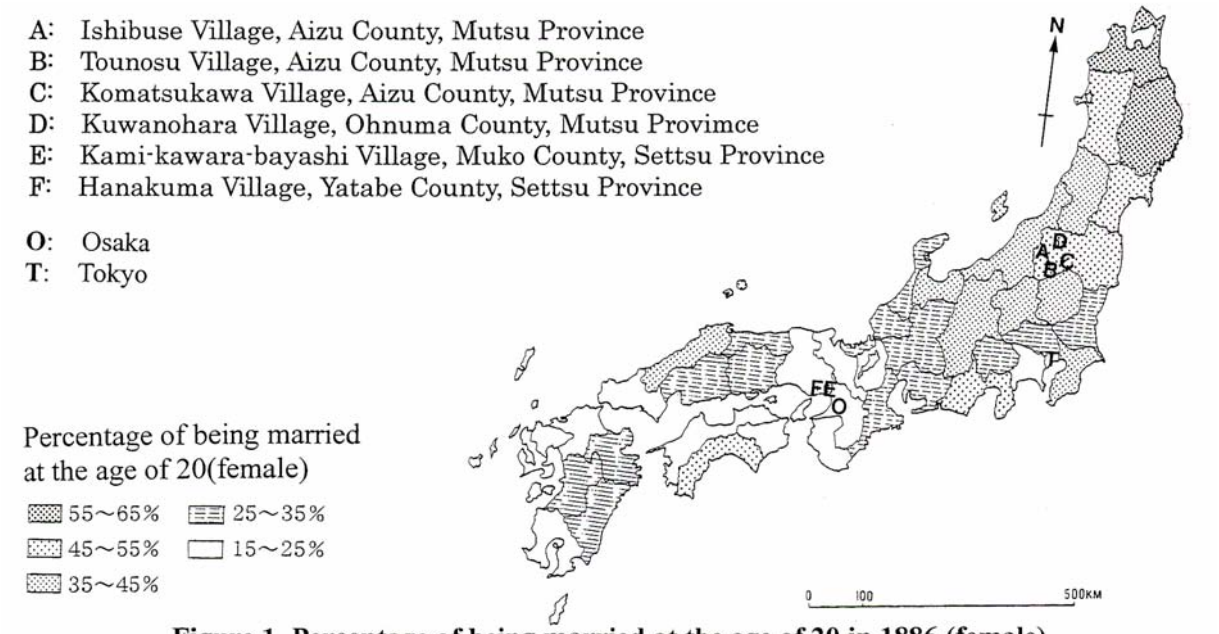

Figure 1. Percentage of being married at the age of 20 in 1886 (female)

The regional differences of the marriage age were probably going to homogenize after the industrial revolution around the 1890's. It was one of the most important characteristics, which show the shift from the traditional society to the modern society to homogenize the regional differences of basic life style of common people in Japan. Such a regional difference was just recognized by Professor Akira Hayami (Hayami, 2001). Regional typology of historical demography and factors of the regional difference are totally in the dark. I hope Japanese scholars will collect a lot of series of SAC documents with DANJURO system and place the population characteristics of each village under the nationwide view with GIS in the near future.

7. CONCLUSION

In case of attempting to make a bridge between the pre-modern and the modern Japanese societies from the view of historical demography, it is probably a pressing subject to reconstruct the transition of population reproductive system and to find regional patterns of the reproductive system. Therefore we have to construct a research system to collect, store and analyze Japanese religious investigation registers in villages and towns methodically and share it with scholars.

I have constructed a system named DANJURO ver.2.0. This system is composed of six parts: the image database of SAC documents, application programs for outputting demographic statistics and indicators, the manual for users, links to the related site, the bulletin board for questions and answers and the discussion window for the computer technology of how to recognize old hand writing characters in SAC documents. I have stored up approximately 100 thousand personal data and 23 thousand household data of the following seven villages: *Ishibuse*, *Tounosu*, Komatsukawa, *Kuwanohara*, *Nakatou*, *Kami-kawara-bayash* and *Hanakuma*. I can improve the following four points with this system: cutting down working hours to output

demographic statistics and indicators, assurance of the reproducibility of the data processing, preservation of historical documents as digital images and sharing the data and its analyzing system with researchers in the world. Also I could confirm regional differences of marriage patterns and the necessity to place the population characteristics of each village under the nationwide view with GIS.

8. REFERENCES

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