CULTURAL STUDIES

TRANSFORMATION OF LOCAL GOVERNANCE IN THE EIGHTEENTH AND NINETEENTH CENTURIES: A BASIC ANALYSIS OF POPULATION REGISTRATIONS IN VÕNG TRÌ VILLAGE, THỪA THIÊN HUẾ PROVINCE

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Abstract

In this article, given the current lack of empirical studies using population registers due to the difficulty of obtaining them, we will introduce the population register of Võng Trì village of Thừa Thiên Huế province, and provides a basic analysis. The analysis then revealed the following: It can be said from the village documents of Võng Trì that the population register is not a historical record such as the current population census. Although the administrative regulations required villages to report the exact number of adult males and the village pledged that the contents of the population register were not false, in reality, both the government and the village acted on the implicit assumption that a certain number of the population was concealed for taxation evasion. The number of people registered in the population registers shows how the two were balanced in the struggle between state power and village community at that time. From this point of view, the Tây Son period, when the conscription was greatly strengthened by centralizing the separate control of the prefectural government and arsenal office in the population register, and the Minh Mang era, when the registrants under the control of the government increased by the examination for conscription, were special periods when the state power was superior to the village community which tried to hide their villagers. Conversely, during the Gia Long era and after the Thiêu Tri era, there was no active attempt to take control of the human resources.

Keywords: Population Register, Nguyễn dynasty, Autonomy villages, Huế

Introduction

As represented by the Vietnamese proverb "*Phép vua thua lệ làng*" (Laws

of the Emperor are less than the customs of the village), Vietnamese traditional villages are considered to

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have strong autonomy. For example, Alexander B. Woodside (1988: 152-158) points out that in actual village management, decisions in the "small court" led by the village elder took precedence over central administrative regulations and laws, and that this prevented the centralization by Minh Mang. Furthermore, Pierre Gourou (1936 (2015): 129-134) estimates that even in the 1930s, the French authorities' population census showed that villages underreported their population by 5-15% in order to reduce tax payments. This, combined with the fact that the Nguyễn dynasty was colonized by France, has led to the downgrading of the Nguyễn dynasty as a "weak pre modern state". However,in recent years, there has been a reevaluation of the Nguyễn dynasty. Taga Yoshihiro (Taga 2018, 2020), for example, reveals that the Nguyễn dynasty established their own currency block with eliminating foreign currencies in the first half of the nineteenth century, and and indicates that the beginnings of a "modern state" can be seen in the pre-colonial Nguyễn dynasty. Observing the activities of the Nguyễn Dynasty in the Mekong Delta and the East Sea (South China Sea), there are indications that it was trying to secure its own interests based on a fairly modern territorial concept. Nguyễn Dynasty was by no means an

ignorant regime with regard to Westernization (Vũ Đức Liêm 2016) (Shimao 2014). However, apart from this modernization in external perceptions, there has been little empirical research on what local governance was like in the country. In particular, there is a critical lack of empirical research on specific issues such as how the Nguyễn dynasty administered "autonomous villages" and to what extent it was able to grasp them.

Successive Vietnamese dynasties after independence of the eleventh century have basically been intended toward the Chinese model of state building. In particular, the Lê Dynasty, which regained its independence from the Ming Dynasty, established a centralized bureaucratic state during the reign of Lê Thánh Tông by recruiting Confucian literati through **Imperial** examinations, and governing structure for the local society established in his reign would be basically inherited by successive dynasties and regimes up to the Nguyễn Dynasty. In terms of taxation, those dynasties were essentially based on the land tax (thuế ruông 田稅) levied on public rice field ($c\hat{o}ng$ $d\hat{i}en$ $\triangle \boxplus$) and the poll tax (thuế đinh 丁税) levied on age and social status*, and these two tax systems were supported by the land cadastre (đia ba 地簿), which was compiled for each commune ($x\tilde{a}$ \vec{n}) based on land survey, and the population registration (đinh ba 丁簿), which registered adult males who were subject to taxation. There is no doubt successive Vietnamese that administrations have devoted much effort to compiling these two registers in order to secure their tax revenues. A representative example is the land cadastres of the Nguyễn Dynasty owned by National Archive Centre N1 (Trung tâm Lưu trữ Quốc gia 1). These were compiled by the Nguyen Dynasty after land inspections throughout the territory from the early to mid-19th century, and show us how much effort the pre-modern dynasties put into these records. These land cadastres have been digitized at National Archive Centre N1 and are available to anyone who applies for access. Many scholarships have been conducted using these land cadastres as primary sources.†

On the other hand, research on the population register is extremely scarce. The reason is obvious: it is not a historical document that can be viewed in public archives such as National Archive Centre N1 or Institute of Hán Nôm Studies (Viện nghiên cứu Hán Nôm) ‡. If one wants to see the population register of the pre-modern dynasties, the only way is to find it coincidentally existing in the village. Although many historical researchers know as common knowledge that the population registrations called "đinh ba" was compiled by successive feudal dynasties for the purpose of collecting poll tax, it is extremely rare to see their actual documents. Considering such a situation, it is not surprising that research on population register stagnates.

However, the author is currently collaborating with researchers in Hue, and has found that a number of population registers, mainly from the Nguyễn Dynasty, are still extant in several villages surrounding Huế. The population register of Võng Trì village§,

^{*}While Lê Thành Khôi (1955: 145) states that the poll tax was established during the Trần dynasty, Fujiwara Riichiro (1986: 388-392) denies this and states that it was established during the Early Lê period. In this ảticle, we follow Fujiwara's theory. For công điền system and land cadastre, see (Trương Hữu Quýnh 2004) and (Sakurai 1987). There are various theories about the origin of "công điền", but these will not be discussed in this article.

[†] We will only list the representative studies on the land cadastre of Huế, because studies on the land cadastre of Nguyễn dynasty are too many. For an overview of the land cadastre for the entire

Thừa Thiên Huế province, see (Nguyễn, Đình Đầu 1997). For case studies that discuss agricultural transition by land cadastre of individual villages, see (Nguyễn Thị Hà Thành 2010) and (Ueda 2021). ‡ According to the material search, National Archive Centre N1 holds population registers of the Red River Delta villages, but it cannot be viewed because it has not yet been digitized as of today. Institute of Hán Nôm Studies has several population registers of the Red River Delta villages in the Nguyễn period.

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analyzed in this article, is one such example, was photographed at village communal hall (đình làng) of Võng Trì 網池 village by Lê Thọ Quốc, Research Fellow of Vietnam National Institute of Culture and Arts in Hue (Phân viên Văn hóa Nghệ thuật Quốc gia Việt Nam tại Huế) and his colleagues in the field survey of the summer of 2022, the author cooperated in rephotographing and completed photographing all of the Hán Nôm documents stored in the village communal hall of Võng Trì village. the number of documents reaches 251, and the number of images taken amounts 1,500. After about the photographing, we sorted through these documents and found that they contained about population 40 registers dating from 1777 to 1888. Of the dozens of villages around Hue that have surveyed so far, population register of Võng Trì village is the most exhaustive.

In this article, given the current lack of empirical studies using population registers due to the difficulty of obtaining it, we will introduce the population register of Võng Trì village, and provide a basic analysis for further research development in the future.

1.1. Village documents of the communal hall of Võng Trì village

First, a brief overview of the village documents in Võng Trì village is given examining population prior registers. The Hán Nôm documents used in this article were photographed by Lê Tho Quốc and his colleagues on August 11th, 2022 with financial support of Japan Society for the Promotion of Science. The number of photos taken is approximately 1500, which is equivalent to about 3,000 pages. The number of Hán Nôm documents is 251, but many of the documents are a combination of several related documents * . For example, documents related to tax payments from the Canh Hung era to the Tây son period are bound together with strings and made into a single booklet (VTĐ152), and documents of new registrations and death reports of villager from the 23rd to the 24th year of Tu Đức are combined into a single booklet (VTĐ180). If these considered as separate documents, the number of historical documents would be roughly 300-350.

In most cases, the archives of village communal halls in the surrounding

^{1.} Overview of the Population Registers of Võng Trì village

Vang, tỉnh Thừa Thiên Huế). Now, Võng Trì is just one hamlet within Phú Mậu commune, but it was an independent administrative unit as *Võng Trì xã* 輞池社 during the Nguyễn dynasty.

^{*} In this paper, the village documents are cited by the reference number (VTĐ~~) assigned by Lê Thọ Quốc when he took the photographs.

Huế accumulation of are an contemporaneous archives related to administrative matters and village management from the 17th to the early 20th century, and the same is true for Võng Trì village. In the archive of the communal hall of Võng Trì village, the earliest document is the land cadastre of the 6th of Thinh Đức (1658) (VTĐ211), and the most recent document is the courtesy document for the deities in Võng Trì village named "輞池社祀神曲" (Võng Trì xã tự thần khúc) of the 20th of Bảo Đai (1945). Village documents are documents that were considered important to the villagers of the same period and were left behind for future generations to refer to. Almost all villages have in common the fact that the imperial seal (sắc phong) given to the village's guardian deity called Thành hoàng by the feudal dynasty was considered the most important and has become a kind of "prestige property" of the village. However, what documents other than sắc eligible phong were preservation varies widely from village to village. In the case of Võng Trì village, a large amount of administrative documents, especially those related to tax payment and resident registration, have existed, indicating that there was fairly precise population management between the administration and the village at that time. This includes about 40 years of population register from 1777 to 1888 (2 years of the occupation of the Lê-Trinh government,

2 years of the Tây Sơn dynasty, and 36 years of the Nguyễn dynasty. Including drafts). Thí article provides a basic **ẽ**amination of these population and registers reconsiders the relationship between feudal administration and "autonomous villages".

From the seventeenth to nineteenth centuries, the rulers of Huế area changed rapidly from the Nguyễn Lords, the Lê-Trịnh government (Trinh Lords), the Tây Sơn dynasty, and the Nguyễn dynasty, but all of these regimes imposed two major taxes on settlements: land tax and poll tax. In order to levy these two taxes, successive regimes compiled land cadastres and population registers. The Võng Trì documents show that successive regimes, especially the Nguyễn Dynasty, spent enormous administrative costs to compile them and update their content. For example, in order to compile a land cadastre, the boundaries with adjacent settlements must first be established to determine the taxable area before the actual cadastral survev could begin. Therefore, under the leadership of the local government, a consensus on the boundary was reached between the consensus both villages, and a document was drawn up stating that the two villages agree on the boundary. ordinary settlement borders several or more settlements, and unless an agreement can be reached with all of them on the boundary, the

cadastral survey cannot begin*. Even after the creation of the land cadastre, Võng Trì village had been engaged in border disputes constant with neighboring villages, which have repeatedly sued each other. This process led to the accumulation of various land dispute-related documents in the communal hall, for instance complaints, counterclaims, boundary management, reaffirmation of boundary, and so on.

The same is true for the population register. In the case of the population register, it is not compiled once and never ends, because village population is constantly changing due to deaths, new registrations, emigration, and other factors. For this reason, at least in the case of the Tây Sơn and Nguyễn dynasties, the population register of Võng Trì village show a fairly precise grasp of population † . During the Nguyễn dynasty, Võng Trì village frequently reported the deaths of registrants and the registration of new adult males to administration, and the information on the population register was updated annually to determine accurate poll tax amounts based on these reports.

a result of administrative processes such above, several hundred administrative documents were accumulated in one village of Võng Trì alone. Since there were several hundred local administrative units called $x\tilde{a}$ in the area surrounding Huế alone, the administrative side must have spent a considerable amount of cost and effort on them. From these village documents, it appears that successive regimes, especially the Nguyễn Dynasty, had a fairly precise local governance at first glance.

1.2. Introduction of Population register in Võng Trì village

1.2.1. Population Register in the Nguyễn Lord period

There is no surviving population register of the Nguyễn Lords period in Võng Trì village. At present we have already surveyed dozens of hamlets surrounding Huế, and have not seen any population register of the Nguyễn Lords period, not only in Võng Trì, but also in other settlements. It is difficult to believe that only the population register of the Nguyễn Lords period has been scattered, since other official documents from the Nguyễn Lords such as the land cadastres of Thịnh Đức era (1653-1658) and Vĩnh Khánh era

^{*} This process was further complicated if the settlement has detached territory, rights to use waterways, or extensive fishing rights. See (Motohiro 2014).

[†] As will be discussed below, The Lê-Trịnh government has abandoned detailed population ascertainment by $Binh\ L\hat{e}\ ph\acute{a}p\$ 平例法 at the end of the 17th century. See (Ueda 2019: 147-153).

(1729-1732), are still extant in the Võng Trì and other settlements.

According to *Đại Nam thực lục* 大南 寔錄 and Phủ biên tạp lục 撫邊雜錄, Nguyễn Lords compiled population register called loai ba 類簿 every six years, and update every three years following the regulations of Lê Thánh Tông era. In the case of three district of Hường Trà, Quảng Điền, and Phú Vang, examined villager were conscription at a place called Con Nhô Ha xứ 坩瑪下處, and based on this, Nguyễn Lords supplemented their military personnel and collected poll tax called Sai du tiền 差餘錢.* Four copies of population register were made based on this inspection, and sent to Nguyễn Lords, Ministry of Revenue, province and district † . According to this regulation, during the Nguyễn Lords period, the population register was kept only in government office and not on the village side. Perhaps this is the reason why the population register of Nguyễn Lords period is not extant in the surrounding Huế.

1.2.2. Population Registers in the Occupation period by the Lê-Trịnh government

It is a well-known fact that, taking advantage of the confusion caused by the uprising of the Tây Sơn Party, the Lê-Trinh government forces led by Hoàng Ngũ Phúc moved southward in 1774, and occupied Phú Xuân in 1775. After that, the area around Huế was under the control of the Lê-Trinh government for more than ten years until 1786, when Nguyễn Huệ of the Tây Sơn Party began his northern The conquest. earliest extant population register of Võng Trì (VTĐ127) was compiled in the 37th year of Canh Hung (1776), shortly after the occupation by the Lê-Trịnh government. In addition to this, a population register compiled in the 40th year of Canh Hung (1779) is still extant. Both are titled "申簿 thân bạ" on These were the only two the cover. population registers during the Lê-Trinh government, and it seems that they were not revised every year as was the case during the Nguyễn dynasty.

As noted by Lê Quý Đông in his *Phủ* biên tạp lục, the Lê-Trịnh government basically did not examined for conscription but fixed the amount of

established Six Ministry in 1740s. Since *Phủ biên tạp lục* was written based on Lê Quý Đôn's survey after the fall of the Nguyễn Lords, it is thought to describe the situation at the end of the Nguyễn Lords.

^{*}Examination for conscription called *Duyệt tuyển* 閱選 was not just a draft conscription, but also a compilation of population register. Details are discussed below.

[†] Đại Nam thực lục, Tiền biên, vol.2, pp.22b-23a; Phủ biên tạp lục, vol.3, p.128b. Nguyễn Lords

the poll taxes for each village based on the population register called Bình lệ bô 平例簿 compiled during the Cảnh Trị era (1663-1671) by the Bình lệ pháp 平例法 of "not deleting the dead and not enrolling the born"*. Presumably, the Lê-Trinh government applied local governance in the Red River Delta to the newly occupied territories, and did not make frequent revisions to the population register. The earliest extant population register of Võng (VTĐ127) is in the form of a "report of the number of people in the Nguyễn Lords period," probably because the Trinh Lords forces were unable to conduct a full-scale examination for conscription immediately after the occupation. Therefore, they were able to make a quick fix by having the population register of the Nguyễn period transcribed Lords submitted as it was in 1776. Later, they conducted a full-scale examination for conscription in 1779 when war refugees returned to their home village.

1.2.3. Population Registers of Tây Sơn period

In Võng Trì, three years' worth of population registers of the Tây Sơn period are extant: the 9th year of Thái Đức (1786) (VTĐ143), the 3rd year of Quang Trung (1790) (VTĐ139), and

the 5th year of Quang Trung 5 (1792) (VTĐ150). These basically follow the format of the Lê-Trịnh government. What is characteristic of the three population cadastres of the Tây Sơn period is that while the contents of population register in 1786, which was made soon after Nguyễn Huệ occupied Huế, were basically the same as those of the Lê-Trịnh government, and the number of registered persons in the population registers of the Quang Trung era had more than doubled. This is discussed in detail in Section 2.

1.2.4. Population Registers of the Nguyễn dynasty period

In Võng Trì, 25 years' worth of population registers of the Nguyễn dynasty are extant † : The earliest population register was compiled in the 8th year of Gia Long (1809) (VTĐ27), the most recent population register was compiled in the 1st year of Thành Thái (1888) (VTĐ196 & VTĐ246). On average, there is one year's worth of population registers for every three years, however, the extant population register is mainly from the Gia Long-Thiệu Trị period, with very few population register from the Tự Đức period onward. This uneven distribution of population registers is not simply due to the fact that

^{*} See (Ueda 2019: 147-153)

 $[\]dagger$ In some cases, there are multiple copies of the same date and contents, such as drafts of 42

population registers. Including these, 35 population registers of the Nguyễn dynasty are extant in the communal hall of Võng Trì village.

materials from the Tự Đức period onward have been scattered, but is presumably related to the Nguyễn dynasty's local governance and its ability to grasp villages. In terms of the possibility of the existence of historical materials, it is natural that the number of historical materials from the first half of the 19th century is rather small, while the number of historical materials from the second half of the 19th century is increasing.

2. Examination of Population Registers of Võng Trì village

2.1. The type of population register: Duyệt tuyển bộ and Chấp bằng bộ

As mentioned above, except for two years of the Lê-Trịnh government and three years of the Tây Sơn dynasty, all the other extant population registers in Võng Trì village are from the Nguyễn dynasty. Here is a more detailed description of the Nguyễn dynasty's population registers.

First, although population register is generally referred as "Đinh bạ 丁簿", strictly speaking there is no historical document named "Đinh bạ". As mentioned earlier, in the Lê-Trịnh government and Tây Sơn periods, the population register was called as "Loại bạ 類簿" or "Thân bạ 申簿", and the population register in the Nguyễn dynasty period is broadly divided into two types, Duyệt tuyển bạ 閱選簿 and Chấp bằng bạ 執憑簿. Đinh bạ are a kind of population register with very similar content, but each had a

different purpose for compilation. In the analysis of the population register, this difference is very important and will be explained here. The following is an explanation of the population census-related documents.

2.1.1. Duyệt tuyển ba 閱選簿

Duyêt tuyển ba is the list of adult males in the commune (xã) that was compiled by the examination for conscription called Duyêt tuyển 閱選. In which classifies the adult male of the village according to their age, economic conditions, social status, and so on. The classification method and the name of classes varied depending on the dynasty and era. For example, in the Nguyễn dynasty (Gia Long era), males aged 18-19 were classified as Dân đinh 民丁, males aged 20-54 were classified as Tráng hang 壮項 or Dân hang 民項 depending on economic status, males aged 55-59 were *Lão hang* 老項, males aged over 60 were Lão nhiêu 老饒. Furthermore, from among these, males in good health were selected and some of those became soldier called Lánh hạng 另項 or Binh đinh 兵丁, and some of those were classified as reservist called Quân hang 軍項. Thus, to be more precise, Duyệt tuyển bạ was a military conscription list to conscript or replenish the ranks for military services. However, in order to compile this list, it is necessary to examine all adult males in the village and classify them. resulting in the military conscription list not being much Transformation of Local Governance in the Eighteenth and Nineteenth Centuries: A Basic Analysis of Population Registrations in Võng trì village, Thừa Thiên Huế Province

different from the (male-only) population census. Therefore, *Duyệt tuyển bạ* was also the basis for poll tax. Basically, the total amount of the village's poll tax was calculated according to the number of registration in *Duyệt tuyển bạ*, and the tax was to be paid annually by the village*.

for However, examination conscription called Duyêt tuyển was not held every year. According to the existent Hán Nôm documents of Võng Trì, Duyệt tuyển was only done once in the 12th year of Gia Long (1813) during the Gia Long era. After that, Duyêt tuyển was done every 5 years during the Minh Mang era. The Thiệu Trị - Tự Đức eras, there is no evidence of Duyệt tuyển and Duyệt tuyển bạ at all. This is not a special fact limited to the Nguyễn Dynasty, and earlier regimes are actually not much different. For example, according to the regulation of the Lê Thánh Tông era, the population register had minor-revisions every 3 years, and major-revisions every 6 years. Thus, the frequency of the *Duyệt* tuyển was at most once every three years. In the case of Lê-Trinh government, Duyêt tuyển was administered every 10-15 years during the first half of the seventeenth century, and after when *Bình lệ pháp* 平例法 had been enforced, *Duyệt* tuyển was only administered every 50 years. In the Red River Delta, the frequent renewal of the land cadastre and population register, which was established during the Lê Thánh Tông era, was abandoned, and from the end of the 17th century, the tax system shifted -to a rural self-governing system of taxation for each village (Ueda 2019: 147-174).

On the other hand, the Nguyễn Lords which occupied central and southern Vietnam in the seventeentheighteenth centuries, the conscription and poll taxes system established during the Lê Thánh Tông era seems to have been maintained (or revived). According to *Đai Nam thực lục*, Nguyễn Lords frequently conducted Duyêt *tuyển* every three to six years[†]. it may be that Nguyễn Lords wanted to assert his political legitimacy over Trinh Lords by succeeding to the Lê Thánh Tông's era, but more importantly, Nguyễn Lords may have been more keen on military opposition to Trinh At the time Nguyễn Hoàng moved to central Vietnam in the first half of the seventeenth century, the Kinh people's population in central and

^{*} Many implementing bylaws for *Duyệt tuyển* and *Duyệt tuyển bạ* were recorded in the Nguyễn dynasty is recorded in *Khâm định Đại Nam hội điển sự lệ* 欽定大南會典事例, for example vol.38, Hộ bộ 3, Đinh phú; vol.56, Hộ bộ 21, Duyệt tuyển, and so on. The excerpts from these implementing bylaws

were printed in woodblock and distributed to each village. These documents are still extant in Tiên Nộn village, the neighboring village of Võng Trì.

[†] However, we cannot find any population register of the Nguyễn Lords period as previously mentioned.

southern Vietnam must have been significantly smaller than in the north, and to counter Trịnh Lords militarily, it would have been necessary to conduct strong conscription based on a precise grasp of the human resource. Lê Quý Đông who conducted the survey after the demise of Nguyễn Lords, stated that number of soldiers and reservists had been so many in the *Duyệt tuyển* by Nguyễn Lords, comparing it with the northern Vietnam under Trịnh Lords' control*.

2.1.2. Chấp bằng bạ 執**憑**簿

At the time of tax payment, the villagers submit a document stating the basis for the calculation of the amount of tax due, and the administration returns the document to the villagers with the words ``Chấp bằng 執憑" or "Vi chấp bằng 爲執憑" written on it. In today's terms, Chấp bằng bạ 執憑簿 is the document equivalent to a certificate of tax. There are two major categories of Chấp bằng bạ: Chấp bằng bạ of land tax and Chấp bằng bạ of poll tax.

In the case of *Chấp bằng bạ of* land tax, the area of land subject to taxation in that settlement, such as public rice fields and public lands, and the amount of land tax to be imposed on them are enumerated, and it was submitted to administration with land taxes. In this case, detailed information such as the

cultivator's name and his cultivating area was not recorded, and merely transcribed the total cultivated areas registered in the land cadastre of the village. This is because as long as the area of a village's arable land does not change significantly, there is no change in the total amount of land tax of the village, regardless of who is cultivating how much land in the village. Therefore, Chấp bằng ba of land tax is a simplified form that contains only excerpts of the total area of the various types of land transcribed from the land cadastre and the amount of tax to be levied on those areas.

On the other hand, the population of a settlement is constantly increasing and decreasing, imposing a poll tax based only on Duyệt tuyển bạ would result in an error between the actual population and the taxable amount, because Duyệt tuyển was basically an irregular process for conscription, and the contents of *Duyêt tuyển ba* were not updated frequently as mentioned earlier. Therefore, at the time of poll tax payment, the village prepared an up-to-date population register reflecting the latest information, including new registrations, deaths of registrant, and changes in registration details after the most recent Duyêt tuyển, and submitted this with their poll tax. Thus, Chấp bằng bạ of poll tax was equivalent in effect to a population

^{*} *Phủ biên tạp lục*, tập 1, pp.127a-127b of photocopy section.

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register updating *Duyệt tuyển bạ* with the latest information.

From the viewpoint of historical material, the advantage of the *Chấp bằng bạ* of poll tax is that it provides much more detailed information on the increase or decrease in the number of registrants in the village than *Duyệt tuyển bạ*, because poll taxes were paid every year, and *Chấp bằng bạ* of poll tax also was compiled for each tax payment. It is possible to know the increase or decrease in the number of registrants for each year.

2.2. Main classification of registrants in the population register

A brief explanation of the basic classifications used in the population registers of Võng Trì is given below.

- Sắc mục 色目 (Lê-trịnh period)/Chu sắc Lệnh chỉ 朱 勅 令 旨 (Tây Sơn period)/Chức sắc 職 色 (Nguyễn period)

A person who has served as a bureaucrat in the administration and possesses official rank. In the case of Võng Trì, there are more than 10 military officers in the Tây Sơn period, but in other periods, most of them are low-ranking officials of administrative organizations such as *Thủ hợp* 首合 and *Cai hợp* 該合. The average number of officials in the Nguyễn period was generally three-five persons.

Lánh hạng 另項 (Tây Sơn period)/Lánh binh 另兵 (Gia Long era)/Binh đinh 兵丁 (Minh Mạng era~)

Conscripted soldier in active service. Basically, the name of the unit to which the soldier belongs was also listed. Basically, most soldiers are assigned to units around Huế. However, during the Tây Sơn period, a number of soldiers were garrisoned in Northern Vietnam, and their mortality rate was quite high.

- Tráng Quân Dân hạng 壯軍民項 /Tráng Quân Dân tam hạng **壯軍民三** 項 (Nguyễn period)

General term for three classes of Tráng hang 壯項, Quân hang 軍項, and Dân hạng 民項. In the regulation of Nguyễn dynasty, *Tráng hạng* and *Dân* hang were general adult male aged 20-54, and they were classified as Tráng hạng (upper class) and Dân hạng (lower class) according to their financial situation. Quân hạng was a reservist to replace soldiers. However, in the practice of compiling the population register, health and economic status were not strictly examined, and adult registered males were together without distinction as Tráng Quân Dân hạng. Why was the Nguyễn dynasty not distinct from these 3 classes in the population registers?

According to *Khâm định Đại Nam* hội điển sự lệ, if the number of adult males is 10, they are automatically registered as 3 *tráng hạng* (poll tax 1

quán 400/1 person), 3 quân hạng (poll tax 1 quán 200/1 person), 3 dân hạng (poll tax 1 quán/1 person), and 1 đào hạng 逃項 (tax-exempt). * In other words, according to this provision, the total poll tax for 10 adult males is automatically fixed at 10 quán 800/10 person, regardless of their actual health or financial situation. Therefore, for tax purposes, it is not necessary to distinguish between the tráng hạng, quân hạng, and dân hạng on the population register, but only the total number of persons in these three classes should be ascertained.

The problem with this method is when it is necessary to fill new soldiers with a replacement from the village. According to the regulations, they should be supplemented from reservist called quân hạng, but the population register only has one section "Tráng Quân Dân hạng" for adult males, and it does not indicate at all who among them belong to quân hạng. Therefore, it is up to the village to decide who will be drafted into the military. For example, there are a number of draft-related documents in the Võng Trì documents, and among them, the village side decides and reports who will be conscripted. Problems such as villages offering exiles and the poor people as replacements were caused by this institutional background.

- Dân đinh 民丁

According to the regulations, Dân đinh is a younger adult male aged 18-19. Generally, upon reaching the age of 20, the registration was changed to the adult male classes such as Tráng hang and Dân hạng. In reality, however, there were some cases where a person was registered as a *Dân đinh* at the age of 15 in the Duyệt tuyển bạ. It is presumably registered early, taking into account that the examination for conscription was held irregularly. Furthemore, the number of Đân đinh on the population registers have varied greatly from era to era in the Nguyễn dynasty period. This may have been related to Nguyễn dynasty policies, which will be discussed later.

- Biệt nạp 別納/Biệt tính 別**併**

General adult males had to pay land tax and poll tax collectively called Chánh phú 正賦. Persons called Biệt nạp 別納, and Biệt tính 別併 were those who pay the government for local products and handicrafts in lieu of Chánh phú. The difference between Biệt nạp and Biệt tính is not clear. Perhaps Biệt nạp refers to a person who pays all of taxes with other products, while Biệt tính refers to a person who pays a portion of taxes in another product. In the Tây Son period, there were both Biệt nạp and Biệt tính in Võng Trì, but only Biệt tính during

^{*} Khâm định Đại Nam hội điển sự lệ, vol.38, pp.1a-1b.

the Nguyễn dynasty. After that, these classes changed their name to *Miễn dao hạng* 免徭項 during the Thiệu Trị era.

It should be noted that people of Biệt nap and Biệt tính, even though they resided in the same village with people who pay regular taxes, had a different tax payment destination and different administrative jurisdiction from ordinary people. people of Biệt nạp and Biệt tính in Võng Trì village were basically supervised by *Tri twong ty* 治 匠司, and their productions were also delivered to Tri twong ty. In other words, people belonging to the ordinary local administrative offices such as prefecture (phủ 府) and district (huyện 縣) and people belonging to Trị twong ty lived together in one village, and this situation often caused trouble between local administration and village. For example, according to one village document of Võng Trì (VTĐ 163; VTĐ166; VTĐ177; VTĐ214) a dispute had arisen between district officials and Võng Trì village, because Phú Vang district tried to impose labor for Võng Trì village, but the village claimed to be exempted from the labor of district on the basis that they belonged to Tri tượng ty. As previously mentioned, the "separate annexation" was name changed to "exemption" during the Shaoji period because of the many cases, like the separate annexation residents of Yuchi, who got into trouble

with the prefecture over whether or not they were liable to pay for the labor of their ancestors. As previously mentioned, the classified name "Biệt tính 別併" was changed to "Miễn dao hạng 免徭項" during the Thiệu Trị era, probably because of the many cases of trouble between the local administration and handicrafts men over whether or not they should bear the burden of labor, as was the case with the Biệt tính people in Võng Trì.

- Lão hạng 老項, Lão nhiêu 老饒

On the regulations, *Lão hạng* were people aged 55-59, *Lão nhiêu* were people aged over 60. However, the agebased classification is often ambiguous in the population registers of Võng Trì. In some cases, the person aged over 60 was registered as *Lão hạng*, but in some cases, the person aged under 60 was registered as *Lão nhiêu*.

- Nhiêu tật 饒疾, Bất cụ hạng 不具項
 People who are exempt from taxation or receive a tax break due to illness or disability.
- Thủy tục 始續/Thủy hồi 始回

Thủy tục is people who are newly registered and start paying taxes. Thủy hồi is people who have moved elsewhere but have returned.

- Phi tổ phụ hạng 非祖父項

People who are exempted from the conscription because they have no relatives or kin.

- Tống Sơn huyện 宋山縣

Probably, means Tống Sơn district of Thanh Hóa province. Although there are no related documents in Võng Trì village, there are documents related to "Tống Sơn huyện" in the neighboring village of Tiên Nôn, which indicate that they were military officers (and their descendants) who migrated from Tổng Son district during the Gia Long era. Institutionally, they were registered in Tống Sơn district, their original home, and were distinguished from those who originally resided in Võng Trì in the population registers. They first appeared in the population register of the 12th year of Gia Long (1813), but most of them were registered as lost person (Thất tích 失跡) lost or escaped person (Đào hang 逃項) in the Minh Mang era

2.3. Analysis of the number of registrations within the population register of Võng Trì

We have briefly described the basic contents of the population register. In this section, the following is chronological transition population registers of Võng Trì village. Table 1 organizes the contents of the population registers of Võng Trì and arranges them in chronological order. As mentioned earlier, the population registers of Võng Trì have a time span of more than 100 years, from the period of occupation by the Lê-Trịnh government to the Thành Thái era. Although there had been changes in classification names by dynasty and era, the general framework of the classification of registrants has not varied much. In Table 1, classifications that have only been renamed and are judged to be nearly homogeneous, for example Sắc muc (Lê-Trinh period), Chu sắc Lệnh chỉ (Tây Sơn period), and Chức sắc (Nguyễn period), combined into single a entry, regardless of time period. In the following section, we will see the local governance of successive administrations through this table.

2.3.1. From the occupied period by the Lê-Trịnh government to the Tây Sơn period

The most striking change in the population registers during this period is the dramatic increase in the number of registrants during the Tây Sơn period. The number of registrants in the population registers during the Lê-Trinh government was only around 40. The population register of 1786, when the area around Huế had just come under the rule of the Tây Son dynasty, was almost directly inherited from the population register of the Lê-Trinh government, and the number of registrants has more than doubled 1790 (around 80-100 since registrants), when the rule of the Tây Son dynasty began in earnest. However, this should not be simply considered as the result of an actual doubling of the settlement population.

The first cause of the increase in the registrants of the population register is

the increase in the number of *Biệt nạp* people being listed in the population register. As mentioned earlier, the reality of Biệt nạp, and Biệt tính people were handicrafts belonging to Tri tượng ty, and have resided within Võng Trì village since before the Tây Sơn period. For example, in the oldest population register compiled in 1777, when Trinh Lords forces just occupied Huế, around six persons registered as "ex-soldier" (Cuu lánh 舊 另) and were all annotated "Soldier of Trị tượng ty" (治匠司另), That is, to say, they were handicrafts who had belonged to Tri twong ty during the Nguyễn Lords period. Because, as Li Tana (1998: 38-39) has already clarified, various handicrafts and engineers were incorporated into the military organization as *Twong binh* 匠 兵 or Tượng lánh 匠另 during the Nguyễn Lords period. Furthermore, according to village document of Võng (VTĐ123), Võng Trì village belonged to Tri twong ty around 1700, and supplied ships as a government service. In 1767, they applied to live in their village while belong to the Tri twong ty and deliver handicrafts as government services. These facts indicate that, from the Nguyễn Lords period, there were already both farmers who were registered in the population resistor and handicrafts men belonging to Tri twong ty living in Võng Trì village.

Inferring from the administrate system of the Nguyễn dynasty, it is thought that this was not merely a difference in occupation, but that even in the Nguyễn Lords period, the government offices with institutional jurisdiction were different even though they lived in the same village, such as the farmers under the jurisdiction of the local administrative office and handicraftsman under the jurisdiction of Tri twong ty. Considering the fact there were two different administrative systems for one village, it can be inferred that the population registers of the Lê-Trinh government only were registered farmers belonging to prefectures and district, and did not include handicrafts men belonging to Tri twong ty. In the Tây Son dynasty, both farmers belonging to prefectures and district, handicrafts men belonging to to *Tri twong ty* were registered together in the population register. As a result, the number of registrants in the population register had doubled.

Another major characteristic is the large increase in the number of conscripts during the Tây Sơn period. While the number of conscripts was increasing, the number of *Tráng hạng* was decreasing significantly, especially in the population register of 1790, the most of adult men could have been conscripted. The number of Chức sắc also increased, but most of them were

military officers. This significant strengthening of conscription during the Tây Sơn period can be seen not only in Võng Trì village, but also in the other around Huế village such as Thanh Phước. In the notes for each soldier, there are frequent references to injuries or death from illness in Northern Vietnam*.

2.3.2. From the Gia Long era to the Minh Mang era

The method of registering both people belonging to general local administration and people belonging to arsenals in one population register, which was begun by the Tây Sơn dynasty, was also inherited by the Nguyễn dynasty. However, in the early Nguyễn dynasty, there were never more than 100 registrants as in the Tây Son dynasty. At a first glance, the number of registrants during the period from the 8th year of Gia Long (1809) to the 4th year of Minh Mang (1823) was generally around 80, remaining almost unchanged. Moreover, the total number of registrants on Table 1 includes persons classified as Tống Sơn huyên since the population register of 1813. They were newcomers who migrated during the Gia Long years and were distinguished from the original inhabitants on the population registers. Excluding those classified as Tống Sơn huyện, the

number of registered original residents was 66 in the 4th year of Minh Mang (1823). In the long term, the registrants of the original Võng Trì village residents were in gradual decline.

From the 5th year of Minh Mang (1824), the number of registrants on the population registers of Võng Trì began to increase. This was obviously due the examination to for conscription called Duyêt tuyển. From the extant population registers typed Duyêt tuyển ba, we can be sure that the Duyệt tuyển was held every five years such as 1824, 1829, 1834, 1839 in the Minh Mang era. While the number of registrants in the population registers typed Chấp bằng bạ was in gradual decline as was the case of the Gia Long era, many youths of under 20 called Dân đinh were newly registered for each holding Duyệt tuyển. As a result, the number of registrants gradually increased overall with increasing and decreasing in a 5-years cycle. In the 20th year of Minh Mang (1839), the number of registrants reached 102 persons.

The way of increasing registrants in the Minh Mang era indicates an important point for us. Such as earlier mentioned, if there was a death of a registrant or a new registration after compiling *Duyệt tuyển bạ*, village

Central Vietnam and had failed to establish local governance in Northern Vietnam. This issue will be addressed in the future.

^{*} These give the impression that Tây Son dyanasty's military power was quite dependent on

reports them for administration, and Chấp bằng bạ was compiled based on these reports, updating the contents of Duyệt tuyển bạ. However, the number of registration in Chấp bằng bạ always tended to decrease from the number of registration in Duyêt tuyển ba. This is most likely due to the fact that, in order to limit the increase in the poll tax, the village only accurately reported the death of a registrant and knowingly failed to report the new registrations of youth. The Minh Mang tried overcome this problem by implementing Duyêt tuyển frequently. As a result, the number of registrants increased during the Minh Mang era, but this naturally led to an increase in the amount of poll tax on the village side. For this reason, from the 8th-11th year of Minh Mang (1827-1830), petitions were repeatedly submitted by Võng Trì village to reduce the tax burden (VTĐ47). Here, we can see a conflict between the administration, which wanted to increase the revenue from the poll tax by increasing the number of registrants, and the village, which wanted to suppress the poll tax decreasing the number by of registrants.

2.3.3. From the Thiệu Trị era to the Thành Thái era

As mentioned above, the Minh Mang succeeded in significantly increasing the number of registrants, but from the Thiêu Tri era onward, the number of registrants in the population registers began a long-term downward trend again. The number of registrants, which had reached over 100 by the end of the Minh Mang era, decreased to 67 by the 1st year of Thành Thái (1888). For the Thiệu trị era, almost annual population registers typed Chấp bằng ba are still extant, but they are significantly simplified compared to previous Minh Mang population registers types Chấp bằng ba. Until the Minh Mang era, Names of all registrants in the village listed in the Chấp bằng ba. On the other hand, Chấp bằng bạ of the Thiệu trị era only listed the number of persons for each classification, such as adult man: X persons, soldier: X persons, reservist: X persons, and so on. In addition, we cannot be sure the the implementation of Duyệt tuyển. The Thiệu Trị era is characterized by a marked tendency to reduce and simplify administrative affairs. We get the impression that the administration of the Thiệu Trị era was significantly less motivated to grasp an accurate population of villages such as the Minh Mang years.

It is difficult to infer to the Tự Đức era, since the extant population register of the Tự Đức years in Võng Trì village are only two population registers typed *Chấp bằng bạ* of the 1st year of Tự Đức (1847) and the 27th year of Tự Đức (1873). As far as these two are concerned, the decline in the

number of registrants has not been halted, although there has been a resurgence of name entries such as in the Minh Mang years. Furthermore, from the existing documents, we cannot confirm that Duyêt tuyển was conducted. Judging from the decrease in the number of registrants from 1839 to 1888, it is highly likely that Duyệt tuyển was not conducted during this period, or lost its substance. Because, in the case of Võng Trì village, the number of soldiers during the Tây Son period was inherited by the Nguyễn dynasty, and was generally fixed at around 20 until 1847. However, there was only one soldier in the population register of 1873*. We can suppose that, as a result of the long absence of Duyệt tuyển due to the reduction in the scale of the army after the Thiệu Trị period, the ability to grasp the population of the villages may have also been greatly reduced.

Conclusion

This article examined the local governance of successive regimes from the end of the eighteenth century to the second half of the nineteenth century. First of all, it can be said from the village documents of Võng Trì that the population registers are not historical record such as the current population census. Although the administrative regulations required villages to report the exact number of adult males and the village pledged that the contents of the population register were not false, in reality, both the government and the village acted on the implicit assumption that a certain number of the population was concealed for taxation evasion. If we had considered that the number of registrants in the population registers of Võng Trì is a faithful reflection of the changes in the village population, without taking into account transformation of institutions governance, then the village population had doubled during the Tây Son period, had declined during the Gia Long era, had increased again during the Minh Mang era, and had declined again after the Thiệu Trị era. That is to say, the statistics on the population registers is merely a reflection of the way and degree of control of the village at a given time, and there must have been a certain number of people who were not listed in the population register at any given time. Probably, even in the Minh Mang era, when government approached closest to the actual population of village by the frequent implementation of Duyêt tuyển, a certain number of population would have been concealed in the village.

Therefore, the population register of the pre-modern Vietnamese

the conscription in the 21th of T ψ Đức (1841). We do not know whether this petition was accepted or not.

^{*} According to the Võng Trì village document (VTD178), this village petitioned for a relaxation of

successive regimes cannot be used as it is as a historical record of population statistics. Rather, the number of people registered in the population registers shows how the two were balanced in the struggle between state power and village community at that time. From this point of view, the Tây Sơn period, when the conscription was greatly strengthened by centralizing the separate control of the prefectural government and arsenal office in the population register, and the Minh Mang era, when the registrants under the control of the government increased by the examination for conscription, were special periods when the state power was superior to the village community which tried to hide their villagers. Conversely, during the Gia Long era and after the Thiệu Trị era, there was no active attempt to take control of the human resources. Probably, at this time of year, the administration was avoiding unnecessary friction with the village communities for the smooth administration without undue overhead. It will be necessary in the future to closely examine Châu bản 硃 本 and other administrative documents of the Nguyễn dynasty to clarify what discussions were held about local administration at the central imperial court and how these discussions were reflected as differences in the direction of local administration.

It should be noted that, comparing the population register of 1777 compiled by the Lê-Trinh government, with the most recent one of 1888 in the Thành Thái era, we can say that the degree of state authority's grasp of human resources has been much stronger in the long term. mentioned above, although the Nguyễn Dynasty had periods of active and inactive grasping of human resources, the Nguyễn dynasty basically inherited the administrative direction of the Tây Son period, which centralized the grasp of the population of the village and strengthened conscription. In the long run, the Nguyễn dynasty's grasp on human resources úa considerably strengthened compared to Nguyễn Lords and Trinh Lords. In Vietnamese history, it is often thought that modern governance or its concept was introduced during the French colonial period. Because the "modern state" is a product of the West. However, in recent studies of Japanese history, discussion that the Edo there is a shogunate is reevaluated as "earlymodern state" (Kadomatsu 2014) (Oishi 2018). This is because it is considered that the bases for Japan's modernization rapid industrialization since the Meiji period (1868-1912) was already formed during the Edo period. In view of the strengthening of the state's control over human resources since the end of the eighteenth century, these arguments may also apply to the Nguyễn dynasty. This is because, while it is true that the Nguyễn dynasty lost its political sovereignty due to French colonization. French control of Tonkin and Annam was largely dependent on the local administrative organization of the Nguyễn dynasty. In other words, the Nguyễn dynasty's local administration had the capacity to respond to some extent to the requirements of French colonial rule. It will be necessary to re-evaluate the Nguyễn dynasty from various perspectives in the future.

References *Primary Sources*

- Đại Nam thực lục 大南寔錄: The Keio Institute of Linguistics Studies (ed.), 大南寔錄 Đại Nam thực lục, vol.1-20, Yokohama: Yurindo, 1961-1981.
- Khâm định Đại Nam hội điển sự lệ 欽定 大南會典事例: Tenri Central Library, 196683.
- Phủ biên tạp lục 無辺雑録: Lê Xuân Giao (tr. and ed.), Phủ biên tạp lục, tập I (Quyển 1, 2, và 3); Phủ biên tạp lục, tập II (Quyển 4, 5, và 6), Hà Nội: Phủ Quốc Vụ Khanh Đặc Trách Văn Hóa Xuất Bản, 1973.
- VTĐ \sim : Hán Nôm documents photographed at the village communal hall (đình làng) of Võng Trì on August 11th, 2022.

Secondary sources

Fujiwara, Riichiro. (1986). 東南アジア 史の研究 (Studies on the History

- of South-East Asia), Kyoto: Hozokan.
- Gourou, Pierre. (Nguyễn Khắc Đạm, Đào Hung, Nguyễn Hoàng Oanh, co-trans) (1936 (2003). *Người Nông Dân Châu Thổ Bắc Kỳ*, Hà Nôi: Nxb Trẻ.
- Kadomatsu, Hideki. (2014). 明治維新 と幕臣 (*Meiji Restoration and Shogunate retainer*), Tokyo: Chuokoron-Shinsha.
- Lê, Thành Khôi. (1955). *Le Viêt Nam: Histoire et civilisation*. Paris:
 Editions de Minuit.
- Li, Tana. (1998). Nguyen Cochinchina:
 Southern Vietnam in the
 Seventeenth and Eighteenth
 Centuries, Ithaca: Cornell
 Southeast Asia Program
 Publications.
- Motohiro, Chihiro. (2014). 19 世紀~20 世紀ベトナム中部フェ、ラグーン域と水面管理集落" (Lagoon area and water area management villages in the 19th and 20th centuries Central Vietnam), *Hiroshima journal of Asian Researches*, vol.19, pp.1-23.
- Nguyễn, Đình Đầu. (1997). *Nghiên cứu địa bạ triều Nguyễn: Thừa Thiên*, Hồ Chí Minh city: Nxb Thành phố Hồ Chí Minh.
- Nguyễn, Thị Hà Thành. (2010). Nghiên cứu biến động sử dụng đất và một số yếu tố kinh tế-xã hội làng Địa Linh dựa trên các tư liệu địa chính (1935-1996) (Land use and socioeconomic transition in Dia Linh village based on the cadastral documents (1935-1996)), in: Nguyễn Quang Trung Tiến & Nishimura Mansanari (eds). Văn hóa-lịch sử Huế qua góc nhìn làng xã phụ cận và quan hệ với bên ngoài (Culture and history of Hue from the Surrounding Villages and

Transformation of Local Governance in the Eighteenth and Nineteenth Centuries: A Basic Analysis of Population Registrations in Võng trì village, Thừa Thiên Huế Province

- Outside Regions), Huế: Nxb Thuận Hóa.
- Oishi, Manabu. (2018). "近世" (Early modern period), in: Editorial Department of Chuokoron-Shinsha (ed.), 日本史の論点 (Issues in Japanese History), pp.89-132, Tokyo: Chuokoron-Shinsha.
- Shimao, Minoru. (2014). 中国・ベトナムの漢文文献の中の南シナ海方面の記述について" (A study on description of the South China Sea area in Chinese and Vietnamese literatures)
 - (http://user.keio.ac.jp/~shimao/ SCS%20shimao%20ver1.pdf)
- Taga, Yoshihiro. (2018). 19世紀ベトナムにおける亜鉛銭使用の拡大と銅銭流通の変容" (The Expansion of Zinc Cash Circulation and Transformation of Copper Cash Usage in 19th Century Vietnam), Journal of historical studies, vol.973, pp.1-17.
- Taga, Yoshihiro. (2020). 財政史よりみた一九世紀後半における阮朝統治の再檢討 (Reexamining the Nguyen Dynasty's Rule of Vietnam in the Second Half of 19th Century through the Study of Its Fiscal Administration), The journal of Oriental researches, vol.79 (1), pp.108-143.
- Trương, Hữu Quýnh. (2004). *Chế độ* ruộng đất Việt Nam và một số vấn đề lịch sử Việt Nam (The land

- tenure system in Vietnam and some Vietnamese historical issues), Hà Nội: Nxb Thế giới.
- Ueda, Shinya. (2019). 近世ベトナムの 政治と社会 (Politics and Society in Late Premodern Vietnam), Osaka: Osaka University Press.
- Ueda, Shinya. (2021). The Formation of a Kinh People's Traditional Village on the Outskirts of Huế in Early Modern Vietnam. *Journal of Southeast Asian Studies* vol.52 (12), pp.1-40.
- Vũ, Đức Liêm. (2016). Vietnam at the Khmer frontier: Boundary politics, 1802-1847. *Cross-Currents: East Asian History and Culture Review*, vol.20, pp.75-101.
- Woodside, Alexander B. (1988).

 Vietnam and the Chinese Model: A

 Comparative Study of Vietnamese
 and Chinese Government in the
 First Half of the Nineteenth
 Century, Cambridge: Harvard
 University Press.

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