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ABSTRACT

Access to Land and Tenancy Practices on Tanah Bengkok: Evidence from Java, Indonesia*

Tanah bengkok (bengkok land) in Java, Indonesia boasts a unique institution where elected village leaders receive usufruct rights to a parcel of land owned by the village, in lieu of salary. Despite its relevance to the political economy of land distribution in Java, unavailability of systematic data has so far constrained in-depth empirical research on bengkok land. In 2018, we conducted a survey covering 130 villages and more than 1,800 households in Java. We found substantial heterogeneity in the incidence and use patterns of bengkok land across villages. Fixed rental tenancy appeared more prevalent than sharecropping on bengkok land and bengkok landlords seldom got involved in tenants' farming decisions, which made bengkok land management look more 'business-like'. Finally, evidence is consistent with political cycles as the village heads with reelection motives offered sharecropping contracts to non-relatives to garner a larger pool of supporters.

JEL Classification: H77, H83, O13, P14, O53, Q15

Keywords: Tanah bengkok, land tenancy, village administration, political cycle, Java, Indonesia

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1. Introduction

Indonesia, home to nearly 267.7 million people, boasts 1,905 thousand square kilometers of land of which only 26% is agricultural. As of today, 58 out of every 100 Indonesians live in Java, which makes it the world's most populous island with 2.5% of Indonesia's total landmass. Like other parts of Indonesia, agriculture continues to be the main source of livelihood in Java, and almost 83% of Javanese agricultural families either work as laborers or cultivate less than 0.5 hectares (USAID, 2016). The stiff competition over access to land characterizes the political economy of land distribution in Java, and so does the existence of a historical institution known as *tanah bengkok* (hereinafter, bengkok land), [1] which mandates a handful to have access to village land and consequently raises concerns over shared prosperity. Under this unique institution, elected village leaders and their subordinates obtain usufruct rights to a parcel of land owned by the village, in lieu of salary, as compensations for their services to the village.

The prevalence of bengkok land in Java posits a wide range of policy relevant issues that run from the management of village land through tenancy contracts, electoral process of selecting the village leader to the welfare of the landless and land-poor households. To gain more insights on these issues, we administered a household level survey across 130 Javanese villages, covering more than 1,800 households in Central and East Java in 2018. Within the scope of this study, we focus and provide empirical evidence on (1) the size and distribution of bengkok land across 130 Javanese villages, (2) the distribution of usufruct rights over bengkok land between different types of village administrators, (3) the use of bengkok land through own cultivation, and tenancy contracts of different types, and finally (4) the terms and conditions of the tenancy contracts including the rent amount, length of the contract, responsibility of each party, among other factors.

To the best of our knowledge, none of the above mentioned issues has been adequately addressed in the existing literature. Mainly because scattered ethnographic studies, agricultural surveys[2] and intermittent census figures have been the only sources available on bengkok land. The Village Potential Statistics (PODES), conducted in line with the implementations of the Population Census, Agriculture Census and Economic Census in Indonesia, records land information including bengkok land for all villages in Java. However, the available resources from PODES do not provide detail information on the distribution of bengkok land among different administrators, the choices of tenancy contracts and their terms and conditions, and the electoral process of selecting the village head who gets the usufruct rights to bengkok land.

Our field survey comprised of data collection at three levels: village, household, and agricultural plot. From each study village, we surveyed tenant households roughly in

[1] The institution of *tanah bengkok* was legally codified under the Dutch colonial rule, but there are disputes over its origin before it (see Section 2 for more detail).
[2] Antlov (1995); Hart (1986); Kano (1977); Maurer (1998); White and Wiradi (1979).

proportion to the total number of tenants in that village, and landlord households[3] as a counterpart of each tenant household. We surveyed four types tenancy contracts in detail. These are: (1) sharecropped bengkok plots, (2) bengkok plots under fixed rental, (3) sharecropped non-bengkok plots (i.e., private land), and (4) non-bengkok plots under fixed rental. Our dataset contains complete information for a sample of 913 tenant households either operating or owning 2,652 plots, out of which detail information on farm production and input use are available for 1,692 plots. On the other hand, the landlord sample consists of 930 households owning 2,500 plots including bengkok plots.

The main findings are previewed in this paragraph. The average ratio of bengkok land to total land, agricultural land and wet land in the village are found to be 8.6%, 12.1%, and 15.6%, respectively. The size of bengkok land differs widely across villages. Comparing the bengkok plots across villages, we find fixed rental tenancy more common than sharecropping when bengkok recipients (i.e., village officials) sublet bengkok land. The tendency for self-cultivate bengkok land is strong, especially among village officials other than heads and secretaries. On the other hand, the size of private landholding is comparable between landowning bengkok landlords and private landlords. However, the average size of a farm operated by bengkok tenants (the sum of own land cultivated by themselves, rented-in private land, and rented-in bengkok land, minus rented-out own land) is larger than that of a farm operated by tenants working exclusively on private land. Interestingly, village heads are more likely to hire non-relatives as sharecroppers compared to other officials. The terms and conditions of tenancy contracts, such as sharecropping shares and fixed rental fees are comparable between bengkok and non-bengkok plots. The frequency of written contracts is higher among bengkok plots than non-bengkok plots. These are novel findings that have not been documented elsewhere.

This paper provides a thorough description of the prevalence and functioning of bengkok land with a large spatial coverage. Our paper relates to a growing volume of research on the political economy of Indonesia by applied economists (Martinez-Bravo, 2014; Martinez-Bravo et al., 2017; Lim, 2019; Dell and Olken, 2020). Except Lim (2019), however, none of these studies analyzes bengkok land directly. Lim (2019) examined the long-term impact of bengkok land institution on productivity and poverty reduction comparing primary data from villages located near the boundary dividing Dutch-recognized bengkok area and non-recognized area. The current study differs from Lim (2019) for two reasons. First, our study does not aim to evaluate the existence of bengkok land by comparing the socioeconomic outcomes between villages with and without bengkok plots as done by Lim (2019). We instead focus on the nature of distribution of bengkok plots between village officials, and the mechanisms of tenancy

[3] In Indonesia, private land and land owned by villages are distinctly defined without any overlapping. Bengkok land is a part of land owned by the village, whose use right is given to a village administrator. Therefore, in the literal sense, the village administrator is the tenant and the village is the landlord. However, as it is legal and common for village administrators to rent out bengkok land to others, which is subletting in the strict sense, we call this arrangement as the land rental arrangement and call the village administrator a "bengkok landlord" in this paper.

contracts between bengkok plots and individually owned plots in the village. Second, our survey covers a much wider area with 130 villages spread across 13 districts in Central and East Java compared to only two districts studied by Lim (2019). This enables us to provide more robust evidence on access to land and the existing tenancy practices across villages with bengkok land.

The rest of the paper is organized as follows. In Section 2, we provide a brief history of bengkok land. It also provides information on the size and distribution of bengkok land based on village-level surveys by independent researchers and PODES. Section 3 describes the survey design, sampling procedure at the village, tenant-household and landlord-household levels. Detail descriptive evidence using village-level data is provided in section 4, followed by the same with household-level data in section 5. Section 6 concludes.

2. A brief history and geography of bengkok land in Java

According to many scholars (Tjondronegoro, 2013), an old system of appanage land from the precolonial Javanese kingdom predated the bengkok land institution, which was legally codified under the Dutch colonial rule. In 1866, the Dutch colonial government decided to give the village headmen an official piece of land (*ambtelijk landbezit*) in lieu of salary, which proved to be an inexpensive and convenient means of administration and cooperation with the local economy. Later, with the introduction of the ethical policy "*Inlandsch Gemeente Ordonnantie*" (Native Municipality Ordinance) in 1906, the provision of election for the village headman and the village officers was constituted by law (Kano, 1994). Based on the 1883 colonial statistics, bengkok land occupied 13.9% of total farmland in Java excluding Batavia, Yogyakarta, Surakarta, and Madura. The percentage was reduced to 5.9% in 1932 and the similar figure for the whole Java in 1932 was 6.0%[4]. Looking at the absolute size, however, the same data source shows that the farmland classified as bengkok increased from 340,000 ha in 1882 to 360,000 ha in 1932 in Java excluding Batavia, Yogyakarta, Surakarta, and Madura.

After independence, local administration at the village level in rural Java continued to use bengkok land as in-kind payments to reward village officials[5]. Some of village-level case studies provide details on bengkok land during the Soehrato era. Kano (1981), in a village in Yogyakarta in 1976, found that bengkok land occupied 13% of total wet land for paddy in the village and 6% of the total area of the village, which was not very different from other villages in Yogyakarta. From 80 households surveyed by him in detail, 15 cases of bengkok transactions were reported, classified into 1 case of self-cultivation, 11 cases of fixed rental tenancy, and 3

[4] Data sources: *Koloniaal Verslag van 1883* [Nederl. (Oost-) lndie.], Appendix P. for the 1882 value and *Indisch Verslag 1934 - II. Statistisch Jaaroverzicht van Nederlandsch-Indië*, for the 1932 values. We appreciate the help from Pierre van der Eng for obtaining these numbers. We converted the acreage in "bouw" using 0.71 ha per bouw into the numbers in hectares.

[5] In appendix 1, we provide a detail account of the origin and evolution of bengkok land.

cases of sharecropping. Kano (1994) investigates long-term changes in five villages in a district in Central Java, surveying 500 households in 1990. He found that 8.8% of the total paddy fields in the village were used as bengkok land. He also utilized historical records of the same village and concluded that the percentage of bengkok land in the village land remained similar for 87 years from 1903 to 1990.

In contemporary Java, the government statistics from PODES provide us with some estimation of the geographic spread of bengkok land. Figure 1 shows that bengkok land is concentrated in central areas of Java in 2000[6]. In terms of provinces, Central Java, East Java, and Yogyakarta are associated with dense existence of bengkok land. As Yogyakarta was not directly ruled by the Dutch during the colonial period, the map suggests that core regions of the bengkok land institution lies in Central Java with some western parts of East Java.

[Figure 1 is about here]

The geographic distribution shown in Figure 1 is consistent with historical observations. Collecting information from an Indonesian Law book[7], Kammen (2003) reports that bengkok land is found in the former Cirebon Residency of West Java, and in the entire region of Central Java and East Java. Other independent research reports also support this geographic spread of bengkok land. Using the 1868 Dutch survey data, Kano (1977) reported similar evidence on the prevalence of bengkok land from Cirebon regency in the West Java to Madiun, Rembang, Kediri, Surabaya, and Pasuruan residency in the East Java. In another study, Hefner (1990) and Booth and Sundrum (1981) highlighted more extensive spread of bengkok land in cultivating riverine areas (sometimes up to 30% of village communal land) and less so in the highlands. The unequal distribution of bengkok land was also partly due to the local customs at various places, which influenced the terms and conditions of the reward that village headman and village officers enjoyed against their services (Kano, 1994).

There is another source of information on island-wide prevalence of bengkok land in contemporary Java: Indonesian Family Life Survey (IFLS). From microdata of IFLS 2014, we found only 46 out of 1,127 landowning households in Central and East Java reporting to own bengkok plots. Altogether, it is difficult to obtain enough observations to conduct an in-depth study from any nation-wide sample survey that does not focus on the bengkok land institution. The official statistics does not give detailed information on how bengkok land is used in

[6] We also have data from PODES 2018, which was conducted in a time much closer to our survey. However, the PODES 2018 dataset reports only a binary variable whether the village had any bengkok land and we found the vast majority of villages in Java replied "Yes". As we think the acreage information is important, we compile the map from PODES 2000, for which the information on the size of bengkok land in each village was available.
[7] Tanya Jawab Hukum Tanah (Questions and Answers about Land Law), Secretariat Bina Desa / Indhrra, 1975) page 23.

villages, either. Only information available in PODES is the size or existence of area classified as bengkok. Unfortunately, this limited information does not allow us to understand the distribution among different administrators[8], actual use of bengkok land including renting through fixed-rental tenancy or sharecropping, terms and conditions of subletting, and its relation to village-level politics.

3. The Survey

We designed and conducted a primary survey in 2018. The purpose of the survey was to collect detailed information on bengkok land at different levels of villages, households, and agricultural plots, covering wider geographical areas beyond case studies. The survey was administered by SurveyMETER using structured questionnaires differently designed for the village, the tenant household, and the landlord household. During the period from 28 February to 10 April 2018, interviews were conducted by enumerators trained by SurveyMETER using the method of computer-assisted personal interview (CAPI). Enumerators were equipped with CAPI-installed laptops in the field so that measurement error in interview and data entry was minimized.

3.1. Village Survey

We decided to focus on Central Java and East Java because bengkok land is more prevalent in these two provinces and they were under the same direct rule during the Dutch colonial period. From government statistics, we first listed rural districts (*kabupaten*[9]) where the bengkok land institution is prevalent and the main crop is paddy. This resulted in ten districts in the eastern part of Central Java (Wonogiri, Klaten, Sukoharjo, Karanganyar, Sragen, Rembang, Pati, Semarang, Magelang, and Purworejo) and three districts in the western part of East Java (Ngawi, Magetan, and Nganjuk). It should be noted that districts Semarang and Magelang in Central Java replaced the initial selections of Grobogan and Kudus, and district Nganjuk in East Java replaced the initial selection of Madiun because of the recent implementation of district laws in Grobogan, Kudus, and Madiun that have abolished or replaced the bengkok land institution. As our research questions and research design were rendered irrelevant in these

[8] IFLS has some information on this aspect. In IFLS5, 79 enumeration areas in Java reported non-zero bengkok land: Its median of the percentage of bengkok land allocated to village head is 23%, the median for village secretary and other officials is between 5-7% each, and the median percentage allocated to each dusun head is around 6-9% each (which adds up to 37% of all bengkok for all dusun heads). The distribution is similar to our findings reported in Section 4,

[9] In Indonesia, districts are classified into two types: *kabupaten* districts, which mostly prevail in rural areas and the majority of its villages are known as *desa* where village heads are directly elected, and *kota* districts, which mostly prevail in urban areas and the majority of its villages are known as *kelurahan* where village heads are appointed by the district mayor. Martinez-Bravo (2014) utilizes the difference between *desa* and *kelurahan* to identify the impact of elections in Indonesian local politics. Our survey covered *desa* villages in *kabupaten* districts.

districts, we replaced these districts with other districts following the original criteria that they are in the center of paddy production in Central and East Java where bengkok institution is still in place.

From each district, two sub-districts (*kecamatan*) were selected. The selection of sub-districts was based on the farmland characteristics. Within each district, using the most recent agricultural statistics, we first excluded sub-districts where the area of the dry farmland is larger than that of the wet farmland. From the remaining sub-districts, we randomly selected two sub-districts to be our sample. The resulting 26 sub-districts in 13 districts are mapped in Figure 2. It matches well with Figure 1 in the sense that our study areas fall on those with denser presence of bengkok land.

[Figure 2 is about here]

Within each sub-district, we selected roughly five villages (*desa*). The selection procedure is similar to the selection of sub-districts. Using the most recent agricultural statistics, we first excluded villages where the area of the dry farmland is larger than that of the wet farmland and then we randomly selected villages as far as the village had bengkok land. In some of the sample sub-districts where the eligible villages were too few, we selected three or four villages, compensated by nearby sample sub-districts in which more than five villages were selected. We also replaced several villages of initial selection when we found that most of bengkok land in these villages was rented out to individuals or companies producing sugarcane in plantations.[10] This happened more frequently in district Rembang. Through this procedure, we selected 130 villages spanning over 26 sub-districts in 13 districts of Central Java and East Java provinces. These sample villages are thus from the pool of villages that were in rice producing areas and bengkok institution was in place.

The village questionnaire included questions on the roster of village administrators (*pamong desa* or *perangkat desa*), village elections, village population, land allocation, infrastructure, agriculture and industries, and experiences of natural disasters. The village administrators are

[10] It is noteworthy to mention that our survey mainly covered wet paddy producing villages, whereas the districts under this study are also major sugarcane producing region. We thank Hitoshi Yonekura for bringing this issue into our attention as sugarcane plays an important role in village land allocation especially in East Java. We do not consider villages that grow sugarcane for two reasons. First, the sugarcane industry in Indonesia collapsed during the Great Depression and have not recovered since then (Dell and Olken, 2020). Since then, the relative importance of paddy has been significantly higher than sugarcane in the Indonesian agriculture (more information on this can be found here:https://www.pertanian.go.id/home/?show=page&act=view&id=61). Second, one of the main objectives of this study was to understand the differences, if any, between the farming system (including the terms and conditions of tenancy contracts) in bengkok plots and private plots that are predominantly small holders. We found the choice of paddy producing villages suitable for this purpose.

led by the village heads (*kepala desa*) [11]. The village official roster covered all officials and includes questions on name, position in the village, age, education, current and previous job experiences, bengkok land and other allowance given, use of bengkok land, etc. Using the questionnaire, interviews were conducted in the village office in most cases with several respondents. The village dataset comprises 130 sample villages. It provides detailed information on the bengkok land institution in villages where the institution is still in place, paddy is the main crop, and paddy is produced on bengkok land (either by the tenants or the bengkok landlord). As these three criteria are robustly found throughout the history of bengkok land institution reviewed in Section 2 and appendix 1, we judge that our sample shows a reasonably well representation of the Javanese villages with bengkok land.

3.2. Household Survey

Two different surveys, one for tenant households and the other for landlord household, were conducted to collect information at the household and plot levels. We provide details of the tenant household survey in appendix 2. Our final dataset contains complete information for a sample of 913 tenant households from 130 study villages (7.02 tenant households per village on average), classified under the following categories:

(1) bengkok land sharecroppers (n =158),
(2) bengkok land fixed-rental tenants (n = 364),
(3) non-bengkok land sharecropper sample (n =199), and
(4) non-bengkok land fixed-rental tenants (n = 192).

The details of the landlord household survey are provided in appendix 3. Our final dataset contains complete information for 930 landlord households from 130 study villages (7.15 landlord households per village on average). Depending on the type of counterpart tenants, we have following groups of landlords:

(1) landlords renting to the bengkok sharecropper sample (n=160),
(2) landlords renting to the bengkok fixed-rental tenant sample (n=372),
(3) landlords renting to the non-bengkok sharecropper sample (n=202), and
(4) landlords renting to the non-bengkok fixed-rental tenant sample (n=196).

The information from these 1,843 households provides detailed information on the bengkok land institution, 913 households from the perspective of tenants and 930 from the perspectives of landlords. Although they are not strictly a random sample of all households in these villages, the household-level and plot-level information will give us valuable insights regarding the bengkok institution.

[11] Under the 2014 Village Law, which prevailed during our survey time, village heads are directly elected by villagers, each term is six years and the maximum is three terms (term eligibility). There is also age eligibility that candidates for the village head should be 25 years old or older.

4. Incidence of Bengkok Land at the Village Level

The village-level data on land are summarized in Tables 1 and 2. In terms of absolute size (Table 1), we focus on two measures shown in bold fonts. First, the sum of bengkok plots allocated to the current village officials[12] (row a') has a mean of 12.4 ha (standard deviation of 7.6 ha). As its distribution is skewed (see Figure 3 below), its median of 10.0 ha is much lower than the mean. The figure demonstrates a large heterogeneity across villages. Second, the total of village-owned land available for bengkok use, including land for *dusun* (hamlet) heads and supporting staff (sum of a., b, c. in Table 1), has a mean of 28.1 ha (standard deviation of 28.0 ha) and a median of 20.2 ha. Approximately two-thirds of bengkok land is for village officials, the rest going to dusun heads with a small portion to supporting staff. In addition to bengkok land, village-owned land is allocated to retired officials, village treasury land, and communal/public use[13]. The total of village owned land has a mean of 47.3 ha (median of 30.6 ha).

[Table 1 is about here]

In the same table, the incidence of bengkok land is shown in terms relative to the average land size of villages (total land, agricultural land, and wet farmland) among 130 villages. Sum of bengkok plots allocated to current village officials occupied 3.8% of the total area of the village, 5.4% of agricultural land, and 6.9% of wet land (for paddy production). Total land available for bengkok use occupied 8.6% of the total area of the village, 12.1% of agricultural land, and 15.6% of wet land. These numbers are not different from historical and case study numbers reviewed in Section 2.

[Figure 3 is about here]

The relative importance of bengkok land can be seen from a different angle. Instead of dividing the mean bengkok size by the mean total land size, we first calculate shares for each village and then aggregate them. The results are shown in Table 2. The share of bengkok plots allocated to current officials occupied 4.6% of the total area of the village, 7.0% of the total agricultural

[12] In this section, "village officials" refer to those village administrators working in the village office (heads, secretaries, and department heads). Although heads of dusun (sub-village) are formally a part of village administration under the 2014 Village Law, we separately treat them in tables on bengkok land.
[13] This includes village-owned land known as *titisara*. Land rents from such land are included in the village revenue as *kas desa* (Yonekura, 1996).

land, and 9.0% of the total wet land on average. When we look at the total village-owned land available for bengkok use, the percentages become almost double. Comparing the number of means and medians reported in Table 2 with those reviewed in Section 2, it is suggested that our sample represents villages where bengkok shares are slightly higher than the average across Java. This reflects our sampling design. What is worth noting is that even within our sampled villages, the heterogeneity across villages is large.

[Table 2 is about here]

The across-village heterogeneity is shown in another way in Figure 4, which indicates the tendency for smaller villages to have a higher share of bengkok land. The size of bengkok land tends to be larger in larger villages in terms of land size, but the increasing rate is less than proportional. As a result, there is a negative correlation between the bengkok land share and the village size.

[Figure 4 is about here]

Information reported as (a') in Tables 1-2 can be disaggregated into different officials, totaling 893 village officials in 130 villages (Table 3). All villages had heads and secretaries but information for village secretaries was incomplete for 10 villages. Out of these 893 officials, 192 (21.5%) were elected through elections, 373 (41.8%) had another job in addition to the official post, and 820 (91.8%) received bengkok land.

[Table 3 is about here]

Regarding the election versus other appointment methods, in all of 130 villages, village heads were subject to direct elections under the 2014 Village Law. However, in five villages, the village head was appointed due to the loss of former village heads, resulting in the number of elected village heads at 125. Although the term of a head is the same at six years, due to the non-synchronization of village head elections, we have variation in the timing of next election: the months until the next election had a mean of 19.7 months, standard deviation of 16.2 months, minimum 3 months, and maximum 69 months. Except for four cases (3.3%), village secretaries were appointed, not elected by villagers. Among other village officials, most of whom were heads of village departments, approximately 10% of them were elected by villagers. In other words, most village secretaries and other village officials were not subject to direct elections by villagers but appointed by the village head. Even when they were elected, elections were

informal ones outside the 2014 Village Law and were synchronized with the elections for heads. Therefore, elections for village heads are expected to affect how bengkok plots are used irrespective of the position of the official in the village administration hierarchy. Approximately 50% of village heads had side jobs in addition to the village administration work. The frequency of secretaries or other officials having side jobs was lower than that of village heads, suggesting that these officials are more specialized in performing administrative services to villagers.

The size of bengkok plot allocated to these officials varies substantially. Village heads[14] received the largest size of bengkok land, with the average size at 5.5 ha and median at 5 ha. Out of 120 village secretaries, 94 (78.3%) received bengkok land, with average size at 2.4 ha, smaller than one half of what village heads received. Other village officials received 1.15 ha of bengkok land on average, about one fifth of average bengkok land given to village heads. The size differential in bengkok land between village heads and other officials can be seen in Figure 5. Another interesting finding is the heterogeneity of village head's bengkok size across villages. The distribution is skewed with 12 heads with bengkok land equal to or larger than 10 ha.

[Figure 5 is about here]

How did these 820 officials manage their bengkok land? Table 4 summarizes this information in the form of indicators whether the bengkok land was cultivated by themselves (A), rented to others on a sharecropping contract (B), rented to others on a fixed rent contract (C), and others (V). When officials use their bengkok land in multiple ways, we indicate it as the combination of alphabets A, B, C, and V. Unfortunately, the exact acreage under each use category is not available. There are nine categories shown in Table 4, with the most frequent one being "Fixed rental only", followed by "Own cultivation only" and "Own cultivation and fixed rental". The category of "Sharecropping only" is in the fourth position in terms of frequency.

[Table 4 is about here]

To account for the multiple usages, we summarize the patterns as the frequency percentages in two ways in the lower panels of Table 4. First, to see the pure frequency distribution, we report frequency percentages without any weighting. Then we show numbers weighted by the size of

[14] All of 130 village heads were eligible to receive bengkok land, but in one village, the actual allocation was not yet implemented at the time of our survey. As a result, we obtain bengkok land information for 129 village heads only.

bengkok land each official received. The weighted numbers of frequency are proxy for the acreage distribution (they become equal to acreage distribution if bengkok land is divided equally among multiple uses for each bengkok landlord). Both aggregate figures confirm that the most common way for bengkok land usage is fixed rental tenancy, followed by own cultivation.

One important finding from our survey is the difference among three types of village officials regarding the use pattern of bengkok land. First, village heads and secretaries are less likely to cultivate bengkok land themselves than other officials. This indicates that these posts require more work effort so that they have little time to work on the land. Village secretaries are responsible for providing day-to-day administrative services to villagers. Second, village heads are more likely to adopt sharecropping than secretaries and other officials. Our interpretation is that heads are more affected by the traditional norm of supporting landless and land-poor households through sharecropping than secretaries and other officials. Third, village heads' tendency to adopt fixed rental is also the highest among the three official types. This can co-exist with the second observation because the largest bengkok land is allocated to village heads (Table 3). As shown in last rows of each panel of Table 4, multiple uses of bengkok land are most frequently found among village heads. When the size of bengkok land allocated to each official becomes larger, the tendency for the official to use the land in multiple ways increases and it becomes more likely to include fixed rental tenancy. By comparing the last panel (weighted) and the panel above (unweighted), the frequency of "Involving fixed rental" and "Multiple use" increases after weighting in all three types.

To conclude this section, we summarize the key findings. The village-level data showed substantial heterogeneity in the incidence of bengkok land across villages. Fixed rental tenancy is much more common than sharecropping when bengkok recipients (i.e., village officials) sublet bengkok land. The tendency for self-cultivate bengkok land is strong, especially among officials other than heads and secretaries. Village heads are more likely to adopt sharecropping.

5. Use of Bengkok Land and Tenancy Arrangements at the Household Level

5.1 Land Management by Sample Landlords

We first discuss the household-level analysis from the landlord side. The distribution of 2,500 plots of farmland owned by 930 sample landlord households is shown in Table 5. Reflecting the sampling design, we have a higher concentration of plots in specific sampling categories: bengkok sharecropped plots owned by landlords renting to bengkok sharecroppers (n=296), bengkok fixed-rental plots owned by landlords renting to bengkok fixed-rental tenants (n=652), private sharecropped plots owned by landlords renting to non-bengkok sharecroppers (n=358),

and private rented plots owned by landlords renting to non-bengkok fixed-rental tenants (*n*=275).

As shown in Table 5, other cells are also not negligible. For instance, as many as 49 bengkok plots were rented out on fixed-rental basis among landlords sampled from the pool of landlords renting to bengkok sharecroppers, and as many as 30 plots were rented out on sharecropping basis among landlords sampled from the pool of landlords renting to bengkok fixed-rental tenants. This indicates the co-existence of two types of tenancy arrangements within one bengkok landlord, which is consistent with the existence of type ABC or BC in Table 4. Another important finding from Table 5 is that private plots owned by bengkok landlord are also important. Co-existence of sharecropping and fixed rental is found for private land as well. As consistent with Table 4, Table 5 also shows that self-cultivation of bengkok plots is frequent. Looking at the total of our sample (last column of Table 5), 202 out of 1,282 bengkok plots are cultivated by village officials themselves.

[Table 5 is about here]

To have a clearer picture of landholding patterns, we reclassify 930 landlords into three broader categories of pure bengkok landlords (those who are provided with bengkok plots and owning no private farmland), landowning bengkok landlords (those with both bengkok and private farmland), and private landlords (those with private farmland but without bengkok land). By construction, all samples from the first two sampling pools (*n*=160+372=534) are bengkok landlords. In addition, 21 samples from the last two sampling pools were found to own bengkok plots, resulting in the total sample of bengkok landlords, *n*=534+21=555, which is divided into 308 pure bengkok landlords and 247 landowning bengkok landlords. The size of non- bengkok landlords is thus $n = 930 - 555 = 375$. It is worthwhile to note that many village officials with bengkok land belong to landless households.

[Table 6 is about here]

The size of private landholding is comparable between landowning bengkok landlords and private landlords: both have the median number of one plot and the average size of total private landholding is around 0.5 ha (the difference is not statistically significant). The size of bengkok landholding is comparable between pure bengkok landlords and landowning bengkok landlords in terms of the median number (both have two bengkok plots) but landowning bengkok landlords with 2 ha of bengkok land on average, significantly larger than 1.6 ha owned by pure bengkok landlords. These indicate that size of bengkok land allocated to each official is large in comparison to private landholding. Another point to note is the heterogeneity in landholding

size, both bengkok and private land, shown by the large standard deviation. Although not shown in the table, among bengkok landlords, there is a clear disparity between village heads and other officials. The size of bengkok land per landlord is much larger for heads than for other officials in the landlord household data, as already discussed using the village-level data (Table 3). Looking at private landholding, out of 247 landowning bengkok landlords in our sample, 46 were village heads. Their average number of private plots was 2.89 plots (median of 2 plots) and its average size was 0.78 ha (median of 0.48 ha), both of which are much larger than reported in Table 6. This supports the standard view in the literature that village heads were from village elite families (see Section 2). At the same time, out of 308 pure bengkok landlords in our sample, 33 were village heads. This indicates that a substantial proportion of village heads were from landless households. However, our dataset indicates that many of these landless village heads are indeed wealthy.[15]

The middle panel of Table 6 shows how these landlords use these plots in three categories: self-cultivation, sharecropping out, and renting out on fixed rental. As multiple plots allow the household to engage in more than one category, the sum of the percentages is greater than 100%. Self-cultivation is observed from about 30% of bengkok landlords, with slightly larger percentage for those with private land. This may reflect the higher engagement in farming by these landowners. The percentage of self-cultivation of private plots is much higher among landowning bengkok landlords than the percentage of self-cultivation of bengkok plots. This indicates that when a landowning household becomes a bengkok land recipient, it is more likely to rent out the bengkok plots than their own private plots. The reason for this is worth further analysis. Although not reported, tendency to use sharecropping rather than fixed rental increases when we restrict the bengkok landlord sample into village heads only. For bengkok plots, this is simply a confirmation of what we already discussed using Table 4 but similar tendency exists for private plots of land owned by bengkok landlords.

The three types of landlords are different in other dimensions as well. As shown in the last panel of Table 6, private landlords had smaller household size, higher frequency of having female heads, less educated than bengkok landlords, and with lower level of assets than bengkok landlords, the difference is significant at the 1% level. This indicates that a substantial proportion of private landlords rent out their land to tenants due to the shortage of manpower within their household, including the shortage due to the life-cycle reason. The disparity in

[15] It is possible that such landless village heads belong to a landowning family but due to the life-cycle reason, their household did not own land at the time of our survey. It is also possible that such landless village heads make living from non-agricultural sources with high returns. We collected the information on village heads' side jobs but not the earnings from them. We therefore cannot directly investigate income levels of these households. Looking at the asset ownership, however, we found that 26 of the 33 village heads who are landless are in the top wealth quintile of all our respondents combined. The average asset index scores (compare with the last row of Table 6) among 33 landless village heads was 1.80 and that among 46 landowning village heads was 1.82 (the difference is statistically insignificant). These provide a support that most of these landless village heads are wealthy.

household size and education becomes slightly larger when we restrict bengkok landlords to village heads only.

5.2. Land Management by Sample Tenants

The distribution of 2,652 plots of farmland owned or rented-in by 913 sample tenant households is shown in Table 7. Reflecting the sampling design, we find concentration of bengkok sharecropped plots rented-in by tenants sampled as a bengkok sharecropper (n = 184), concentration of bengkok fixed-rental plots rented-in by tenants sampled as a bengkok fixed-rental tenant (n = 476), concentration of private sharecropped plots rented-in by tenants sampled as a non-bengkok sharecropper (n = 341), and concentration of private rented plots rented-in by tenants sampled as a non-bengkok fixed-rental tenant (n = 315). As shown in the table, however, other cells are not negligible. For instance, as many as 12 bengkok plots were rented in on fixed-rental basis among tenants sampled from the pool of bengkok sharecroppers, and six plots were rented in on sharecropping basis among tenants sampled from the pool of bengkok fixed-rental tenants. This indicates the co-existence of two types of tenancy arrangements within one bengkok tenant, mostly from different bengkok landlords, a finding not reported elsewhere. Another important finding from Table 7 is that these bengkok tenant households also own many private plots cultivated by themselves. Furthermore, similar co-existence of sharecropping and fixed rental is found for private land as well. The last row of Table 7 indicates the average farm size of 2.85 plots (2,605 plots divided by 913), out of which 28.3% were owned plots, 27.7% were rented-in plots on sharecropping, and the rest (44.0%) were rented-plots on fixed rental.

[Table 7 is about here]

To gain more insights on land management patterns, we reclassify 913 tenants into four broader categories focusing on whether bengkok plot is rented-in (bengkok tenants vs. non-bengkok tenants) and whether the household owns private land. In the literature on land tenancy, the distinction of landed tenants (owner-cum-tenants) and pure, landless tenants is important due to their completely different asset base (Otsuka, 2007). We follow this classification. By construction, all samples from the first two sampling pools (n = 158 + 364 = 522) are bengkok tenants. In addition, 43 samples from the last two sampling pools were found to rent-in bengkok plots, resulting in the total sample of bengkok tenants, n = 522 + 43 = 565, comprising of 313 landowning tenants and 252 landless tenants. The size of non-bengkok tenants is thus n = 913 – 565 = 348, comprising 173 landowning tenants and 175 landless tenants.

[Table 8 is about here]

Table 8 summarizes landholding patterns using the above-mentioned classification of sample tenants. The size of private land owned by land-owning tenant households is small, with median of one plot and the average size around 0.3 to 0.4 ha. The difference between bengkok tenants and non-bengkok tenants is small (marginally significant at the 10% level). These numbers are only slightly smaller than land ownership data shown in Table 6 for landlords. In other words, in rural Java, the distance in asset positions between tenants and landlords is not large. Bengkok tenant households rented in one plot of bengkok land as median and its average size was around 0.4 ha. The difference between landowning and landless households in terms of renting-in bengkok plots is not significant. The difference between landowning and landless bengkok tenants in terms of renting-in private, non-bengkok land is not significant, either. As a result, the size of farm operation (owned land + rented-in bengkok land + rented-in private land − rented-out owned land) is much larger among landowning tenants compared to landless tenants. In other words, tenancy arrangement does not equalize the landholding much. Another important finding from Table 8 is that the size of rented-in private land is larger among non-bengkok tenants than among bengkok tenants but the difference is not large enough to completely compensate for the additional land of bengkok plots cultivated by bengkok tenants. As a result, the final farm size is significantly larger among bengkok tenants than among non-bengkok tenants, and this applies to both landless and landowning households. This suggests that tenancy through the bengkok land institution plays the role of bringing additional benefits to land-poor households in a land-scarce economy of Java. In other words, bengkok landlords can use bengkok plots to increase their vote bank through increasing the number of bengkok tenants.

The lower panel of Table 8 shows how these tenant households use these plots in five categories: renting-out of owned plots, renting-in bengkok plots either through sharecropping or fixed rental, and renting-in private plots either through sharecropping or fixed rentals. As all owner-cum-tenant households in our sample cultivated at least a part of their plots, we do not include the row for self-cultivation (100% for the two categories of owner-cum-tenants). As multiple plots allow the household to engage in more than one category, the sum of the percentages is greater than 100%. Among both bengkok tenants and non-bengkok tenants, the tendency to adopt sharecropping is significantly higher among landless households than among landowning households. This confirms the view that poor, landless households cannot afford fixed rental contracts with higher risk and necessity of advance payment so that they use sharecropping, which has an implicit function of providing risk sharing and credit (Otsuka, 2007). As shown in the last panel of Table 8, the four types of tenant households are somewhat similar regarding the household size, incidence of female heads, and the head's education. Looking at the asset position, landowning tenants are much wealthier than landless tenants. It is important to note that regardless of the type of tenant households, their education level and

the asset position are much lower than those of landlord households reported in Table 6. This indicates that tenant households are much less wealthy than landlord households.

5.3. Terms and conditions for land tenancy

In this subsection, we report characteristics of terms and conditions for land tenancy using information on rented-in plots cultivated by our sample tenant households. Similar information can be obtained from rented-out plots owned by our sample landlord households but many of them are overlapping by the survey design and the information for the same contract reported by the tenant and the landlord is mostly consistent. We also ignore a few cases of tenant households who rented out part of their owned land, because such cases are not common. The dataset contains 207 bengkok sharecropping plots, 517 bengkok fixed rental plots, 512 non-bengkok sharecropping plots,[16] and 629 non-bengkok fixed rental plots. Some contract parameters are common for fixed rental and sharecropping and others are different. We start with common parameters.

Table 9 shows the size of the plot, its location, existence of written contract, relationship with the landlord, length of contract, and responsibility of tenant/landlord in production decision making. Plots under sharecropping tend to be smaller than plots under fixed rental, whose difference is statistically significant. We do not find a particular pattern regarding the plot size difference between bengkok and non-bengkok plots. Fixed rental plots are more likely to be a wet land and irrigated plot, and less likely to be an upland plot. Here again, the sharecropping vs. fixed rental contrast is significant while the bengkok vs. non-bengkok contrast is not. Regarding the location of plots, non-bengkok plots are slightly more likely to be outside the village and the difference is statistically significant.

[Table 9 is about here]

The frequency of the landlord being a relative of the tenant is higher among sharecropping plots than fixed rental plots and lower among bengkok plots than non-bengkok plots. The difference is statistically significant in both dimensions. The reason for higher frequency of sharecropping among relatives can be attributed to the lower transaction costs among relatives, which may reduce asymmetric information problem that is associated more with sharecropping than with fixed rental (Otsuka, 2007). Or it could be the case that sharecropping is more reciprocal in nature and thus more suitable for land transactions among relatives. The reason for lower frequency of bengkok plots among relatives can be attributed to the political

[16] In Table 7, we report the number of non-bengkok sharecropping plots as 514. As two of such plots had incomplete information on contract details, we drop them in the analysis of this subsection.

motivation of bengkok landlords to distribute benefits among non-relatives to improve their political positions in the village.

Another finding is that the frequency of written contracts is lower among sharecropping plots than fixed rental plots and higher among bengkok plots than non-bengkok plots. The difference is again statistically significant in both dimensions. The reason for lower frequency of written contracts for sharecropping can be attributed to similar reasons above. The reason for higher frequency of written contracts for bengkok plots could be due to the nature of bengkok with limited tenure associated with the political cycle. The average length of the bengkok contract (both past record and future expectation) is shorter than that of the non-bengkok contract (the difference is statistically significant). The tenure is also shorter among fixed rental contracts than among sharecropping contracts. The percentage of tenants responding "I don't know" to the question of expected length in the future was higher among sharecroppers than among fixed rental tenants but no difference between bengkok and non-bengkok tenants. Finally, the involvement of landlords into tenants' production decision is highly limited regardless of contract types. The landlord has no say about crop production on plots accounting for more than 90% of plots in total. However, the percentage of cases with landlord involvement is higher among sharecropping plots than among fixed rental plots, as expected from the standard theory of land tenancy (Otsuka, 2007). The percentage of cases with landlord involvement is slightly higher among bengkok plots than among non-bengkok plots, but the difference is only marginally significant at the 10% level. Overall, the information in Table 9 mostly supports the view of a more formal and business-like nature of fixed rental contracts than sharecropping.

Sharecropping is an arrangement in which the tenant and the landlord divide the output in the ratio agreed upon ex ante[17]. In the dataset, the tenant's share in the output ranges from 25% to 85%, with 50% as the median and the mode. In all contracts, labor cost is borne by the tenant. There is variation regarding the sharing of fertilizer costs and seed costs. Table 10 shows the combinations of output shares and input shares observed in our sample. Approximately 45% of sharecropped plots had equal sharing (50%-50%) of output and all costs of seed and fertilizer borne by the tenant. The percentage is similar between bengkok and non-bengkok plots. The second most frequent pattern is cases where the tenant's share in output is more than 50% (mostly two thirds) when all costs are borne by the tenant. This arrangement, which is more favorable to tenants in comparison with the dominant one, is more frequently found among non-bengkok plots than among bengkok plots. The case where fertilizer and seed costs are borne by the landlord is much less frequent.

Overall, the difference between bengkok and non-bengkok sharecropping plots is statistically significant in the direction of more favorable terms to tenants on non-bengkok plots[18].

[17] The Javanese term for the share tenancy (bagi hasil in Indonesian) 50% tenant = maro (Javanese) / bagi dua (Indonesian); two-thirds or one-third tenant = mertelu (Javanese) / bagi tiga (Indonesian), 25% tenant = merapat (Javanese) / bagi empat (Indonesian), 85% tenant = moro pitu (Javanese) / bagi tujuh (Indonesian).

[18] To have a sharper comparison, we calculated the net percentage of output that is paid to landlords as the sharecropping rent, assuming that the seed cost is 5% of the gross value of paddy output and the fertilizer cost is

Therefore, our dataset does not indicate that sharecropping parameters of bengkok plots are adjusted to help resource-poor tenants. This does not mean, however, that bengkok sharecropping does not help landless or land-poor households. In the land scarce economy of Java, giving land-poor households access to land through bengkok sharecropping may give them sufficient benefits even without adjustment of sharecropping parameters.

[Table 10 is about here]

Table 11 summarizes the information for the rental fee for fixed rental contracts. Most of them are paid for per-year basis and about 5% were defined as a seasonal rate[19]. This is the same regardless whether it is a bengkok plot or private plot. In more than 80% of the cases, the rent is paid for one cropping season or for one year. But for the rest of the cases, the rent is paid in advance for equal to or more than two seasons (years). Therefore, we normalize the rent in 1,000 Rp per season (year) per ha and report the resulting numbers in the lower panel of Table 11. The average level was around 6.9 million Rp. per ha per season for seasonal rents and around 17 million Rp. per ha per year for yearly rents. Assuming two crops per year, the last rows of Table 11 show summary statistics for appended observations. The rent level for bengkok plots is slightly lower than that for non-bengkok plots. However, the difference is not statistically significant. This suggests that there is no favorable treatment for bengkok plots as far as the nominal level of land rent is concerned. In other words, we do not observe the reduction of the rent level below the market level to distribute additional benefits to bengkok tenants. This may suggest that due to the land scarcity in Java, giving land-poor households access to land through bengkok tenancy gives them sufficient benefits even without adjustment of rental fees. However, as the level of land rent depends on land quality and we do not control for these factors in the comparison of Table 11, the conclusion is highly tentative.

[Table 11 is about here]

So far in this section, we show household- or plot-level observations pooled across tenancy types and across villages. Under this treatment, it is implicitly assumed that contracting parties can choose different types of tenancy. However, if certain village-level institutional constraints exist, they could limit the room for contract choice. Fortunately, this is not the case in our data. We already noted the existence of within-household variation. Our sample includes cases where landlord (or tenant) households are simultaneously involved in fixed rental and sharecropping contracts. The village-level data provides similar evidence as 62 out of 130 villages reported both sharecropping and fixed rental contracts on bengkok plots (eleven villages were with sharecropping only and 57 villages were with fixed rental only). The

15% of the gross value of paddy output. The average among bengkok plots was 44.2% and that among non-bengkok plots was 43.0%, and the difference is statistically significant at the 5% level (p-value = 0.048).

[19] Typically, land is rented out for the period specific to the growing season for a particular crop. In this sense, we may call this a “crop-wise” rental rather than a seasonal rental.

existence of within-village variation can also be shown from the plot-level data. Using the 12 categories of sharecropping parameters in Table 10, we calculated how many of them were observed within each village. We found 64 villages with two or more categories of sharecropping parameters (in 50 villages, uniform output and cost sharing ratios were adopted; in 16 villages, no sharecropper sample was drawn in the tenant household survey). The variation in fixed rents shown in Table 11 also includes substantial within-village variation. Using the five categories of rental time unit, we found 2 or more categories in 74 villages. We thus have substantial within-village variation in tenancy parameters, which is not reported elsewhere.

6. Conclusion

Bengkok land is a unique institution prevalent in Java, Indonesia, in which the use rights of village land are allocated to village administrators while they are in office as compensations for their services. To gain more insights on how the farming practices and tenancy contractual arrangements on bengkok plots differ from that in the private plots, we conducted a primary survey in 2018 covering 130 villages and more than 1,800 households in Central Java and East Java.

We found substantial heterogeneity in the size of bengkok land across villages. Fixed rental tenancy was more common than sharecropping as tenancy choice, and in many villages self-cultivation of bengkok plots by officials themselves was evident. Furthermore, we found limited involvement of bengkok landlords into tenants' decision making in production such as choice of crops and inputs. Another notable finding was the absence of contract parameter adjustments in favor of tenants when bengkok plots were rented out compared to private plots. All these pieces of evidence suggest that the bengkok land management had more business-like features. At the same time, we found that the average size of a farm operated by bengkok tenants was larger than that of a farm operated by private tenants. Finally, evidence is consistent with political cycles as the village heads, who potentially have reelection motives, offered sharecropping contracts to non-relatives to garner a larger pool of supporters.

The overall picture indicates coexistence of different motivations in bengkok land management by village officials. On the one hand, bengkok land serves as safety nets to support the livelihoods of landless and land-poor households by providing them access to land through tenancy contracts. On the other, it serves as in-kind reward system for public services rendered by the village administrators and allows them to extract economic returns from bengkok plots as temporary landlords. It is imperative that we have a thorough understanding of the interaction between these two mechanisms in light of political cycles in conjunction with periodic village elections. Another potential area of further research is to gain insights on the sources of heterogeneity in bengkok land management practices across villages. We leave both tasks for the future research.

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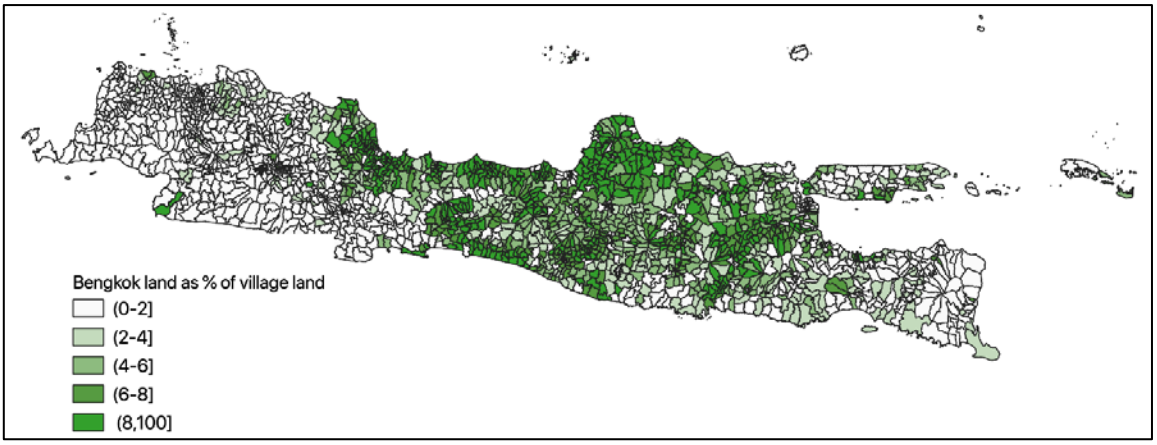

Figure 1: Distribution of Bengkok Land in 2000

Note: This map shows the percentage of bengkok land in the total area of each village, averaged at the sub-district level.
Source: Drawn from the information in PODES 2000.

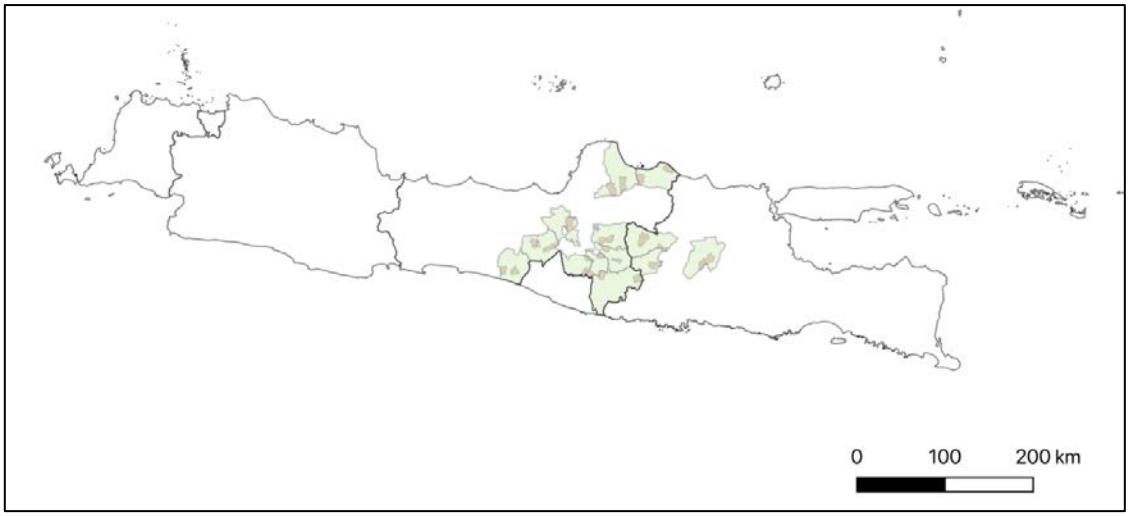

Figure 2: Districts and Sub-districts of the Study Areas

Note: The light brown segments show our sample sub-districts and the light green segments surrounding them show the districts to which our sample sub-districts belong.
Source: SurveyMETER.

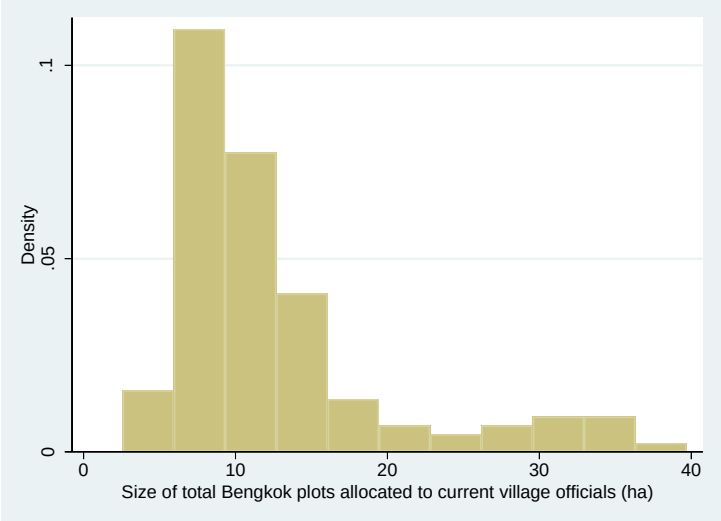

Figure 3: Distribution of the size of Bengkok land (ha) across 130 villages

Note: The figure shows the histogram of the sum of plots allocated to current officials, i.e., (a') in Table 1.
Source: Drawn by the authors using the survey data (same for the following tables).

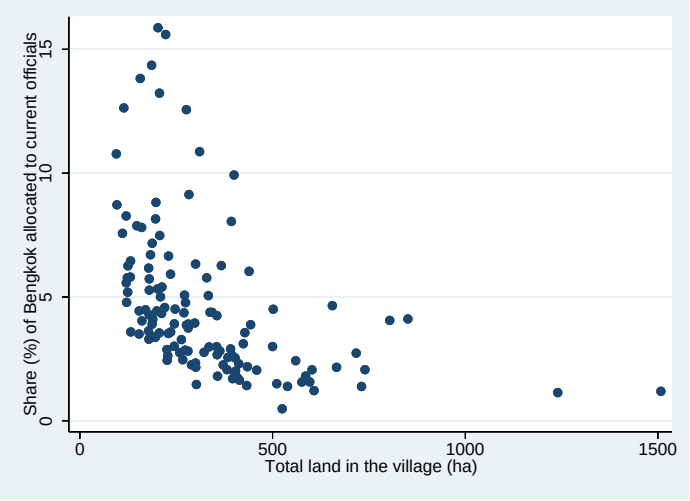

Figure 4: Correlation of the relative size of Bengkok land and the village size

Notes: The figure plots % of bengkok (sum of plots allocated to current officials, i.e., (a') in Table 1) to total land on the Y-axis against the X-axis of village size in total land (ha). The number of observations is 130 villages.

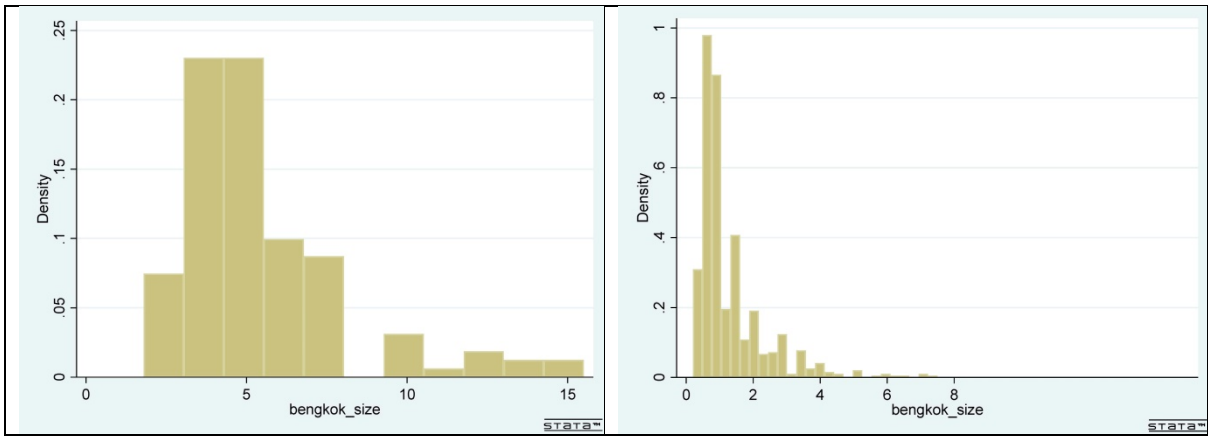

Figure 5: Size distribution of Bengkok land

Note: Village heads (left) and all other officials (right)

Table 1: Prevalence of Bengkok Land across Sample Villages

	Level (in ha)			Composition based on mean (%)		
	Mean	(S.D.)	Median			
Land owned by the village						
a. Bengkok for village officials[1]	19.0	(21.8)	12.0	5.8	8.2	10.5
a'. Bengkok actually allocated to current village officials[1]	**12.4**	**(7.6)**	**10.0**	**3.8**	**5.4**	**6.9**
b. Bengkok for dusun (sub-village) heads	5.7	(7.8)	3.5	1.7	2.5	3.2
c. Bengkok for supporting staff	3.4	(7.8)	0.0	1.0	1.5	1.9
d. Retired officials' land	0.5	(2.4)	0.0	0.2	0.2	0.3
e. Village Treasury Land	8.1	(14.0)	3.4	2.5	3.5	4.5
f. Communal/public use	10.5	(24.4)	2.5	3.2	4.5	5.8
Total bengkok (sum of a, b, and c)	**28.1**	**(28.0)**	**20.2**	**8.6**	**12.1**	**15.6**
Total village-owned land (sum of a,b,c,d,e, and f)	47.3	(47.7)	30.6	14.4	20.4	26.2
Total area of the village (private land and village-owned land)						
Land used for agriculture						
a. Wet land, irrigated	133.4	(104.1)	118.5	40.6		
b. Wet land, unirrigated	47.2	(81.7)	3.2	14.4		
c. Dry land	51.2	(78.5)	17.6	15.6		
Wet land, total (a.-b.)	180.6	(122.8)	145.5	55.0		100.0
Total agricultural land (a.-c.)	231.8	(172.8)	178.6	70.6	100.0	
Non-agricultural land	96.7	(93.1)	74.1	29.4		
Total area	328.5	(207.6)	276.4	100.0		

Notes: The number of observations is 130. In the first panel, all information except (a') was taken from the village land question page that reports the classification of village-owned land. On the other hand, the information in (a') was taken from the village official question page that reports the actual usage of bengkok land at the time of the survey. Therefore, (a) and (a') are close but not exactly the same ((a) is greater than (a') in many cases but (a) is smaller than (a') in some cases).

1. Among village administrators defined by the Village Law of 2014, village officials except for dusun heads are included here.

Source: Prepared by the authors using the survey data (same for the following tables).

Table 2: Bengkok Land Incidence in Relative Terms

	Ratio of total Bengkok/village land (%)		
	Mean	(S.D.)	Median
Bengkok actually allocated to current village officials (a'. of Table 1)			
Ratio to total area of the village	4.6	(3.1)	3.9
Ratio to total agricultural land	7.0	(5.1)	6.0
Ratio to total agricultural land (wet land only)	9.0	(7.0)	7.1
Total bengkok (sum of a, b, and c of Table 1)			
Ratio to total area of the village	10.6	(12.1)	6.5
Ratio to total agricultural land	15.2	(16.1)	9.9
Ratio to total agricultural land (wet land only)	20.6	(29.9)	12.9

Note: The number of observations is 130.

Table 3: Roster of Village Officials and Bengkok Land Allocation

	Position in the village			
	Village heads	Village secretaries	Others (mostly village dept heads)	Total
Number of observations	130	120	643	893
Out of which:				
elected through elections	125	4	63	192
having employment in addition to the official post	67	42	264	373
were provided with bengkok land	129	94	597	820
Summary statistics of bengkok land allocated				
NOB	129	94	597	820
Mean (ha)	5.51	2.38	1.15	1.97
(Standard deviation)	(2.63)	(1.71)	(0.80)	(2.09)
Median (ha)	5.00	2.06	0.90	1.00
Total bengkok land allocated to these officials (in ha)	710.6	223.5	684.3	1,618.4
(distribution: %)	(43.9)	(13.8)	(42.3)	(100.0)

Note: Data for village secretaries exist for all 130 villages but the information on their appointment route, additional employment, and bengkok land was missing for 10 secretaries.

Table 4: Use of Bengkok Land by Village Officials

	Position in the village			
	Village heads	Village secretaries	Others (mostly village dept heads)	Total
Number of observations	129	94	597	820
Use of bengkok land (mutually exclusive categories, raw numbers)				
A (Own cultivation only)	7	18	159	184
AB (Own cultivation and sharecropping)	5	1	23	29
ABC (Own cultivation, sharecropping, fixed rental)	5	0	13	18
AC (Own cultivation and fixed rental)	32	15	125	172
B (Sharecropping only)	26	17	81	124
BC (Sharecropping and fixed rental)	12	9	18	39
C (Fixed rental only)	42	33	177	252
CV (Fixed rental and other)	0	0	1	1
V (Other)	0	1	0	1
Patters of bengkok land usage (non-exclusive categories, frequency shares in %)				
Without weighting				
Involved in own cultivation	38.0	36.2	53.6	49.1
Involved in sharecropping	37.2	28.7	22.6	25.6
Involved in fixed rental	70.5	60.6	55.9	58.8
Multiple ways to use	41.9	26.6	30.2	31.6
Weighted by the size of Bengkok plot				
Involved in own cultivation	39.6	34.9	55.8	45.8
Involved in sharecropping	31.9	25.7	17.5	25.0
Involved in fixed rental	75.9	72.5	63.9	70.4
Multiple ways to use	42.6	33.2	34.6	37.9

Table 5: Distribution of Plots Owned by Sample Landlords

	Sampling type of landlords				Total
	Landlords renting to the bengkok sharecropper sample	Landlords renting to the bengkok fixed-rental tenant sample	Landlords renting to the non-bengkok sharecropper sample	Landlords renting to the non-bengkok fixed-rental tenant sample	
Number of landlord observations	160	372	202	196	930
Bengkok plots allocated by the village					
0. Own cultivation	36	157	4	5	202
1. Sharecropping	296	30	3	6	335
2. Fixed rental	49	652	12	12	725
3. Not cultivated or others	11	6	0	3	20
Sub-total	392	845	19	26	1,282
Plots of private land owned by the household					
0. Own cultivation	92	176	49	90	407
1. Sharecropping	53	29	358	28	468
2. Fixed rental	8	45	12	275	340
3. Not cultivated or others	2	1	0	0	3
Sub-total	155	251	419	393	1,218
Sum of two types of plots					
0. Own cultivation	128	333	53	95	609
1. Sharecropping	349	59	361	34	803
2. Fixed rental	57	697	24	287	1,065
3. Not cultivated or others	13	7	0	3	23
Total	547	1096	438	419	2,500

Table 6: Landholding of Sample Landlords

	Landlord type			Total	p-value for testing the equality of means[1]	
	(A) Pure bengkok landlord (w/o private farmland)	(B) Landowning bengkok landlord (w/ private farmland)	(C) Landlord owning private farmland but without bengkok		(A)=(B)	(B)=(C)
Number of landlord observations	308	247	375	930		
Number of private plots owned by the household						
Mean	0	1.89	2.01	1.31	n.a.	0.419
S.D.	0	1.82	1.74	1.72		
Median	0	1	1	1		
Total acreage of private plots owned by the household (ha)						
Mean	0	0.49	0.48	0.32	n.a.	0.833
S.D.	0	0.76	0.49	0.55		
Median	0	0.25	0.33	0.18		
Number of Bengkok plots allocated to the household						
Mean	2.19	2.45	0	1.38	0.144	n.a.
S.D.	1.41	2.47	0	1.89		
Median	2	2	0	1		
Total acreage of Bengkok plots allocated to the household (ha)						
Mean	1.64	2.07	0	1.09	0.019	n.a.
S.D.	1.75	2.42	0	1.84		
Median	1.00	1.12	0	0.60		
% of households involved in the following:						
Bengkok plots, self-cultivated	27.0	34.8	0	18.2	0.047	n.a.
Bengkok plots, sharecropped out	31.5	37.3	0	20.3	0.158	n.a.
Bengkok plots, fixed rental	79.6	71.3	0	45.3	0.025	n.a.
Non-Bengkok plots, self-cultivated	0	66.0	19.5	25.4	n.a.	0.000
Non-Bengkok plots, sharecropping	0	29.2	56.0	30.3	n.a.	0.000
Non-Bengkok plots, fixed rental	0	20.2	51.2	26.0	n.a.	0.000
Household (hh) characteristics						
Average hh size in number	4.12	4.21	3.34	3.83	0.471	0.000
% of female-headed households	3.6	1.2	30.4	13.8	0.064	0.000
Average age of household heads	48.2	49.7	59.7	53.2	0.037	0.000
Average years of schooling of heads	12.37	12.10	8.13	10.59	0.196	0.000
Asset index score[2]	0.765	0.930	-0.246	0.401	0.108	0.000

Notes: 1. "p-value for testing the equality of means" is based on t-tests for the null hypothesis that the two groups have the same mean, allowing for unequal variance. "n.a." means "not applicable by construction of landlord types".

2. "Asset index score" is the predicted value of the first principal component, aggregating 13 dummy variables for the household ownership of each asset (the loading coefficients, all positive, were estimated from the pooled sample of both tenant and landlord households). Its mean is zero, SD is 1.647, minimum is -6.06, and maximum is 4.67 (n=1,843).

Table 7: Distribution of Plots Owned or Rented-in by Sample Tenants

	Sampling type of tenants				
	Bengkok sharecropper sample	Bengkok fixed-rental tenant sample	Non-bengkok sharecropper sample	Non-bengkok fixed-rental tenant sample	Total
Number of tenant observations	158	364	199	192	913
Plots of private land owned by the household					
0. Own cultivation	93	357	118	170	738
1. Rented out on sharecropping	2	11	1	0	14
2. Rented out on fixed rental	4	22	5	2	33
Sub-total	99	390	124	172	785
Bengkok plots rented-in from village officials					
1. Sharecropping	184	6	15	2	207
2. Fixed rental	12	476	9	20	517
Sub-total	196	482	24	22	724
Plots of private land rented-in from others					
1. Sharecropping	79	59	341	35	514
2. Fixed rental	18	272	24	315	629
Sub-total	97	331	365	350	1,143
Total plots in the tenant data	392	1,203	513	544	2,652
Plots cultivated by the household					
0. Cultivation of owned plots	93	357	118	170	738
1. Sharecropping (bengkok+private)	263	65	356	37	721
2. Fixed rental (bengkok+private)	30	748	33	335	1,146
Total	386	1,170	507	542	2,605

Table 8: Landholding of Sample Tenants

	Tenant type				Total	p-value for testing the equality of means[1]	
	Bengkok tenant, land-owning	Bengkok tenant, landless	Non-bengkok tenant, land-owning	Non-bengkok tenant, landless		(bengkok) = (non-bengkok)	(land-owning) = (landless)
Number of tenant observations	313	252	173	175	913		
Number of private plots owned by the household							
Mean	1.69	0	1.49	0	0.86	0.052	n.a.
S.D.	1.36	0	0.91	0	1.20		
Median	1	0	1	0	1		
Total acreage of private plots owned by the household (ha)							
Mean	0.40	0	0.33	0	0.20	0.196	n.a.
S.D.	0.59	0	0.61	0	0.47		
Median	0.20	0	0.18	0	0.04		
Number of bengkok plots rented-in by the household							
Mean	1.28	1.28	0	0	0.79	n.a.	0.909
S.D.	0.67	0.68	0	0	0.82		
Median	1	1	0	0	1		
Total acreage of bengkok plots rented-in by the household (ha)							
Mean	0.48	0.44	0	0	0.29	n.a.	0.365
S.D.	0.46	0.59	0	0	0.47		
Median	0.33	0.30	0	0	0.14		
Number of non-bengkok plots rented-in by the household							
Mean	0.88	0.90	1.85	1.82	1.25	0.000	0.681
S.D.	2.22	1.82	1.52	1.16	1.87		
Median	0	0	1	1	1		
Total acreage of non-bengkok plots rented-in by the household (ha)							
Mean	0.25	0.28	0.40	0.39	0.31	0.005	0.719
S.D.	0.88	1.21	0.38	0.33	0.85		
Median	0	0	0.28	0.30	0.15		
Number of total plots cultivated by the household							
Mean	3.73	2.18	3.29	1.82	2.85	0.002	0.000
S.D.	3.29	2.21	1.81	1.16	2.56		
Median	3	2	3	1	2		
Total acreage of plots cultivated by the household (ha)							
Mean	1.10	0.72	0.70	0.39	0.78	0.000	0.000
S.D.	1.50	1.61	0.61	0.33	1.28		
Median	0.72	0.40	0.53	0.30	0.50		

(to be continued)

Table 8: Landholding of Sample Tenants (continued)

	Tenant type				Total	p-value for testing the equality of means[1]	
	Bengkok tenant, land-owning	Bengkok tenant, landless	Non-bengkok tenant, land-owning	Non-bengkok tenant, landless		(bengkok) = (non-bengkok)	(land-owning) = (landless)
% of households involved in the following:							
Owned plots, rented-out	11.18	0	3.47	0	4.49	0.001	n.a.
Bengkok plots, sharecropped in	27.16	38.10	0	0	19.82	n.a.	0.006
Bengkok plots, rented in on fixed rental	75.40	64.68	0	0	43.70	n.a.	0.006
Non-bengkok plots, sharecropped in	18.21	24.21	50.87	64.00	34.83	0.000	0.001
Non-bengkok plots, rented in on fixed rental	27.48	27.78	61.27	47.43	37.79	0.000	0.253
Household (hh) characteristics							
Average hh size in number	3.82	3.76	3.58	3.48	3.69	0.007	0.352
% of female-headed hh	1.9	2.8	1.7	3.4	2.4	0.788	0.249
Average age of hh heads	55.6	53.3	55.7	55.2	54.9	0.228	0.038
Avg ys of schooling of heads	7.08	6.65	6.69	6.27	6.73	0.151	0.105
Asset index score[2]	-0.187	-0.609	-0.312	-0.613	-0.409	0.371	0.000

Notes: 1. and 2. See notes to Table 6.

Table 9: Terms and Conditions of Plots Rented-in by Sample Tenant Households

	Tenancy type of the plot				Total	p-value for testing the equality of means or independence[2]	
	Bengkok land, share-cropping	Bengkok land, fixed rental	Non-bengkok land, share-cropping[1]	Non-bengkok land, fixed rental		(bengkok) = (non-bengkok)	(share-cropping) = (fixed rental)
Number of plot observations	207	517	512	629	1,864		
Size of the plot (ha)							
Mean	0.24	1.27	0.47	1.03	0.85	0.270	0.000
S.D.	0.19	4.93	1.84	3.78	3.55		
Median	0.20	0.32	0.16	0.20	0.21		
Type of land (%)						0.993	0.000
Wet land, irrigated	51.7	63.3	57.2	62.6	60.1		
Wet land, unirrigated	10.1	27.7	15.2	28.3	22.5		
Upland	38.2	9.1	27.5	9.1	17.4		
Location of land (%)						0.000	0.016
At the house	1.0	0.8	0.8	1.0	0.9		
Same hamlet (dusun)	69.1	58.6	67.8	63.6	64.0		
Same village (desa)	29.5	36.0	25.6	27.2	29.4		
Different desa	0.5	4.6	5.9	8.3	5.7		
Landlord is a relative? Yes (%)	30.4	23.6	45.1	25.8	31.0	0.000	0.000
Written contract? Yes (%)	3.4	32.1	1.2	25.8	18.3	0.000	0.000
Years since the start of cultivating the plot[3]							
Mean	5.76	4.33	7.14	4.32	5.26	0.001	0.000
S.D.	6.87	4.06	7.72	3.98	5.74		
Median	3	3	5	3	3		
Years ahead expected to cultivate the plot							
NOB	198	503	489	612	1802		
(% who responded "I don't know")	(4.3)	(2.7)	(4.5)	(2.7)	(3.3)		
Mean	7.43	5.36	8.30	6.25	6.69	0.005	0.000
S.D.	5.97	7.40	9.48	12.37	9.84		
Median	5	3	5	4	5		
Does the landlord have any say on production decision? (%)						0.054	0.000
No	73.4	99.2	83.4	99.8	92.2		
Yes on crop choice	4.4	0.6	1.0	0.0	0.9		
Yes on input use	12.1	0.0	9.0	0.0	3.8		
Yes on both	10.14	0.19	6.64	0.16	3.06		

Notes: 1. In Table 7, we report the number of non-bengkok sharecropping plots as 514. As two of such plots had incomplete information on contract details, we drop them in this table and the next.
2. "p-value for testing the equality of means" is based on t-tests for the null hypothesis that the two groups have the same mean, allowing for unequal variance. "p-value for independence" is based on chi-squared tests for the independence of row and column distributions.
3. There was one observation with missing information ("I don't know"), belonging to bengkok, fixed rental.

Table 10: Sharecropping Parameters Observed among Sample Tenant Households

Output share of the tenant	Cost sharing (% is the share borne by the tenant)	Bengkok plots		Non-bengkok plots		Total	
Less than 50%[1]							
	All landlord	5	2.4%	16	3.1%	21	2.9%
	Sharing	0	0.0%	6	1.2%	6	0.8%
	All tenant	1	0.5%	0	0.0%	1	0.1%
Equal to 50%							
	All landlord	2	1.0%	1	0.2%	3	0.4%
	Sharing (seed 0%, fertilizer 50%)	15	7.2%	10	2.0%	25	3.5%
	Sharing (seed 50%, fertilizer 50%)	20	9.7%	24	4.7%	44	6.1%
	Sharing (seed 100%, fertilizer 50%)	28	13.5%	56	10.9%	84	11.7%
	Sharing (others)	9	4.3%	30	5.9%	39	5.4%
	All tenant	96	46.4%	228	44.5%	324	45.1%
More than 50%[2]							
	All landlord	0	0.0%	1	0.2%	1	0.1%
	Sharing	1	0.5%	15	2.9%	16	2.2%
	All tenant	30	14.5%	125	24.4%	155	21.6%
Total		207	100.0%	512	100.0%	719	100.0%

Notes: p-value for testing the independence of row and column distributions by a chi-squared test is 0.000.
1. Out of these 28 observations, 13 with 25%, 5 with 30%, 2 with 33% (one third), and 8 with 40%.
2. Out of these 172 observations, 60 with 60%, 101 with 67% (two thirds), 45 with 70%, 10 with 75%, and 1 with 85%.

Table 11: Fixed Rental Rates Observed among Sample Tenant Households

	Bengkok plots		Non-bengkok plots		Total		p-value for testing the equality of means or independence [1]
Time unit of rental							0.127
Seasonal, single crop period	17	3.3%	34	5.4%	51	4.5%	
Seasonal, multiple crops period	2	0.4%	5	0.8%	7	0.6%	
Annual, single year	422	81.6%	477	76.0%	899	78.5%	
Annual, multi years	76	14.7%	111	17.7%	187	16.3%	
Other (gadai tanah)	0	0.0%	1	0.2%	1	0.1%	
Total	517	100.0%	628	100.0%	1,145	100.0%	
Rent for seasonal rental (1,000 Rp/ha/season)							
NOB	19		39		58		
Mean	6,865		6,894		6,884		0.982
S.D.	4,259		5,095		4,800		
Median	6,071		5,952		5,976		
Rent for annual rental (1,000 Rp/ha/year)							
NOB	498		588		1,086		
Mean	16,655		17,133		16,914		0.493
S.D.	10,721		12,216		11,552		
Median	14,286		16,212		15,590		
Appended data, assuming 2 cropping seasons per year (1,000 Rp/ha/year)							
NOB	517		627		1,144		
Mean	16,548		16,925		16,754		0.576
S.D.	10,656		12,120		11,478		
Median	14,286		16,000		15,134		

Notes: In this table, one observation in the category of "Non-Bengkok plots" was deleted because the reported level of rent was 0 Rp. Rent was then calculated for 1,144 observations, excluding one case of gadai tanah (land pawning contract).
1. "p-value for testing the equality of means" is based on t-tests for the null hypothesis that the two groups have the same mean, allowing for unequal variance. "p-value for independence" is based on a chi-squared test for the independence of row and column distributions.

Appendix 1. The origin and evolution of bengkok land

While disputes remain about its origin (Moertono, 1968; Soetrisno, 1993), according to many scholars (Tjondronegoro, 2013), an old system of appanage land from the precolonial Javanese kingdom predated the bengkok land institution, which was legally codified under the Dutch colonial rule. During his tenure between 1830 and 1833, Governor-General Van den Bosch drafted a plan to enable the Dutch entrepreneurs to establish estates (*cultuurmaatschappijen*) in forested areas of Java as land was made available on lease for a 21.5-*year* term. The system of estates cultivating agricultural (mainly cash crop) products soon became profitable for the European investors. Many Dutch banks including the Dutch Trading Association (*Nederlandsche Handel-Maatschappij*), the Escompto Bank, and the Commercial Bank (*Handelsbank*) started financing these agricultural estates in Java and Sumatra. In a few years, the number of companies increased to 227 (with a total capital of 29.8 million guilders), of which 64 were based in the Netherlands, and the rest from the Netherlands Indies (Tjondronegoro, 2013).

In 1866, the Dutch colonial government decided to give the village headmen an official piece of land (*ambtelijk landbezit*) in lieu of salary, which proved to be an inexpensive and convenient means of administration and cooperation with the local economy. Later, with the introduction of the ethical policy "*Inlandsch Gemeente Ordonnantie*" (Native Municipality Ordinance) in 1906, the provision of election for the village headman and the village officers was constituted by law, which stated "the revenue for public organization to the village headman and other village officers, whether in the form of *ambtelijk landbezit*, or in other ways of performing services (*dienstverrichtingen)*, as long as it is feasible and desirable for the benefit of residents, based on the consideration of the prefectural administrative chiefs (Article 3)" (Kano, 1994). At that time, the village headman and village officers also enjoyed various labor services by the villagers.

There is a consensus among historians that under the Cultivation System introduced by the Dutch government, landholdings of the village government increased (Elson, 1994). Due to their higher social rank, village heads usually rented out bengkok land to landless or land-poor households. Dell and Olken (2020) regarded the expansion of village land including bengkok during the colonial period as an important component of strengthening the Cultivation System.

After independence, local administration at the village level in rural Java continued to use bengkok land as in-kind payments to reward village officials. While labor service practices were gradually abolished (Kano, 1994), the bengkok land system was continued as the main compensation for village administrators. Mortimer (1974) noted that following independence the practice of bengkok land not only continued but has also been extended by reclassifying communal land in villages that did not have bengkok land before. Such acts corroborated the legacy of class domination in rural politics that continued since the Dutch colonial times.

The diverse and more or less autonomous village governance continued until the Soeharto era, when the New Order regime started to incorporate villages into state administration by providing villages with uniform structure and clear hierarchy to have more control over villages (Antlov, 2003). The top-down approach to rural development increased the reach of the state into village governance (Hardjono,1983). During this era (especially after 1971), efforts were made to reclassify communal land in villages with little or no bengkok land to create a more equitable distribution of bengkok land across Java. For example, in Jember (a district in East Java), in 1994, the district government allocated funds to purchase additional bengkok land for villages that had too little (Soetrisno, 1993). In another study, White and Wiradi (1979), compared data on bengkok land collected in the 1970s with that from the 1860s, and found a considerable increase in the number of villages with bengkok land in Priangan (West Java).

Some of village-level case studies provide details on bengkok land during the Soehrato era. Village studies conducted by Hiroyoshi Kano, a Japanese economist specialized in Indonesian studies, are particularly worth mentioning because of detailed reports on how bengkok land was operated and its relationship with local politics. From his surveys in a village in Yogyakarta in 1976 (Kano, 1981), he found that bengkok land occupied 13% of total wet land for paddy in the village and 6% of the total area of the village, which was not very different from other villages in Yogyakarta. From 80 households surveyed by him in detail, 15 cases of benkok transactions were reported, classified into 1 case of self-cultivation, 11 cases of fixed rental tenancy, and 3 cases of sharecropping. Kano (1994) investigates long-term changes in five villages in a district in Central Java, surveying 500 households in 1990. He found that 8.8% of the total paddy fields in the village were used as bengkok land. He also utilized historical records of the same village and concluded that the percentage of bengkok land in the village land remained similar for 87 years from 1903 to 1990.

During the 1980s and the 1990s there were sporadic attempts to replace the bengkok land institution with fixed salary for village heads. But in most parts, these were half-hearted efforts that failed to make any significant impacts (Kammen, 2003). After the fall of Soeharto in 1998, the Law 22 of 1999 on Regional Administrations was introduced to decentralize the government, giving much more autonomy not only to districts, but also to villages (Antlov 2003).

At the time of our survey in 2018, the Village Law of 2014 and regulations related with it were in force. The law makes it clear that village heads are elected directly by villagers for a tenure of six years, with the tenure restriction of the maximum of three terms. The 2014 Village Law also made concrete suggestions to abolish the bengkok land institution, and instead village headman and village officers to receive a stipulated monthly salary (*penghasilan tetap*), various allowances (*tunjangan*) and medical benefits (*jaminan kesehatan*) from the financial resources available at the subdistrict level (*dana perimbangan*) (Kano, 2017). In 2015, the government started consolidating village funds (*dana desa*) in order to support salaries for the village

administrators[20] (Lewis, 2015). Following the 2014 Village Law, the Government Regulation 43 was passed, which governs village assets so that the village officials will be paid from village budget. This law did not explicitly mention about the future of bengkok land. However, under pressure from villages, in 2015 the Government Regulation 47 was also enacted, which explicitly retain the status of bengkok land as additional means of support for village officials, on top of the paid salary. This clearly marked a victory for the villages that called for the continuation of bengkok land. However, around this time some districts decided to get rid of bengkok land. During our fieldwork in 2018, we found three out of thirteen districts that were initially identified as core regions of the bengkok land institution had just implemented district laws to abolish bengkok land (described in detail in section 3).

Appendix 2. Tenant household survey framework

From each study village, we surveyed tenant households, and landlord households as their counterparts. The number of sampled tenant households in each village was roughly in proportion to the population of tenants in the village, averaging seven samples per village. Land tenancy types include four broad categories: bengkok plots sharecropped, bengkok plots based on fixed rental, non-bengkok plots (i.e., private land) sharecropped, and non-bengkok plots based on fixed rental. To maximize within-village variation in contract types, we intentionally selected different types of tenancy from each village so that all sample villages have tenants renting in bengkok land and tenants renting in non-bengkok land on the one hand, and attempted to cover both sharecropping and fixed rental tenancies (if both types existed in the same village) on the other.

Due to the non-availability of eligible households or refusal, some villages had fewer than seven tenant households in our sample, compensated by additional households in nearby sample villages. Throughout the fieldwork, whenever the availability of landlord/farmer types was not ideal, detailed notes were documented about each case and the decision made.

Our final dataset contains complete information for a sample of 913 tenant households from 130 study villages (7.02 tenant households per village on average), classified under the following categories:

(5) bengkok land sharecroppers (n =158),
(6) bengkok land fixed-rental tenants (n = 364),
(7) non-bengkok land sharecropper sample (n =199), and
(8) non-bengkok land fixed-rental tenants (n = 192).

However, landless or land-poor households can rent in plots from both bengkok and non-bengkok landlords simultaneously. From our sampling strategy, those tenant households who were chosen from the category bengkok sharecroppers may rent in additional land from non-bengkok landlords, and those chosen from the category of non-bengkok fixed-rental tenants may rent in additional land from bengkok landlords. This is an important aspect of the bengkok land institution, which is neither mentioned in other studies nor available from government statistics. Section 5 explains it in greater detail.

In the tenant household questionnaire, the household roster includes questions on education and occupation of each member. The other sections collect information on assets including agricultural machinery, livestock, household durables, etc.; land ownership and management; cropping pattern and outputs, details of crop production; debts and credits; non-agricultural income sources, and finally the Raven's progressive matrices to measure logical reasoning

ability of the respondent.[21] The respondent was the household head in most cases, interviewed at their home.

We collected plot-level information in two different ways.

First, the ownership or tenancy status of all kinds of farmland was collected at the plot level and the information covered all plots either owned (self-cultivated or rented-out) or rented-in by the tenant household. We collected detail information on land size, land quality, location, procedures of acquisition of privately owned land, details of rental terms and conditions if an owned plot is rented out or a plot owned by others is rented in. All our 913 sample households manage to have at least one plot. The resulting dataset contains information on 2,652 plots (2.90 plots per household on average).

Second, details of crop production such as material inputs, family labor, hired labor, output disposal, etc. were collected from two representative plots of the sample tenant households. If the household manages only one or two plot(s), we collected information from these plots. If the household manages more than two plots, we chose plots on which paddy was produced in the last cropping season and plots belonging to different types of tenancy, with larger plots given a priority. A plot managed by our sample tenant household is either a plot under bengkok sharecropping, a plot under non-bengkok sharecropping, a plot under bengkok fixed-rental tenancy, a plot under non-bengkok fixed-rental tenancy, or a plot owned by the tenant. By this strategy, we attempted to have within-household variation in contract types. The resulting dataset contains detailed crop production data on 1,692 plots operated by our 913 sample households (1.85 plots per household on average).

The information from these 913 households provides detailed information on the bengkok land institution from the perspective of tenants. Although they are not strictly a random sample of all tenant households in these villages, the household-level and plot-level information will give us valuable insights regarding the institution and its impact on productivity.

[21] The twelve Raven's Matrices used in this study are a subset of Raven's Coloured Progressed Matrices designed to measure abstract reasoning and parts of fluid intelligence (Raven, 2000). The same subset of questions has been used in other surveys in Indonesia such as IFLS.

Appendix 3. Landlord household survey framework

We surveyed landlords who rent their land (including bengkok land under their control) to each of our sample tenant households. This suggests we aimed to contact landlord households in each village who are tied to four categories of tenant households (bengkok sharecroppers, bengkok fixed-rental tenants, non-bengkok sharecroppers, and non-bengkok fixed-rental tenants). Some of our sample tenant households had more than one landlord, some landlords were not available for survey, and some landlords rented to multiple tenants among our sample tenant households. As a result, our final dataset contains complete information for 930 landlord households from 130 study villages (7.15 landlord households per village on average). Depending on the type of counterpart tenants, we have following groups of landlords:

(5) landlords renting to the bengkok sharecropper sample (n=160),
(6) landlords renting to the bengkok fixed-rental tenant sample (n=372),
(7) landlords renting to the non-bengkok sharecropper sample (n=202), and
(8) landlords renting to the non-bengkok fixed-rental tenant sample (n=196).

However, landlords with private farmland can rent out their plots from both bengkok plots and non-bengkok plots simultaneously. In rural Java, many of village administrators' households are also involved in farming. We report further details on the actual land management pattern for each landlord in Section 5.

The landlord household questionnaire is a shortened version of the tenant household questionnaire. They were asked the same questions that were included in the tenant household roster, assets, land ownership and management, and Raven's progressive matrices. An additional section on respondent's position in the village such as management history of bengkok plots was added to the landlord questionnaire. Since many landlord households rented out all of their land to tenants, and we were not interested in analyzing agricultural production strategies from the landlord's viewpoint, we did not ask about plots rented in from others and cultivated by the landlord households. In the landlord questionnaire, we did not include questions on cropping pattern/outputs and details of crop production, either. For plots rented out to tenants, especially under fixed rental contract, it is usually the case that production management is fully under the control of tenants and landlords do not know its details (Otsuka, 2007).

It should be noted, however, that we explicitly asked the landlord about their responsibility regarding the tenant's farming for each plot owned by the landlord, including bengkok land allocated from the village. The section on farm plots included questions on land size, land quality, location, how to acquire, and details of rental terms and conditions if an owned plot is rented out. The survey design enables us to cross-check the information on a plot under tenancy from the landlord survey (rented-out plot) and the tenant survey (rented-in plot). We can also compare contract terms across different plots owned and rented-out by the same landlord. The resulting dataset contains information on 2,500 plots (2.69 plots per household on average).

The dataset comprising these 930 households provides detailed information on the bengkok land institution from the perspective of landlords. Combining the dataset with tenant data, we can obtain household- and plot-level information for contract pairs. This will give us valuable insights regarding the institution and its impact on land distribution. Due to technical errors, we were not able to construct 930 tenant-landlord pairs, but 911 pairs were identified, all of which are different households (one-to-one match).