land

MDPI

Article

Exploration of Informal Farmland Leasing Mode: A Case Study of Huang Village in China

Tingting Fang [1], Yuefei Zhuo [2,*], Cifang Wu [1], Yihu Zhou [3], Zhongguo Xu [2] and Guan Li [2]

[1] School of Public Affairs, Zhejiang University, Yuhangtang Road, 866, Hangzhou 310058, China; 11522037@zju.edu.cn (T.F.); wucifang@zju.edu.cn (C.W.)
[2] Law School, Ningbo University, No.818 Fenghua Road, Ningbo 315211, China; xuzhongguo@nbu.edu.cn (Z.X.); liguan@nbu.edu.cn (G.L.)
[3] College of Public Administration, Nanjing Agricultural University, Nanjing 210095, China; 2016209024@njau.edu.cn
* Correspondence: zhuoyuefei@nbu.edu.cn

Abstract: How to effectively promote the large-scale and market-oriented farmland leasing process in China is one of the most important practical issues concerning the current academic circle and decision makers. However, restricted by the current situation of rural social development, farmers' spontaneous and informal farmland leasing is still widespread. Exploring the long-term evolution characteristics of informal farmland leasing at the village scale is of great significance for optimizing the process of farmland leasing, perfecting the farmland leasing market, and promoting moderate-scale farmland management. Therefore, based on field survey data from the whole village and social network analysis methods, this research conducted a detailed empirical study on the characteristics, development process, and consequences of informal farmland leasing behavior in a traditional rural society in central China. The results show that with the development of time, the scope of informal farmland leasing in Huang village has been expanding, of which more than 70% of the farmland in 2020 was leased among acquaintances. Farmland leasing among acquaintances is becoming a trend toward informal farmland leasing in some villages. At present, 13 large-scale households lease 73.9% of the total area of farmland leasing in Huang village. The informal farmland leasing in the village has basically formed a centralized circulation pattern with the villager group as the core, which can promote moderate-scale farming to a certain extent. However, there are also problems, such as the ability of a simple internal leasing mode to resist external risks is limited. The findings may be helpful in rethinking China's farmland leasing policy and provide useful insights into the multifaceted rural sustainability of other similar traditional villages.

Keywords: informal farmland leasing; traditional village; large-scale farmers; social network analysis; China

Citation: Fang, T.; Zhuo, Y.; Wu, C.; Zhou, Y.; Xu, Z.; Li, G. Exploration of Informal Farmland Leasing Mode: A Case Study of Huang Village in China. *Land* **2022**, *11*, 756. https://doi.org/10.3390/land11050756

Academic Editors: Fangzhou Xia, Rong Tan, Hualin Xie and Xiaoshun Li

Received: 17 April 2022
Accepted: 19 May 2022
Published: 21 May 2022

1. Introduction

Smallholder farming has historically played an irreplaceable position in the agricultural practices of the majority of Asian and African countries [1], which has made an immense contribution to food security, rural development, and environmental protection in these developing countries. However, due to technological advances and marketization, the traditional mode of smallholder farming is being impacted in all aspects [2]. China, a developing country with a large population, scarcity of farmland resources, and smallholder-dominated rural landscapes, is now confronting similar pressures. In order to develop modern agriculture and ensure food security, the Chinese central government has carried out a series of farmland reforms.

Since 1949, except for the short-lived private ownership of land at the beginning of the establishment of the country, China has always adhered to the collective ownership of farmland. Therefore, the farmland reforms in China mainly concentrated on the reform

of land use rights. In 1982, through a bottom-up reform, China's rural areas established a household contract responsibility system (HCRS); that is, farmland was divided into small plots and redistributed to peasant households so as to realize the transfer of farmland use right from village collectives to peasant households [3]. The peasant households, who have obtained the land contractual management rights, will have the rights to use, operate, and manage the farmland but will not be allowed to sell or lease the land [4,5]. The HCRS was in line with the development level of agricultural production in China at that time and effectively promoted agriculture development for a long time [6,7]. However, with the development of the economy and society, the HCRS, as a smallholder farming system, is facing a series of new contradictions and challenges. On the one hand, the decentralization and miniaturization of China's traditional agricultural system seriously restrict the mechanization and modernization level of agricultural production, making it difficult to improve agricultural productivity, thus affecting the improvement of farmers' income level [6]. On the other hand, with the acceleration of industrialization and urbanization, many cultivated land non-agricultural transformation phenomena have appeared, and large-scale young and middle-aged rural labor force has been transferred to cities and industrial production sectors [8,9]. Coupled with the impact of China's Household Registration System and mass migration, China's agricultural system has become a sector dominated by the elderly and women [10,11].

As mentioned above, there is an insufficient labor force for agricultural production. At the same time, the fragmentation and decentralization of farmland brought about an increase in cultivation costs, resulting in a decrease in agricultural production profits, which further intensified the pressure on farmers to turn to part-time farming or even abandoned farming. In this context, it also led to the prosperous farmland exchange between acquaintances—the initial form of land transfer [12–14]. The farmland transfers initially emerged in the 1980s and were not recognized by the government. In 1984, the Chinese government firstly issued an official document on land transfer, which officially acknowledged land transfer. Furthermore, in 2002, the 'Rural Land Contract Law' was issued to give legal recognition to farmland transfer. Further, the Chinese government proposed the 'Tripartite Entitlement System' in 2014, which further divides the farmland contractual management rights into two parts: contract rights that cannot be leased and operation rights that can be leased or mortgaged [15,16]. Along the reform path of 'Grass-Roots Innovation-Official Support-Policy Implementation', up to now, a farmland transfer system has basically been established across the country.

China's farmland transfer has become more frequent, and the scale of transfer has grown rapidly, especially since the 1990s [17]. According to Benjamin and Brandt [18], transfers accounted for less than 3% of farmland leased in 1988 and 1995. The proportion of leased farmland also increased from 4.57% in 2006 to 35.1% in 2016 [18,19]. At the end of 2020, more than 550 million mu (1 mu =0.067 ha or 0.16 acre) of farmland have been transferred nationwide, accounting for approximately 38% of the total contracted farmland (http://www.moa.gov.cn/govpublic/FZJHS/202011/t20201117_6356403.htm (accessed on 8 April 2022)). The current common modes of farmland transfer mostly come from local innovations across the country, including leasing, transferring, subcontracting, exchanging, share cooperation, land trust, and so on. According to the needs of this study, we divided the farmland circulation into two forms: formal circulation and informal circulation. Formal farmland circulation is driven by power or capital, usually by local governments and village committees or intermediary organizations to centralize farmers' farmland through formal lease contracts and package them into large areas of land to lease to professional cooperatives, agricultural enterprises, family farms, and other economic organizations, so as to carry out larger-scale, more commercial agricultural projects. Its general model includes shareholding cooperation, trust, indirect leasing, and leaseback and re-contracting. Informal farmland circulation generally refers to the transfer of farmland of farmers themselves on the basis of personal relationship networks such as blood and geography to reach informal contracts (oral agreements) with other farmers within a

certain geographical range. The general model includes direct leasing, subcontracting, and interchange. Moreover, informal farmland leasing is characterized by the fact that: (1) The lease contract is generally oral and short-term; (2) The leased farmland is small in scale, and the rent is relatively low; (3) It usually occurs among farmers (generally in the same or adjacent villages without the participation of the government or intermediary agencies [4]. Furthermore, the mode of farmland transfer that we focus on is the leasing of farmland from one farmer to another farmer, which is equivalent to the informal farmland leasing mode mentioned above. In 2015, the area of farmland leased between farmers accounted for 58.65% of the total transferred farmland [20]. Yet, farmland leased between farmers often tended to be relatively unregulated. According to the survey of 17 provinces in China, 70% of farmland transfer contracts have not been signed, 52% of farmland transfer period has not been agreed upon, and 39% of farmland transfer rent has not been paid [21]. The spontaneous circulation of farmland by farmers still occupies an important position and often exists in an informal form in rural China.

In the context of land transformation and encouraging the development of farmland leasing, the growing literature mostly focused on the development trend and the modes of farmland transfer, the operation characteristics of the formal transfer pilot projects organized by local governments and village committees, the influencing factors of farmland leasing, and the impact of farmland leasing on the farmers' income, agricultural labor and production [15,22–26]. At present, there are few studies focused exclusively on informal farmland leasing. These studies found that informal farmland leasing commonly exists in rural China, and it generally occurs in traditional agricultural areas where economic and social development is relatively lagging. The vast majority of farmland leasing is conducted among relatives and acquaintances in a village or neighboring villages. Moreover, informal farmland leasing led by the farmers helps to improve grain yields and the efficiency of the allocation of family labor resources, increase the economies of scale in agriculture and maintains social order in villages [27–34].In general, these studies principally draw their information from social surveys, provide a static picture of informal farmland leasing, and lack long-term observations and research on a village, which makes it difficult to reflect the dynamics of farmland leasing in particular localities in detail. Of course, this is mainly due to the cost and difficulty of data collection. As a result, little is known about the continuing trends and consequences of land leasing in villages. However, in the evolving smallholder farming system, it is of great importance to understand China's agricultural transformation by studying the changes in informal farmland leasing. In sum, there is a dearth of in-depth case studies (Village Sample) exploring the local dynamics of informal farmland leasing in a growing smallholder economy. It is this gap that we seek to fill.

Furthermore, as an interdisciplinary research method, social network analysis (SNA) is widely used in occupational mobility, industrial clusters, social governance, international trade, information transmission, and other fields [35–39]. However, few studies applied the SNA approach to analyze land leasing; they mainly focused on the roles and patterns of some important nodes in the network but seldom focused on the changes in the whole network [40,41]. To the best of our knowledge, there are no studies that use the social network method to delineate the informal farmland leasing process. Compared to a single statistical analysis and case study approach, SNA can well reflect the characteristics, development process, and results of informal farmland leasing in an area. First of all, the entire research object can be clearly observed through network visualization, which helps to grasp the overall network characteristics by describing the connections and interactions between nodes; secondly, the combination of social network analysis and case analysis can make an in-depth analysis of key nodes, which helps to investigate the differences between nodes. In addition, comparing the same network at different points in time can also reflect the development trend of the whole network [42].

In view of this, we attempt to empirically expound the current situation and changes in informal farmland leasing in a village by the social network analysis method. This paper aims to address the village's informal farmland leases via three research questions:

(1) How informal farmland leasing in a village has developed? (2) What are the direct or implicit consequences of informal farmland leasing practices in a village? (3) What are the implications of informal farmland leasing practices in a village for the reflection of current farmland leasing policies? Accordingly, this paper intends to make a contribution to land leasing debates from two aspects:(a) As far as we know, this is the only study showing the trends of farmland leasing in a complete village in China, especially in the case of restricting informal farmland leasing. This is surprising given that informal land transactions represent more than half of the land rentals in the country; (b) Our analysis provides insights into how changes in informal farmland leases in traditional rice-growing areas may have an impact on existing farmland circulation markets. The social systems and attitudes toward market-oriented policies in different villages in China are very different from those of informal farmland leases.

The findings of this paper are useful to orient agricultural policies in the traditional crop-growing areas of the developing world. It sheds light on the effect that informal land transfers can have on agricultural productivity and scale operation of the region. It highlights the importance of considering pre-existing farmland circulation institutions and social norms of a village before implementing large-scale circulation projects and constructing the farmland trading market that seeks to modify such arrangements.

Following the Section 1, we will then introduce the materials and the research methods, including the study area, data collection and the method we applied (Section 2). Then, we will present the results of the social network analysis (Section 3) and discuss and analyze the results based on the practices in the study area (Section 4). Finally, the conclusion and prospect of this study are presented (Section 5).

2. Materials and Methods

2.1. Study Area

The study area was selected due to the following considerations: (1) Based on the suitable climate and flat terrain, the case village has been the main farming area in China since ancient times; (2) In recent years, the further advancement of the urbanization process had led to a large outflow of labor from the case village. Coupled with the imperfection of the farmland leasing system, the phenomenon of informal farmland leasing has become prominent, and eventually, small-scale farming has been formed in the case village; (3) Chinese traditional village is a relatively closed but evolving small-holding peasant economy, which is in line with the purpose of this research: to investigate the changes of farmland leasing at the local level. Meanwhile, the case study at the village level is also suitable for investigation. It is difficult to argue that Huang village is an ideal representative of China, but there are also some villages with similar situations to Huang village. The situation in Huang village can reflect the commonalities of these villages. However, discussing the typicality of Huang village is beyond the scope of this paper, which aims to provide an observational sample to study in depth the situation of informal farmland leasing of a complete village in China.

The case study area is Huang village, located in Zongyang Country, Anhui Province, in central China (Figure 1). Huang village is a natural village (Administrative division levels in China are national, provincial, prefecture, county, township, and administrative village. The administrative villages contain and supervise one or more natural villages.) which covers an area of approximately 2.7 km^2. The landscape of Huang Village includes mountains, plains, and rivers. This region, situated in a subtropical monsoon humid climate, is very favorable for agricultural production. Village farmers organize their own production in two kinds of plots. One is attached to their household dwellings, concentrating on vegetable production and raising household animals. The other is located at a distance, with paddy fields for rice cultivation and dry land for sweet potato and rapeseed production. Since other types of plots are too small and scattered, we focus on the farmland that produces rice. Of the 130 hectares of rice cultivation in Huang village, 90.16% belongs to the villagers (reported by the header of the village committee), and the rest is owned by the village

committee. According to the village report, the population of Huang village in 2020 was 1343, divided into 341 households. Huang village is a typical small-holding community with a per capita farmland area of 0.09 hectares and 0.36 hectares per household. At present, village statistics show that more than 50% of farmers leave for work. Moreover, wages from outside work are becoming the main source of family income.

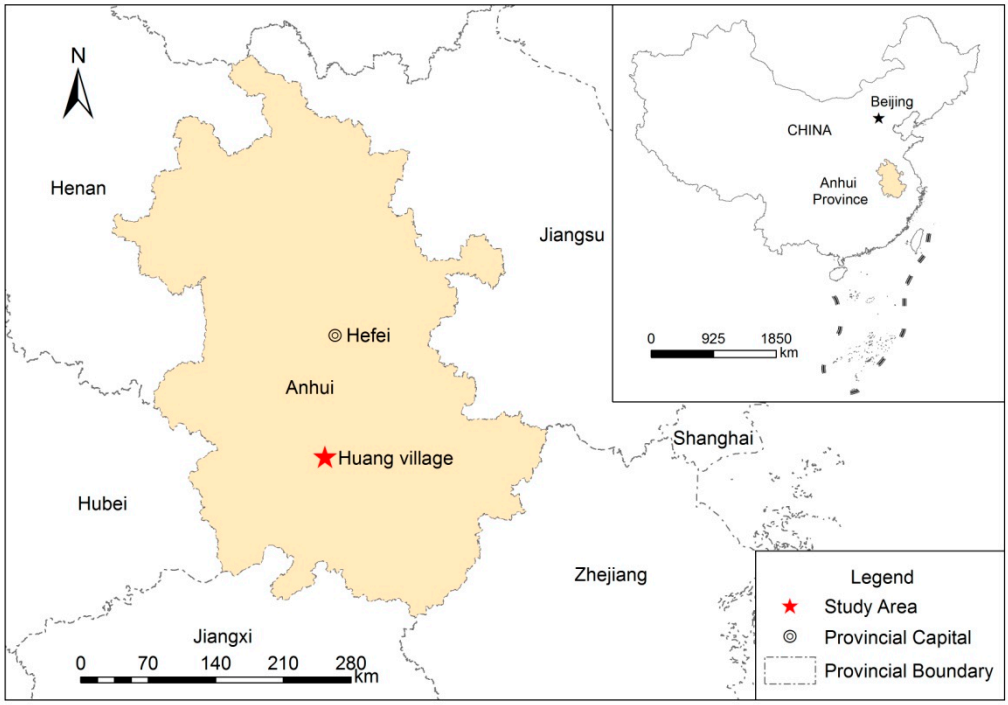

Figure 1. Location of the study area.

After the 1990s, as some villagers went out to work, the phenomenon of farmland leasing began to appear in Huang village. At this time, all leasing activities were carried out without signing a formal contract. At the same time, the lessee was often a member of the same extended family or clan and usually did not have to pay a leasing fee. Later, as many farmers went out to work, the farmland leasing activities in Huang village became very active. Rural households also do not sign formal contracts in the process of farmland leasing. However, due to incomplete information and immature intermediary organizations, the scope of farmland leasing is not limited to relatives and neighbors. Leasing mostly occurs within the villager group (The villager group is a grassroots unit under the village committee and the smallest unit for villagers to carry out autonomous activities.) but rarely beyond the scope of the village. Prices that are paid for farmland leasing depend strongly on the location of plots and family relationships. They can be a combination of cash and in-kind, as well as direct and deferred payments. According to the survey, the leasing fee of most farmland is 300 yuan per mu.

2.2. Data Collection

The household-level questionnaire survey was carried out between February 2020 and March 2020, coinciding with the Chinese New Year, when most migrant workers returned to their villages. With assistance from leaders of the village committees, this survey was conducted with face-to-face interviews with the household heads, while other family members answered questions with assistance. A complete enumeration, sometimes called a "dense" or "saturation" sample, is often sought. In case when a household could not be interviewed, his questionnaire was answered by his neighbors or the villager group leaders who are familiar with each other. Therefore, there is no problem with the authenticity of the survey data.

With a focus on the farmland leasing relationships between rural households, we used the recall method [43], where each household head reported general household characteristics, labor arrangements and employment, crop cultivation and leasing, especially farmland leasing activities from the beginning to the present, namely: the year farmland leasing took place, the area of farmland leasing, the amount of farmland leasing, the leasing fee and the lessors and lessees.

In addition, to get a better picture of the evolution of the overall network of farmland leasing among households, we conducted in-depth interviews in 2020 (February–March) with the village heads, village cadres, villager group cadres, and some current/former large-scale farmers. The interviews mainly covered the changes inland use and livelihood, the changes in rural communities in the village, the relationship among households, the reasons why households choose to lease farmland, and how to choose the leasing partners. Our final sample, therefore, contains 341 rural households.

2.3. Methods

2.3.1. Establishment of Farmland Leasing Network

The social network analysis (SNA), which is widely used in many disciplines, is a comprehensive analysis of the structure and attributes of 'collections of actors and their relationships' [44,45]. With the help of the powerful tool of SNA, the analysis of the overall network characteristics and network node status is very suitable for understanding the overall trend of farmland leasing within Huang village. In social networks, actors are represented as nodes, and their interactions are represented by links/ties. The network is divided into a directed network and an undirected network according to the directivity, and a valued network and an unvalued network according to the value.

Considering that the farmland leasing is divided into lease-in and lease-out, as well as the size of farmland leasing, we construct a directed and valued network for the farmland leasing process. In this network, rural households in Huang village are nodes of the network, the relationships of farmland leasing between rural households are edges of the network, and the farmland leasing area is the weight of the edge. In order to better reflect the trend of farmland leasing in Huang village, we choose the 30 years (from 1990 to 2020) as the research time span and conducted data collection every ten years. In other words, the farmland leasing data for2000, 2010, and 2020 are collected, respectively, and then form the farmland leasing relationship matrix W. The matrix W can be expressed as follows:

$$W_{ij}^{t} = \begin{Bmatrix} w_{11} & \cdots & w_{1n} \\ \cdots & \cdots & \cdots \\ w_{n1} & \cdots & w_{nn} \end{Bmatrix}, \quad (1)$$

In this formula: W_{ij}^{t} represents the t-year farmland leasing network of Huang village, where the element w_{ij} in the matrix W_t indicates the leasing area from household i to household j, and w_{ij} is not equal to w_{ji}.

As SNA can usually be summed up as the overall network path and ego network path, we used node measures and network measures by UCINET software to quantify the network features [46], then visualized them in the Gephi software [47]. The following SNA indicators were selected to measure the network.

2.3.2. Network Measures

Density is defined as the ratio of all existing ties in a network to the maximum number of possible ties between nodes in the group [48]. It indicates the degree of closeness between nodes in the network. Network density ranges between 0 and 1. The higher the density in a network, the closer the connection between nodes.

Clustering coefficient means the coefficient of the degree to which the nodes in the network are clustered together. The clustering coefficient of a network is the weighted mean of the clustering coefficient of all nodes in the network, and each node is weighted by

its degree. It is also commonly known as transitivity and provides an overall indication of clustering in a network in terms of the fraction of triplets (three nodes with at least two ties between them) [49]. Moreover, the clustering coefficient of a node represents the density of its open neighborhood and reflects the closeness of the cluster formed by its neighboring nodes (complete graph). The higher the clustering coefficient, the higher the clustering degree of the network.

2.3.3. Node Measures

In a directed weighted network, the outdegree of a node is the sum of the values of the ties initiated by other nodes, while the indegree of a node is the sum of the values of the ties received by other nodes [50]. Degree centrality reflects whether a node is in a more 'core' position relative to other nodes in the network. In addition, considering the different network scales in this research, we used normalized degree centrality, which was expressed as a percentage: the degree centrality of a node divided the maximum possible degree in the network. It can be divided into Normalized outdegree (NOD) and Normalized indegree (NID) [51].

In a weighted network, node strength is the analog of node degree, which is the sum of the connectivity weights of the ties attached to each node [52]. Like the node degree, it can be divided into the in-strength of a node (IS), which refers to the sum of the edge weights of all nodes entering the node in the network, and the out-strength (OS) of a node refers to the sum of the edge weights of all nodes pointed to by the node in the network.

3. Results

3.1. Descriptive Analysis Results

3.1.1. The General Characteristics of Huang Village

Table 1 shows the general characteristics of villagers and laborers in the Huang village. There are341 rural households in the village, with a total of1343 people, 630 of whom are female. Regarding labor distribution, the total labor force in Huang village is 829, among which 674 farmers are engaged in off-farm employment, accounting for 81.3% of the total labor force. Almost every household has at least one member going out to work. In contrast, only 145 farmers are engaged in agricultural production, accounting for 17.5% of the total labor force. Among them, 69 are female farmers, accounting for 47.6% of the total number of farm employment, indicating that there is no gender imbalance in the agricultural labor force. The reason is that more than 50% of the 145 agricultural labor forces in Huang village were large-scale households (with a cultivated area of more than 50 mu). The large scale of agricultural production requires relatively high quality of labor resources, mainly reflected in demand for male labor. Therefore, it was different from the status quo of small-scale agricultural production that can be carried out only by female labor in other studies [10,53]. Moreover, the average age of farmers who engaged in agricultural production was62 years, which was consistent with the other research [23,54].

Table 1. Overview of Huang village in 2020.

		Frequencies	Percentage (%)
Villager	In total	1343	-
	Female	630	46.9
Labor force	In total	829	-
	Non-farmer	674	81.3
	Part-time farmer	10	1.2
	Full-time farmer	145	17.5
	Female farmer	69	47.6
	Average age of farmer	62	-

Source: Authors' survey.

3.1.2. The Characteristics of Household in Huang Village

Table 2 summarizes the characteristics of rural households in Huang village. The age of the head of the rural households is mainly concentrated in the 40–69 age group. The average family size is 3.9, of which 3–4 people account for 43.99%. From the perspective of the household labor force, most rural households have 1 to 4 labor forces, among which more than 50% had 1 to 2 non-farmers, while more than 70% of rural households no longer engaged in agricultural production. It implied that rural households in Huang village are economically dependent more on non-agricultural activities, which is also proved by other data in Table 2. The average annual income of households in Huang village is 94,410.55 yuan, of which 40.18% is between 50,000 yuan and 100,000 yuan. In household income, agricultural income accounts for a relatively low proportion. Only 8.5% of rural households earned more than half of their income from agricultural production. In Huang village, each household owns 6.7 plots of land with an average area of 5.37 mu. As Table 2 shows, the distribution of variables to measure farmers' contracted land is more or less homogeneous distribution, reflecting the characteristics of the smallholder farming system.

Table 2. Characteristics of rural households in 2020.

		Frequencies	Percentage (%)
Household number		341	-
Average age of householder	≤40	6	1.76
	40–49	68	19.94
	50–59	117	34.31
	60–69	83	24.34
	70–79	59	17.3
	≥80	8	2.35
Number of household member	1–2	76	22.29
	3–4	150	43.99
	5–6	95	27.86
	≥7	20	5.86
Labor force per household	0	36	10.6
	1–2	157	46
	3–4	129	37.8
	≥5	19	5.6
Agricultural labor force per household	0	253	74.2
	1	31	9.1
	2	57	16.7
Off-farm labor force per household	0	62	18.2
	1–2	171	50.1
	3–4	94	27.6
	5–6	14	4.1
Household income	≤10,000	53	15.54
	10,001–50,000	53	15.54
	50,001–100,000	137	40.18
	100,001–150,000	56	16.42
	≥150,000	42	12.32
Household income composition	Agricultural income	83	24.34
	Non-agricultural income	283	82.99
	Agriculture and non-agriculture	62	18.18
	Over half from agricultural income	29	8.5
Areas of Contracted farmland (mu)	≤2	25	7.33
	2–3	30	8.8
	3–4	52	15.25
	4–5	76	22.29
	5–8	118	34.6
	≥8	40	11.73
Numbers of plots per household	≤3	24	7.04
	4–5	95	27.86
	6–7	107	31.38
	8–9	68	19.94
	≥10	47	13.78

Source: Authors' survey.

3.1.3. Farmland Leasing in Huang Village: Current Situation and Changes

Considering the construction requirements of the overall network, households in Huang village lease their farmland to the households in neighboring villages, households in Huang village lease in farmland from outside the village to expand their scale, and households in Huang village lease in collectively-owned polders, etc., which are not within the scope of this paper.

According to the survey, the first farmland leasing in Huang village was in 1983. The farmer went out to work, leased his contracted farmland to his relatives for free, and agreed in oral form. As Figure 2 indicates, the trend of farmland leasing became much more significant after 2000. In 2000, 55 households participated in farmland leasing activities in Huang Village, leasing 221 plots of 144.9 mu farmland in total, of which 35 households were leased out and 20 households were leased in. Among them, a large-scale farmer leased 108 plots of farmland with a total area of 57.9 mu (Figures 3 and 4). In 2010, 190 households participated in farmland leasing, accounting for more than 50% of the total number of households in Huang village, with 878 plots of 665.8 mu farmland leased. Over 70% of households leased their farmland out. Regarding leased farmland, four large-scale households occupy 46.5% of the total leased farmland. After 2017, the growth rate of farmland leasing was slow, and both the farmland leased-in and leased-out were close to saturation.

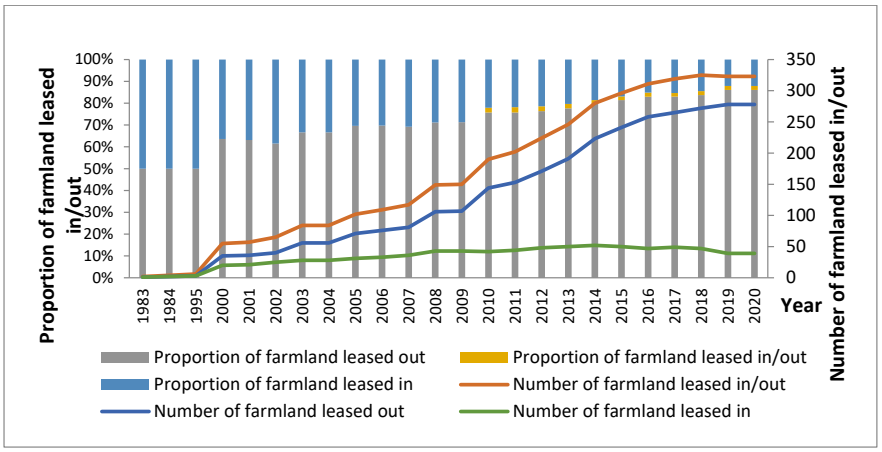

Figure 2. Households of farmland leasing in Huang village.

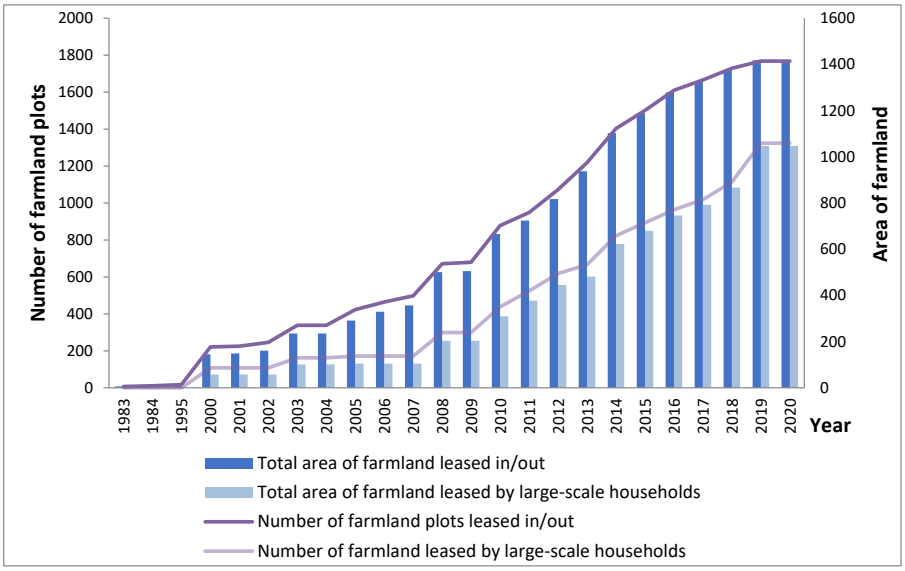

Figure 3. General process of farmland leasing in Huang village.

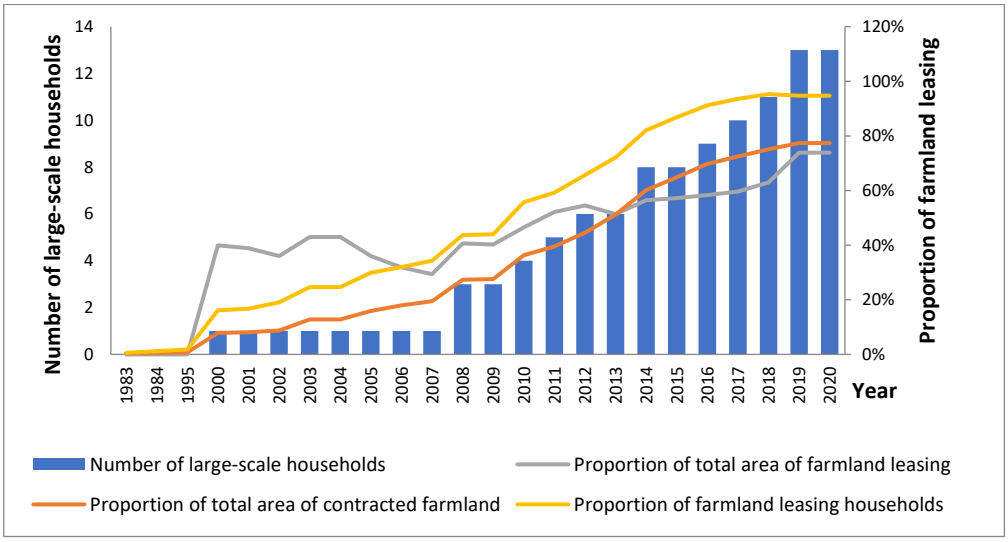

Figure 4. Farmland leasing of large-scale household in Huang village.

As of 2020, there were 329 households involved in farmland leasing, accounting for 96.5% of the total in Huang village. Among them, 13 smallholders leased out part or all their farmland to the large-scale households in neighboring villages, and 323 households leased in or/and out their farmland (Table 3). More than 80% of households leased their farmland. The households in the village leased 1768 pieces of farmland with a total area of 1417.9 mu, accounting for 77.4% of the total contracted farmland area. Moreover, there were 13 large-scale households in Huang village that managed the contracted farmland leased from smallholders and polder leased from the collective. Apart from the polder, these large-scale households leased in 1047.45 mu of farmland, accounting for 73.9% of the total area of farmland leasing. There was still some farmland leasing among smallholders, but it was not dominant. From the perspective of households leasing out farmland, the number of households leasing out farmland showed an overall growth trend, which was consistent with that of households involved in farmland leasing activities. However, the growth rate began to slow down after 2017. From the perspective of households leasing in farmland, before 2014, the number of leasehold farmers showed a general trend of rapid growth but began to fluctuate and even decline in recent years. Another interesting finding is that the ratio of households leasing in and out of farmland shows that the growth of households leasing in is much lower than that of households leasing out (Figure 2), which proves that the use of farmland is generally moving toward a concentrated trend. In addition, as can be seen in Figure 2, a small number of households have both leased in and out farmland since 2010. The reason for farmland leasing out was that some scattered farmlands were too far away from farmers' homes for farming.

As Figure 3 indicates, the amount of farmland leasing in Huang village increased year by year, but the growth rate slowed down in the past two years. Since 2017, over 70% of the contracted farmland in Huang village has been leased (Figure 4). Compared with the leased households, the ratio of leased farmland area was not high, with some households leasing out only part of their contracted farmland while the rest was operated by their own families. This part of self-farmed land was often close to home and easy to manage, which could meet the needs of some women and elderly family members who cannot go out to work and can partly support their family livelihoods. In addition, in terms of farmland leased, large-scale households have always been the main force of farmland leasing activities, reaching 70% by 2020. This showed that the current farmland leasing had reached a mature stage, and there may be some potential farmland leasing between large-scale households and elderly smallholders who may gradually lose their ability to farm. The addition of three new large-scale households in 2019 also proves this conjecture.

Table 3. Farmland leasing of Huang village in 2020.

		Household Proportion (n = 341)	Proportion of Contracted Farmland Area (mu) (n = 1832.6)	Proportion of Contracted Farmland Plots (n = 2284)
General information				
In total		96.5%/329	79.9%/1464.9	80.1%/1830
Location of leased farmland	Neighboring village	1.8%/6	2.5%/47	2.7%/62
	Own village and neighboring village	2.1%/7	_	_
	Own village	92.6%/316	77.4%/1417.9	77.4%/1768
Detailed information (farmland leasing relationship level)				
# Farmland leasing relationship		370	1417.9	1768
Relationship Type	Close relatives	9.2%/34	9.3%/132.4	10.5%/185
	Other relatives	17%/63	20.6%/292.7	16.5%/325
	Neighbors	0.6%/2	0.4%/5.2	0.3%/6
	Group members	33.8%/125	35.6%/504.4	34.8%/615
	Acquaintances	39.4%/146	34.1%/482.2	37.9%/670

Source: Authors' survey.

In the survey, it was found that the farmland leasing in Huang village generally did not specify the leasing period. Moreover, there was a tacit understanding between the lessor and the lessee. If the lessor wants the farmland back, the lessee would generally return the farmland to the lessor after negotiation. As for the leasing fee and payment method, it was mostly paid free or in-kind before 2005. At present, the farmland leasing fee is basically stable and is paid in cash every year, mostly between 200–300 yuan. In terms of farmland leasing relations, the survey found that most of the early farmland leasing occurred between relatives or group members. In recent years, more and more households chose to lease their farmland to group members and acquaintances, and the farmland leasing relationship between relatives was no longer dominant. Table 3 reports the social relationships between the householders of 370 farmland leasing in 2020. Among them, nearly 70% of the farmland was leased to group members and acquaintances, most of whom are also large-scale households.

3.2. SNA Analysis Results

This study adopts the SNA approach to measure and visualize the farmland leasing network in Huang village: (1) the current situation and changes in important households; (2) the structure of the farmland leasing network. The nodes of the whole network include all households in Huang village (n = 341); we divide the nodes into three categories: the households that only lease in farmland, the households that only lease out farmland and the households that both lease in and lease out farmland. Most of the farmland has gone to a small number of households, and our follow-up analysis focuses on the second type of households that only lease out farmland. Additionally, the SNA results show that due to the characteristics of the smallholder farming system, that is, the area of farmland owned by the family is small; the change of node NOD is small. Therefore, we set the size of the node according to the NID of the corresponding year, which describes which household receives the most ties. Furthermore, the ties are given different colors according to the relationship between the two nodes, which can be divided into five types: close relatives, other relatives, neighbors, group members, and acquaintances. Moreover, the thickness of ties is determined by the farmland area leased between two households.

3.2.1. Network Level Results

Figure 5 visualizes the farmland leasing in Huang village over different years, showing different types of control and demand for the farmland in the leasing process. From 2000–2020, the number of households in the network had increased gradually, and the number of leasing ties had increased 9.5 times, from 39 to 370. This reflects not only an

increase in acreage where farmland leases take place but also a diversification of the leasing partners to ensure the security of leases. As shown in Figure 5, the leasing rate accelerated in the first ten years and then gradually slowed in the next ten years.

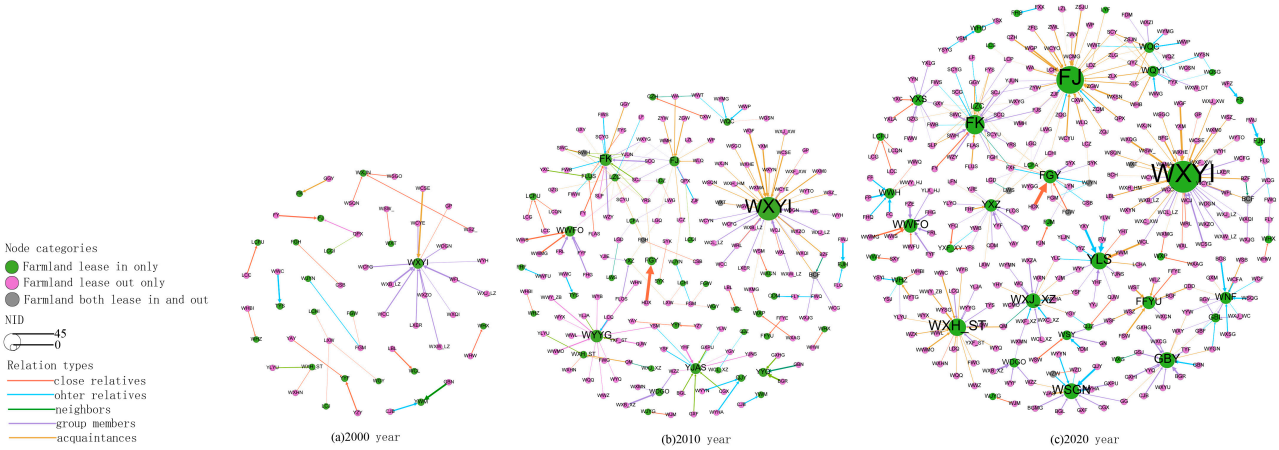

Figure 5. Digraphs of farmland leasing network in the first wave (2000), second wave (2010), and third wave (2020).

The density of the network increased with time, from 0.001 to 0.012, during the study period. Although the increase in the density value shows that the network becomes closer and more stable, the value is generally not high, indicating that the structure of the farmland leasing network is relatively loose and the degree of cooperation among farmers is relatively low.

From 2000 to 2020, the clustering coefficient rose from 0 to 0.0096 and then fell to 0.0041, showing a trend of first rising and then falling. It reflects that the clustering level in the farmland leasing network is not high and that the average connectivity level of farmers is relatively weak.

On the other hand, the clustering coefficient is greater than the network density, indicating that the correlation between adjacent nodes is greater than the clustering degree of the network. In other words, internal subgroups have formed in this network [55].

3.2.2. Node Level Results

NIDs of the top 15 households at different time points are shown in Table 4. In 2000, except for *WXYI*, NIDs of the other 14 nodes were relatively small, less than 0.1. Moreover, there is not much difference between them. In 2010, there were six households with an NID greater than 0.1. Among them, the NIDs of *WXYI*, *FK*, and *FJ* have increased significantly in 10 years. In 2020, there were 14 nodes with NID greater than 0.1. Among them, *FJ* has the fastest growth rate, and other nodes have also increased. The NIDs of *WYYG* and *YJAS* fell to 0, indicating that these two households were no longer leasing farmland. For nearly twenty years, *WXYI* has been the largest 'node' in the farmland leasing network, indicating that it is the most important participant in the farmland leasing network and has close connections with other farmers. Furthermore, the NID of *FJ* is the fastest growing in nearly a decade. Overall, the NID growth of *WXYI* is not large, while *FJ* is gradually becoming an important participant in the farmland leasing network.

We visualized the network layout based on the IS (the leased in area of farmland) of nodes, where small nodes were concentrated near the vertical axis, and a few large nodes were sparsely distributed along the horizontal axis (Figure 6). In 2000, the ISs of most nodes in the network were small, with only one node (*WXYI*) having an IS of more than 50. This indicated that the area of farmland leasing among most farmers at that time was relatively small. That is to say, it mainly occurred among small-holding farmers. Therefore, the farmland generally showed the characteristics of a decentralized operation situation in Huang village. Farmland leasing activities mainly take place among relatives

and neighbors. By 2020, the ISs of most nodes in the network have increased, and 13 nodes have an IS value greater than 50. This shows that more farmers in Huang village tend to lease in more farmland for large-scale agricultural production. At present, agricultural production in Huang village generally shows the characteristics of large-scale operation, and farmland leasing mainly occurs between smallholders and large-scale farmers. Most of the farmland leasing in Huang village occurs between acquaintances and group members. In addition, there were also a small number of nodes whose ISs showed a trend of rising first and then falling, which was specifically manifested in the phenomenon that some farmers abandoned their farmland after leasing it (such as *YJAS* and *WYYG*). This is often due to a shortage of agricultural labor caused by the death of the head of household or the labor migration.

Table 4. NIDs of top15 nodes at different time points.

No.	2000		2010		2020	
	Name	NID	Name	NID	Name	NID
1	WXYI	0.170	WXYI	0.451	WXYI	0.560
2	YWM	0.041	WYYG	0.168	FJ	0.467
3	FJ	0.028	FK	0.164	FK	0.281
4	WXJN	0.028	YJAS	0.127	WXH_ST	0.242
5	YYF	0.024	WWFO	0.117	YLS	0.229
6	TYS	0.018	FJ	0.107	GBY	0.205
7	WXH_ST	0.016	YYQ	0.074	WSGN	0.203
8	FK	0.015	FGY	0.063	WXJ_XZ	0.179
9	WCL	0.015	WDGO	0.049	WWFO	0.164
10	LCFU	0.013	LZC	0.043	FGY	0.158
11	WHX	0.012	FJH	0.040	FFYU	0.142
12	WXT	0.009	BCF	0.037	YXZ	0.130
13	WHZ	0.009	QJY	0.037	WNF	0.121
14	WJYN	0.007	WQC	0.037	YXS	0.104
15	FGH	0.006	WXH_ST	0.036	WQYI	0.099

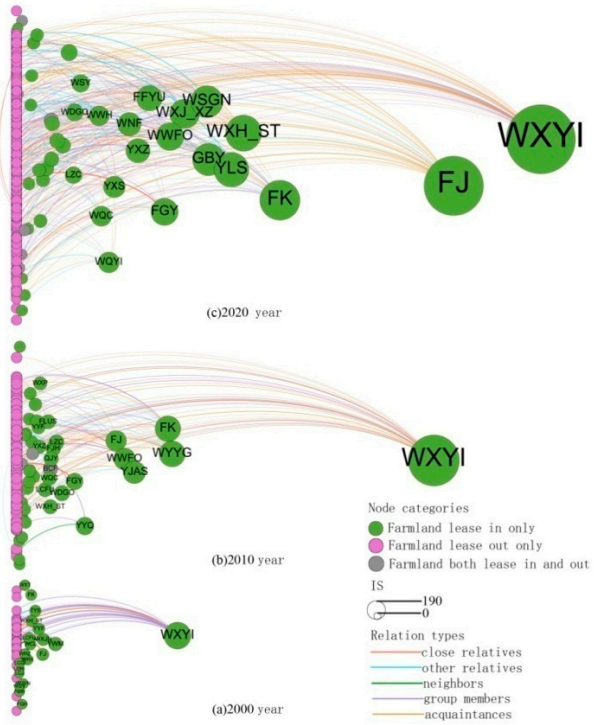

Figure 6. Important households in the network.

4. Discussions

4.1. Rethinking Trends and Consequences of Informalfarmland Leasing

The circulation of farmland allows farmland resources to be redistributed within a certain range, which theoretically makes the optimal allocation of agricultural resources (including labor force and farmland) and improves agricultural productivity, thus making large-scale operation possible [31,56,57]. Holden and Ghebru (2005) find that lessees transacting with acquaintances tend to use land less efficiently, which is also found in Africa, Southeast Asia, and South American countries, such as Zimbabwe, Ethiopia, India, and Vietnam [29,58–61]. However, our findings differ from the view presented by scholars, which states that non-compensated land transactions might be less efficiency-enhancing than those that are market based [58]. Moreover, the literature has widely believed that informal farmland circulation will not be conducive to scale operation [29]. This study provides empirical and robust evidence that the development of informal farmland leasing in a village can form a situation of scale operation to a certain extent which has not been proposed in previous studies. This is due to the fact that the data is obtained from different sources, resulting in different conclusions. Previous studies have reflected through sampling surveys that are independent sample individuals and cannot reflect the effects of scale operations on a regional scale. Of course, informal farmland circulation also has adverse consequences, and it cannot guarantee good development in the future. Compared with formal farmland circulation, informal farmland circulation needs to pay more attention to and cultivate local grain growers to prevent them from succeeding them.

Although informal farmland leasing is prevalent in many developing countries, the process of informal farmland leasing has received little attention [29,59]. One of our findings is that informal farmland circulation was carried out slowly but orderly; eventually, several internal subgroups with the large-scale farming operators as the core were formed within the village to a certain extent, which has not been proposed in previous studies [62]. This is because the informal land transfer process between farmers can be traceable in a traditional agricultural society and visualized by social network analysis methods. However, in scattered case studies, the evolutionary direction and trend of farmland leasing are not clear. We have found that in order to continue to maintain the lease relations, the large-scale farming operators will maintain the relationship with the members of their own villager group or adjacent villager groups. The result was in line with a study by Zou [63]. Regarding formal farmland leasing, most of them are carried out quickly in the form of pilot projects with the support of the government or the village committee [15,64], which may cause damage to social relations within the village due to the entry of foreign capital [65], and rarely benefit the peasants in the village [66].Therefore, our findings show that existing informal farmland leases help to strengthen existing solidarity mechanisms in the region, while there is also literature that argues that formal farmland leasing may weaken existing solidarity mechanisms in a region [67]. Our results have some important consequences for policy since they show that measures promoting further freeing of the land markets might erode existing solidarity mechanisms in the region.

Relational-oriented arable land leasing is a common feature in developing countries. For instance, Mertens K and Vranken L found that in Uganda, people are more willing to sell their plots to family members and are therefore prepared to give up some of the sales proceeds [68]. Wang noticed that over half of the transactions are between relatives in China, which might be regarded as the source of other informalities [69]. Moreover, we found that early farmland transfer in Chinese villages also has the same feature. In addition, our findings confirm that with the change of time, the relational-oriented land circulation gradually turned into a co-led land circulation of interests and relationships, and mainly manifested in the circulation of relatives and friends changing into the circulation of acquaintances, which is in line with a recent study by Qiu [8].

4.2. Limitations and Extensions

The study, which is the first of its kind and provides a nuanced description of informal farmland leasing in rural China, has several limitations: (1) The problem of research is a bit one-sided. We only focused on informal farmland leasing and did not deal with formal farmland leasing. This paper also contributes to the current process of informal farmland leasing, and a comparative study with formal land leasing would certainly be a fruitful direction for future studies; (2) The conclusions are somewhat insufficient. It should be noted that this study has examined only one village, and it is a case study, so we cannot come up with conclusions that reflect the characteristics of the entire Chinese villages. The results do not imply that land leasing in all villages of China is informal; our results lack universality. However, this paper provides an observational academic sample. We suggest that future studies work on land leasing practices in cash crop areas in some economically developed regions, as results may vary depending on different social and cultural contexts, thus complementing this paper; (3) this paper focused on phenomena and processes of informal farmland leasing, the influencing mechanism was too little involved. The free flow of farmland, like any other factor, always improves the efficiency of resource allocation and, in turn, promotes the flow of labor factors and the efficiency of agricultural productivity. From this point of view, future studies can further analyze the influence mechanism of informal farmland leasing from the following aspects: family flow results in the class differentiation of village households, difficulties in the transformation of the agricultural industry (especially in traditional food crop growing areas), the potential impact of migrating population on the long-term development of villages, such as village cohesion has been weakened, and internal social structures have become more sparse and loose.

5. Conclusions

This research takes the spontaneous farmland leasing behavior of a traditional village (Huang village) in Anhui Province, Central China, as the research object and analyzes the farmland leasing mode, evolution process, causes, and consequences. Through social network analysis, this paper reveals the overall evolution process of farmland leasing relationship network, which is helpful to understand better the relationship between farmland leasing practice and land control system. In returning to the research questions, the findings and arguments are as follows:

With the development of time, the scope of informal farmland leasing has been expanding, and the allocation efficiency of farmland resources has been further improved. The informal farmland leasing has changed from the circulation between small farmers in the early days (the circulation between relatives) to the circulation between small farmers and large-scale operators (the circulation between acquaintances), and the scale operation of farmland has been realized within a certain range. The circulation of informal farmland in the village has basically formed a centralized circulation pattern with the villager group as the core, but there are also problems such as the simple internal mode of circulation and the limited ability to resist external risks. These results suggest that informal farmland leasing can improve agricultural production efficiency and play a very important role in village governance and rural social stability, which is in line with the multidimensional goal of rural revitalization in China.

Although informal farmland leasing can promote agricultural scale operation to a certain extent, due to the lack of an agricultural policy support system and agricultural socialization service system, it will still be in an unfavorable situation in the face of agricultural market competition. In the context of the era of urban-rural integration development, the introduction of market mechanisms to promote the rational and orderly transformation of informal farmland leasing is an inevitable trend of future development. It would be interesting to monitor the transformational developments in the informal farmland rental market enabled by the market mechanism reform and study the longer-term implications of the market mechanism on villages and farmers as new cases become available.

Author Contributions: Conceptualization, T.F. and Y.Z. (Yuefei Zhuo); Data curation, T.F.; Formal analysis, C.W.; Funding acquisition, Y.Z. (Yuefei Zhuo) and Z.X.; Investigation, T.F. and Z.X.; Methodology, T.F.; Project administration, C.W.; Resources, G.L.; Software, T.F. and Y.Z. (Yihu Zhou); Supervision, C.W.; Validation, C.W., Y.Z. (Yuefei Zhuo), and G.L.; Visualization, T.F. and Y.Z. (Yuefei Zhuo); Writing—original draft, T.F. and Y.Z. (Yuefei Zhuo); Writing—review and editing, T.F., Y.Z. (Yuefei Zhuo), and Z.X. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by Zhejiang Provincial Social Science Foundation of China, Grant No. 22NDJC068YB, 22NDJC070YB.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data are not publicly available due to privacy.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Lipton, M. From Policy Aims and Small-farm Characteristics to Farm Science Needs. *World Dev.* **2010**, *38*, 1399–1412. [CrossRef]
2. Potter, C.; Tilzey, M. Agricultural multifunctionality, environmental sustainability and the WTO: Resistance or accommodation to the neoliberal project for agriculture? *Geoforum* **2007**, *38*, 1290–1303. [CrossRef]
3. Tilt, B. Smallholders and the 'Household Responsibility System': Adapting to Institutional Change in Chinese Agriculture. *Hum. Ecol.* **2007**, *36*, 189–199. [CrossRef]
4. Zhang, J.; Mishra, A.K.; Hirsch, S.; Li, X. Factors affecting farmland rental in rural China: Evidence of capitalization of grain subsidy payments. *Land Use Policy* **2020**, *90*, 104275. [CrossRef]
5. Ye, J. Land Transfer and the Pursuit of Agricultural Modernization in China: Land Transfer and Agricultural Modernization in China. *J. Agrar. Chang.* **2015**, *15*, 314–337. [CrossRef]
6. Yang, X.; Sui, P.; Zhang, X.; Dai, H.; Yan, P.; Li, C.; Wang, X.; Chen, Y. Environmental and economic consequences analysis of cropping systems from fragmented to concentrated farmland in the North China Plain based on a joint use of life cycle assessment, emergy and economic analysis. *J. Environ. Manag.* **2019**, *251*, 109588. [CrossRef] [PubMed]
7. Lin, J.Y. Rural Reforms and Agricultural Growth in China. *Am. Econ. Rev.* **1992**, *82*, 34–51.
8. Tongwei, Q.; Luo, B.; Choy, S.T.B.; Li, Y.; He, Q. Do land renting-in and its marketization increase labor input in agriculture? Evidence from rural China. *Land Use Policy* **2020**, *99*, 104820. [CrossRef]
9. Xiao, W.; Zhao, G. Who is affected: Influence of agricultural land on occupational choices of peasants in China. *Land Use Policy* **2020**, *99*, 104827. [CrossRef]
10. Liu, J.-C.; Xu, Z.-G.; Zheng, Q.-F.; Hua, L. Is the feminization of labor harmful to agricultural production? The decision-making and production control perspective. *J. Integr. Agric.* **2019**, *18*, 1392–1401. [CrossRef]
11. Stecklov, G.; Winters, P.; Stampini, M.; Davis, B. Do Conditional Cash Transfers Influence Migration? A Study Using Experimental Data from the Mexican Progresa Program. *Demography* **2005**, *42*, 769–790. [CrossRef] [PubMed]
12. Hu, Z.; Rahman, S. Economic drivers of contemporary smallholder agriculture in a transitional economy: A case study of Hu Village from southwest China: Smallholder agriculture in China. *Singap. J. Trop. Geogr.* **2015**, *36*, 324–341. [CrossRef]
13. Xu, D.; Deng, X.; Guo, S.; Liu, S. Labor migration and farmland abandonment in rural China: Empirical results and policy implications. *J. Environ. Manag.* **2018**, *232*, 738–750. [CrossRef] [PubMed]
14. Wan, E.C.G.H.; Cheng, E. Effects of land fragmentation and returns to scale in the Chinese farming sector. *Appl. Econ.* **2001**, *33*, 183–194. [CrossRef]
15. Wang, Q.; Zhang, X. Three rights separation: China's proposed rural land rights reform and four types of local trials. *Land Use Policy* **2017**, *63*, 111–121. [CrossRef]
16. Zhuo, Y.; Xu, Z.; Li, G.; Liao, R.; Lemmen, C.; Wu, C.; Wu, Y. LADM-based profile for farmland Tripartite Entitlement System in China. *Land Use Policy* **2020**, *92*, 104459. [CrossRef]
17. Yuan, X.; Du, W.; Wei, X.; Ying, Y.; Shao, Y.; Hou, R. Quantitative analysis of research on China's land transfer system. *Land Use Policy* **2018**, *74*, 301–308. [CrossRef]
18. Benjamin, D.; Brandt, L. Property rights, labour markets, and efficiency in a transition economy: The case of rural China. *Can. J. Econ. Rev. Can. D'Econ.* **2002**, *35*, 689–716. [CrossRef]
19. Gao, J.; Song, G.; Sun, X. Does labor migration affect rural land transfer? Evidence from China. *Land Use Policy* **2020**, *99*, 105096. [CrossRef]
20. China Agriculture Press. *Ministry of Agriculturee and Rural Affairs China Agriculture Statistical Report (2015)*; China Agriculture Press: Beijing, China, 2016.
21. Ye, J.; Feng, L.; Jiang, Y.; Lang, Y.; Prosterman, R. 2016 Rural Land use Rights Survey in China—Survey results and Policy Recommendations in 17 provinces. *Manag. World* **2018**, *34*, 98–108. [CrossRef]

22. Deininger, K.; Jin, S. Securing property rights in transition: Lessons from implementation of China's rural land contracting law. *J. Econ. Behav. Organ.* **2009**, *70*, 22–38. [CrossRef]
23. Valliant, J.C.; Ruhf, K.Z.; Gibson, K.D.; Brooks, J.; Farmer, J.R. Fostering farm transfers from farm owners to unrelated, new farmers: A qualitative assessment of farm link services. *Land Use Policy* **2019**, *86*, 438–447. [CrossRef]
24. Vranken, L.; Swinnen, J. Land rental markets in transition: Theory and evidence from Hungary. *World Dev.* **2006**, *34*, 481–500. [CrossRef]
25. Zhang, Y.; Wang, X.; Glauben, T.; Brümmer, B. The impact of land reallocation on technical efficiency: Evidence from China. *Agric. Econ.* **2011**, *42*, 495–507. [CrossRef]
26. Shi, X.; Chen, S.; Ma, X.; Lan, J. Heterogeneity in interventions in village committee and farmland circulation: Intermediary versus regulatory effects. *Land Use Policy* **2018**, *74*, 291–300. [CrossRef]
27. Gao, L.; Huang, J.; Rozelle, S. Rental markets for cultivated land and agricultural investments in China. *Agric. Econ.* **2012**, *43*, 391–403. [CrossRef]
28. Hua, X.; Kono, Y.; Zhang, L.; Xu, E.; Luo, R. Land rental in a multi-ethnic society: Insights from Southwest China. *Land Use Policy* **2020**, *97*, 104743. [CrossRef]
29. Teklu, T.; Lemi, A. Factors affecting entry and intensity in informal rental land markets in Southern Ethiopian highlands. *Agric. Econ.* **2004**, *30*, 117–128. [CrossRef]
30. Wang, Y.H.; Xin, L.J.; Zhang, H.Z.; Li, Y.Q. An Estimation of the Extent of Rent-Free Farmland Transfer and Its Driving Forces in Rural China: A Multilevel Logit Model Analysis. *Sustainability* **2019**, *11*, 3161. [CrossRef]
31. Deininger, K.; Jin, S. The potential of land rental markets in the process of economic development: Evidence from China. *J. Dev. Econ.* **2005**, *78*, 241–270. [CrossRef]
32. Wang, X.Q.; Zhou, W.; Zhu, G.L.; Cao, T. The impact of local government-dominated farmland transfer on farmers' transfer scale and grain yield in five cities in Jiangsu. *Resour. Sci.* **2018**, *40*, 326–334.
33. Zhang, J.; Zhu, P.X. The effect of different farmland transfer patterns on household agricultural productivity based on surveys of four counties in Jiangsu province. *Resour. Sci.* **2017**, *39*, 629–640.
34. Huang, Z.F. Disembeddedness and re-embeddedness: Agricultural operation and governance in village order. *China Rural. Surv.* **2018**, *3*, 51–64.
35. Villarreal, A. The U.S. occupational structure: A social network approach. *Sociol. Sci.* **2020**, *7*, 187–221. [CrossRef]
36. Felzensztein, C.; Gimmon, E. Industrial clusters and social networking for enhancing inter-firm cooperation: The case of natural resources-based industries in Chile. *J. Bus. Mark. Manag.* **2008**, *2*, 187–202. [CrossRef]
37. Shen, C.-L.; Tai, H.-S. Values matter: The role of key nodes of social networks in an environmental governance case from Taiwan. *Environ. Manag.* **2021**, *67*, 251–262. [CrossRef]
38. Genç, S.; Akay, D.; Boran, F.E.; Yager, R.R. Linguistic summarization of fuzzy social and economic networks: An application on the international trade network. *Soft Comput.* **2020**, *24*, 1511–1527. [CrossRef]
39. Fritsch, M.; Kauffeld-Monz, M. The impact of network structure on knowledge transfer: An application of social network analysis in the context of regional innovation networks. *Ann. Reg. Sci.* **2010**, *44*, 21–38. [CrossRef]
40. Zhou, L.; Zhang, W.; Fang, C.; Sun, H.; Lin, J. Actors and network in the marketization of rural collectively-owned commercial construction land (RCOCCL) in China: A pilot case of Langfa, Beijing. *Land Use Policy* **2020**, *99*, 104990. [CrossRef]
41. Brangier, V. Intermediación y Grado en una red de venta de tierras: Valle de Pichidegua, Chile, 1820-1835. *Caravelle* **2018**, *111*, 147–162. [CrossRef]
42. Ouyang, Y.Q. Social network analysis and its application to innovative research. *Chin. J. Manag.* **2009**, *6*, 1188–1193; 1203.
43. Marsden, P.V. Network Data and Measurement. *Annu. Rev. Sociol.* **1990**, *16*, 435–463. [CrossRef]
44. Wasserman, S.; Faust, K. *Social Network Analysis: Methods and Applications*; Cambridge University Press: New York, NY, USA, 1994.
45. Mitchell, J.C. *The Concept and Use of Social Network in Urban Situations*; Manchester University Press: Manchester, UK, 1969; pp. 1–50.
46. Borgatti, S.P.; Everett, M.; Freeman, L.C. *Ucinet 6 for Windows: Software for Social Network Analysis User's Manual*; Analytic Technologies, Inc.: Harvard, MA, USA, 2002.
47. Bastian, M.; Heymann, S.; Jacomy, M. Gephi: An Open Source Software for Exploring and Manipulating Networks. In Proceedings of the International AAAI Conference on Web and Social Media, San Jose, CA, USA, 17–20 May 2009; pp. 361–362.
48. Luser, D.; Johan, K.; Garry, R. *Exponential Random Graph Models for Social Networks: Theory, Methods, and Applications*; Cambridge University Press: London, UK, 2012.
49. Clemente, G.; Grassi, R. Directed clustering in weighted networks: A new perspective. *Chaos Solitons Fractals* **2017**, *107*, 26–38. [CrossRef]
50. Freeman, L.C. Centrality in social networks conceptual clarification. *Soc. Netw.* **1978**, *1*, 215–239. [CrossRef]
51. Liu, J. *An Introduction to Social Network Analysis*; Social Sciences Academic Press (CHINA): Beijing, China, 2004; pp. 119–120.
52. Fornito, A.; Zalesky, A.; Bullmore, E. *Fundamentals of Brain Network Analysis*; Elsevier Academic Press: San Diego, CA, USA, 2016; p. xvii476.
53. Jun, H.; Qing, L.; Shu-chi, Z. Family Gender Division and Agriculture Feminization-an Analysis Based on 408 Families in Jiangsu Province. *J. Nanjing Agric. Univ. (Soc. Sci. Ed.)* **2010**, *10*, 50–56.

54. Liao, L.; Long, H.; Gao, X.; Ma, E. Effects of land use transitions and rural aging on agricultural production in China's farming area: A perspective from changing labor employing quantity in the planting industry. *Land Use Policy* **2019**, *88*, 104152. [CrossRef]
55. Liu, K.; Wang, X.; Yan, Y. Network Analysis of Industrial Symbiosis in Chemical Industrial Parks: A Case Study of Nanjing Jiangbei New Materials High-Tech Park. *Sustainability* **2022**, *14*, 1381. [CrossRef]
56. Holden, S.T.; Otsuka, K. The roles of land tenure reforms and land markets in the context of population growth and land use intensification in Africa. *Food Policy* **2014**, *48*, 88–97. [CrossRef]
57. Chen, X.B.; Wu, K.P.; He, Y.L. The effect of farmland circulation on farmers' productivity: An empirical analysis based on DEA methods. *J. Agrotech. Econ.* **2011**, *8*, 65–71.
58. Ayala-Cantu, L.; Morando, B. Rental markets, gender, and land certificates: Evidence from Vietnam. *Food Policy* **2020**, *94*, 101842. [CrossRef]
59. Mudimu, G.T.; Zuo, T.; Shah, A.A.; Nalwimba, N.; Ado, A.M. Land leasing in a post-land reform context: Insights from Zimbabwe. *GeoJournal* **2020**, *86*, 2927–2943. [CrossRef]
60. Akter, S.; Farrington, J.; Deshingkar, P.; Sharma, P.; Rao, L. Land rental markets in India: Efficiency and equity considerations. In Proceedings of the Contributed paper prepared for presentation at the International Association of Agricultural Economists Conference, Gold Coast, Australia, 12–18 August 2006.
61. Mandal, S.; Misra, G.V.; Naqvi, S.M.A.; Kumar, N. Situational analysis of agricultural land leasing in Uttar Pradesh. *Land Use Policy* **2019**, *88*, 104106. [CrossRef]
62. Huang, Z.H.; Wang, P. Farmland transfer and its impact on the development of modern agriculture: Status, problems and solutions. *J. Zhejiang Univ. (Humanit. Soc. Sci.)* **2008**, *2*, 38–47.
63. Zou, B.; Zhong, W.; Zhang, Q. Risk aversion and the duration of the rural land lease contract: An empirical analysis based on the survey of rural households in Guangdong. *South China J. Econ.* **2016**, *35*, 12–22.
64. Rogers, S.; Wilmsen, B.; Han, X.; Wang, Z.J.-H.; Duan, Y.; He, J.; Li, J.; Lin, W.; Wong, C. Scaling up agriculture? The dynamics of land transfer in inland China. *World Dev.* **2021**, *146*, 105563. [CrossRef]
65. Yang, H. Rural land circulation and the restructuring of social classes. *Chongqing Soc. Sci.* **2011**, *5*, 54–60.
66. Davis, K.F.; D'Odorico, P.; Rulli, M.C. Land grabbing: A preliminary quantification of economic impacts on rural livelihoods. *Popul. Environ.* **2014**, *36*, 180–192. [CrossRef]
67. Wang, Y.M. The socialized farmers of China and circulation of farmland. *Issues Agric. Econ.* **2010**, *31*, 45–50.
68. Mertens, K.; Vranken, L. Pro-poor land transfers in the presence of landslides: New insights on norms in land markets. *Land Use Policy* **2021**, *101*, 105202. [CrossRef]
69. Wang, H.; Riedinger, J.; Jin, S. Land documents, tenure security and land rental development: Panel evidence from China. *China Econ. Rev.* **2015**, *36*, 220–235. [CrossRef]