

The Small Peasant Economy in North China: Development or Underdevelopment?*

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Two characteristics of the small peasant economy—development and underdevelopment — have been under debated among scholars. The theory of underdevelopment offered by Philip Huang argues that the development of the small peasant economy of the North China plain was a process of “involution and semi-proletarianization” due to population pressure, commercialization, and the integration of China’s economy into the world economic system. On the other hand, the “development” school of thought indicates that the small peasant has potential to generate growth in the agricultural sector, and this growth will further benefit the modern sector.

This study attempts to use the village survey done by the Japanese investigator in the late 1930s and 1940s to examine the reasons for development or underdevelopment of the North China small peasant economies. By comparing and contrasting eco-systems, crop patterns, degrees of commercialization, and owner-tenant relations of four villages, this study finds the keys for development are: 1. access to water for irrigation; 2. technological innovations, such as adopting new crops and applying fertilizer; 3. eliminating exploitative owner-tenant relations.

Access to irrigation may have been the most crucial factor for development among the three key elements. Hsiao-t’ien-chia-chuang was the only village that achieved a degree of growth, which was the result of this village’s access to water. Irrigation allowed the peasants in Hsiao-t’ien-chia-chuang to grow tobacco, which provided a higher return per unit of input than growing food grain did. The labor intensive characteristic of tobacco production increased the opportunity for peasant households to utilize the marginal

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laborer. This allowed the peasant households to generate a higher income. The other three villages studied either were limited by the inferior eco-system, or by owner-tenant relations, and were not able to get out of the vicious cycle of underdevelopment. According to recent reports, the irrigation system in Sha-ching has been improved a great deal. The peasants in Sha-ching have been able to increase their production to a unprecedented high level.

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1. Introduction

Two characteristics of the small peasant economy — development and underdevelopment — have been widely discussed among scholars. After careful research on the massive volumes of data collected by Japanese scholars during the 1930s and 40s, Philip Huang concludes that the development of the small peasant economy of the North China plain in the past century was a process of “*involution and semi-proletarianization*”, due to population pressures, commercialization, and the integration of China’s economy into the world economic system (Huang 1985). On the other hand, the study of Thomas Smith suggests that the development of the Japanese small peasant economy and paddy agriculture in the seventeenth and eighteenth centuries significantly increased land productivity which became a basis for Japan’s modernization (Smith:1984). In a conclusion drawn from her field study of paddy agriculture in Japan, South China, and South East Asia, Francesca Bray supports Smith’s argument. Bray argues that by combining individual access to land with the sharing of water and

of capital resources, the productivity of rice-farming can be increased to levels where it provides a secure basis for economic diversification and rural growth, even where population pressure on land is high and the average farm size is small (Bray 1986). Based on a set of data identical to that used by Philip Huang, Ramond Myers indicates that "the peasant economy of North China performed remarkably well" in the early twentieth century, and this agrarian system further contributed to the region's development (Myers 1970:Chapt. 19).

These arguments suggest that the evolutionary results of the small peasant economy may have been contradictory. On the one hand, the small peasant economy, as Huang points out, is characterized by "*involution and underdevelopment*" and, on the other, it may as well be as Smith, Bray and Myers suggest, characterized by "*development and growth*".

At the same time, many economists argue that the "Green Revolution" can be achieved through a package of innovations. Through the "package" approach, the small peasant may get out of the "vicious cycle", and achieve significant rural growth. This approach has been intensively discussed by a group of Japanese economists and anthropologists from Kyōto University who work on the development of rice agriculture in Thailand (Ishii ed.:1978). They suggest that given water access, water control, technological innovation, HYV adoption (high yield varieties of seed), and crop diversification, peasant income could launch the "take off" of the small peasant economy.

In this paper four villages of North China will be taken as our examples to examine the reasons for development and/or involution/underdevelopment in the North China small peasant economy. Through discussions on the ecosystem, owner-tenant relations, commercialization, and population pressures, as regards land, a tentative conclusion will be provided to explain why a small peasant economy could either develop and remain underdeveloped at the same time.

2. The Villages

A. The Geographical and Ecological Setting of the Villages

(1) Sha-ching and Ssu-pei-ch'ai of Hopei Province

Sha-ching is a poor village of Shun-i county in Hopei province. The Peking-Hankow railroad passes through Shun-i county which is located about 30 miles northeast of Peking. The railroad station is about 0.6 miles east of the county seat. The village is situated 1.3 miles west of the county seat and is 0.6 mile west of the railroad station (CNKC 1:67-68).

The village's geographical setting and the high frequency of natural disasters resulted in low investment in irrigation facilities, which not only decreased the land productivity of Sha-ching village, but also prevented cotton planting. Natural disasters also occur from time to time in the North China plain where Sha-ching village is situated. The constant flooding of the Pai Ho, (White River) whose tributary, Hsiao-chung-ho, flows west of Sha-ching village, has caused the gritty quality of the land in the village. Climatically, this area has a typical continental climate. Rainfall is concentrated in July and August, which marks the summer of this area as a season of floods. The overflow of the Pai Ho, as a result of the temporal concentration of rainfall, frequently has caused tragedy in the village (CNKC:1:89-91). There were four major floods between 1911 and 1940 in this area.¹ Aside from floods, there were two years where crops were destroyed by frost, in 1917 and 1918, which caused the village to have bad harvests (CNKC 1:91).

For ecological reasons, the irrigation system was not well developed in Sha-ching village. The poor state of the ecology attracted little investment for an irrigation system, which resulted in low agriculture productivity. Irrigation in Sha-ching primarily consisted of water being drawn from wells.

The water level was about seven meters below the earth's surface. In addition, it seems that the supply of ground water was neither stable nor abundant (CNKC 1:91). Until new technology became available, it was unrealistic for the peasants in Sha-ching to invest their capital in an extensive irrigation system. Therefore, the peasants in Sha-ching installed only very simple and low efficiency irrigation systems. When the supply of groundwater was constant, one or two mu of land could be irrigated by an unlined earth-well (t'u-ching, shallow-dug well) utilizing a winch, while a brick-lined well (chuan-ching, deep dug well) could irrigate five to six mus of land. Sometimes, when the ground-water supply was abundant, a brick-lined well could irrigate eight to ten mus of land (CNKC 2:293-294). There is no data to show that peasants in Sha-ching village used animal power to perform irrigation work.

There were only eight wells in the village, among which only half were used for irrigation; the others were primarily used as a source of drinking water (CNKC 1:61).² In the village, very few vegetable gardens could be irrigated; most of land had to depend on rainfall (CNKC:1:62, 2:293). This also explains why the peasants of Sha-ching built a temple to Lung-wang (Dragon King, the god of rain) to pray for rain in times of drought (CNKC 1:104, 2:210, 220-221). In sum, the backwardness of the irrigation system certainly affected the land productivity of Sha-ching.

Ssu-pei-ch'ai is situated in Luan-ch'eng county. The county is about 18 miles southeast from Shih-chia-chuang city which is now the provincial capital of Hopei. Seven miles west of the Ssu-pei-ch'ai there was a station of the Peking-Hankow railroad named Tou-yü (CNKC 3:5-6).

Although natural disasters also occurred from time to time in Ssu-pei-ch'ai, the highly developed irrigation system and exceedingly high irrigation capacity of the wells there allowed the cropping pattern and the level of land productivity of Ssu-pei-ch'ai to be very different from those of

Sha-ching. The concentration of rainfall in the summer season always resulted in floods while the lack of rain (or snow) in the winter frequently caused drought (CNKC 3:36, 54). A river vestige was located at the west rim of the village, but this silted up river had no irrigation uses to Ssu-pei-ch'ai. In the summer when the rain fell heavily, the area around the river was submerged under water, which made this land totally useless.³ At the east end of the village there were eight mu of dry land on which irrigation was entirely unavailable. The frequency of natural disasters in Ssu-pei-ch'ai seems lower than that of Sha-ching. The head of the village recalled that there was one flood, one drought, and a hail disaster during the thirty years from 1911-1941 (CNKC 3:54).

A well developed irrigation system enabled the villagers of Ssu-pei-ch'ai to plant cotton which, in turn, resulted in high land productivity. Ground-water reserves were abundant, and this ensured a relatively stable supply of water for irrigation. This created an incentive for peasants to invest in improving their irrigation facilities. It seems that the Ground-water reserves ground water were enormous, although the level of waterground was lower than in Sha-ching. In this area, the depth of an ordinary well could reach 10 meters, but the depth at which water could be found was only 3.5 meters. This enabled a well to irrigate 20 mu of land if an adequate irrigation system was installed (CNKC 3:365-366). The irrigation capacity of wells in Ssu-pei-ch'ai was almost three to four times higher than that of the brick-lined wells (chuan-ching) and about seven to eight times higher than the unlined earth-wells (t'u-ching) of Sha-ching.

Although the geological conditions of two areas where villages the villages were located are quite similar, the intensive input of capital and the wide use of animal labor in irrigation increased the irrigation efficiency and the land productivity of Ssu-pei-ch'ai. By 1941, Ssu-pei-ch'ai had eighty wells, of which sixty (75%) were engaged in irrigation and twenty supplied

drinking water for the villagers.⁴ In Ssu-pei-ch'ai, the wheelwater and draft animals were widely utilized to irrigate the fields. Almost every irrigation well had a wheelwater. About 71 mules and donkeys were used to run the wheelwater (CNKC 3:27, 365-366). Each wheelwater consisted of fifty-six barrels, each of which was about a half of meter long. One wheelwater could irrigate five mu of land per day, whereas manpower alone could only irrigate one mu per day. A well with a wheelwater could supply the irrigation needs of 20 mu of land (ibid.). The intensive input of capital into irrigation systems made cotton planting possible in Ssu-pei-ch'ai. Water was extremely important for cotton during the growing season. In conclusion, by virtue of the different irrigation systems used in the two villages, Ssu-pei-ch'ai and Sha-ching had very different cropping patterns.

(2). Tu-chia-chuang and Hsaio-t'ien-chia-chuang of Shantung Province.

Tu-chia-chuang is a village located on a slightly sloped terrace five kilometers west of the county seat of I-tu and, eight kilometers north of the village is a station of the Chiao-chi railroad (from Ch'ing-tao to Chi-nan). To the north and west of the village is the Yao-wang hill, whose altitude is about 200-250 meters. The Pei-yang river cuts the loess terrace and flows along the south of the village. On the east and south of the village a slightly sloped loess terrace which stretches into the plain; this is where the farming land can be found (YCTL:4-5).

The lack of an irrigation system made the peasants of Tu-chia-chuang unable to escape the hardships that result from drought, and limited the possibilities of adopting cash crops. Access to water was always a problem for the peasants of Tu-chia-chuang, even though the Pei-yang river flows along the south of the village. Because the river cuts six to seven meters deep into the loess, without modern irrigation facilities, such as a pump, using the water from the river for irrigation was almost impossible. The fact that rain concentrated in the summer further increased the problems

associated with irrigation. Rain on the North China plain concentrates in the summer, the water flow in the river is not stable. The amount of rain fall is very unpredictable in the spring when the peasants need irrigation to start their cultivation. The peasants of the village had to rely on unpredictable amounts of rainfall and a few wells for their water needs (YCTL:3-4). According to an informant in the village, in 1867, there was a very serious drought. Since 1911, there had been three to four serious droughts, among which the one in 1916 severely hurt the harvest of the village (YCTL:10).

Furthermore, the geological setting limited the ability of the peasants to conserve village's water. The average depth of the alluvial loess on the terrace was about 1 meter. Right under the alluvial loess lies a layer of rock. After rain permeates into the rock, it can not be held very long. Therefore, in the dry season, the soil of the village became very dry and granulose. This not only limits water conservation but increases the difficulties of cultivation (YCTL:4-6).

The depth of the ground-water level prevented the possibility of well irrigation for the village. Sitting on a 200 meter high terrace increases the difficulties of digging wells for irrigation. The peasants of the village only used small amounts of water supplied by wells to irrigate small vegetable gardens. The rest of the fields had to rely on rain (YCTL:5).

Locusts and wind storms also resulted in bad harvests. In the village, locusts did major damage to the sorghum and millet harvests. Another insect, whose native name is *yu-ch'ung*, always damaged the growing soybeans and sorghum. Without modern technology, such as insecticides, the peasants could do very little to control the damage resulting from insects (YCTL:10). Also, due to the terrain of the village, gusty wind blew from time to time. Sometimes it resulted in the lodging of the crops. For instance, in 1939 gusty wind dislodged the crops and seriously damaged the harvest (ibid.)

Ten kilometers east of the I-tu station was an open loess plain, where Hsiao-t'ien-chia-chuang was located. Within a radius of 500 meters, there were four villages which formed a residential area. In general the farm land of Hsiao-t'ien-chia-chuang seems to have been on the relatively flat part of the loess plain, but in fact the land is on a large area of terraced land (YCTL:93-94).

The ecosystem of Hsiao-t'ien-chia-chuang was not much better than that found in Tu-chia-chuang in terms of the frequency of natural disasters and the damage from insects; but, access to water resulted in a different agricultural development pattern from that found in Tu-chia-chuang. The water supply of Hsiao-t'ien-chia-chuang was not abundant; however, a minimum amount of water from the wells was available for irrigation. When the rain failed to fall, the crops also failed. Moreover, Hsiao-t'ien-chia-chuang was on a relatively flat plain, so during the rainy season drainage was another problem for the peasants. In addition to problem of water, crops of this area suffered from insufficient levels of sunshine during the harvest season. This severely affected the harvest. In the meantime, hail and locusts frequently damaged harvests (YCTL:120).

One of the major differences between the ecosystems of Hsiao-t'ien-chia-chuang and Tu-chia-chuang was that the peasants of the former had easier access to water. The supply of underground water was relatively easily accessible, although the depth at which the water was found was rather deep. Average depth of the water table ranged from 12-15 meters below the surface of the ground in Hsiao-t'ien-chia-chuang. The water in an unlined earth well (*t'u-ching*), was found at depths as low as 1.5 to 2.5 meters (YCTL:99). In addition to the wells that supplied drinking water below the surface, the number of unlined earth wells available for irrigation in the village during the investigation was seventeen. Because water supplied by the wells was not sufficient enough to irrigate all the land in the village,

the peasants of the village allocated almost all the water to irrigate tobacco fields. The remaining crops had to rely on the rain. As the data shows, all seventeen irrigation wells were used in the irrigation of the tobacco fields (YCTL:98). The consequences of the intensive use of well irrigation were an increase in the degree of commercialization, and higher land productivity in Hsiao-t'ien-chia-chuang.

B. Cropping Patterns and Market Dependency of the Villages

(1). Sha-ching and Ssu-pei-ch'ai (food grain vs. cotton)

The availability of a well-developed irrigation system made cotton the dominant crop in Ssu-pei-ch'ai while the peasants of Sha-ching grew mainly food grains. The cropping pattern of Sha-ching was grain oriented: maize, sorghum, soybeans, and wheat were the major crops. In addition to grains, some vegetables also were planted in gardens and on small fragmented pieces of land. Vegetables were grown mainly for household consumption; only a very small amount was marketed in towns or in the county seat.

The percentages of the major crops in total land sown of the village were as follows: maize 36%, sorghum 20%, soybeans 16%, wheat 12%. Small quantities of peanuts, millet, and sweet potatoes were also grown. Radishes, napa cabbage and green onions were the major vegetables that were grown in the village. Tobacco was rarely planted and no cotton was raised (Huang 1985:Appendix table A2;CNKC: 2:69). Clearly, most crops produced by the peasants in Sha-ching were food grains. Even the small amounts of vegetable and tobacco that were grown were mainly used for self-consumption rather than grown for the market.

The prevalence of cotton in Ssu-pei-ch'ai reveals the major crop pattern difference between it and Sha-ching. Cotton was the major crop of Ssu-pei-ch'ai, and it occupied 40% of the total arable land in the village, while food grains were grown on the remaining 60% of land (CNKC 3:5-6, 36, 197-198).⁵

Cotton production in Ssu-pei-ch'ai was primarily for sale in the market. After the harvest season, peasants kept a portion for self-consumption, and then they sold their cotton to the Japanese cotton agent who stayed in the market during the harvest season, or to the cotton agent in Shih-chia-chuang (CNKC 3:329-341).

Cotton planting resulted in an increase in commercialization and market dependency. An increase in cotton acreage also meant a decrease in food grain acreage. If the amount of land devoted to cotton were to be increased, this would definitely lower food-grain output if cultivation skills remained at the same technological level; furthermore, in order to maintain a level of subsistence, food grain had to be purchased on the market and cotton had to be marketed in exchange for cash. Irrigation equipment, fertilizer, and other necessary land inputs could be purchased only through the market. All of these factors indicated that Ssu-pei-ch'ai was a highly commercialized village in the 1940s. For the peasants of Sha-ching, the market was not as important as it was to the peasants of Ssu-pei-ch'ai. For the villagers in Sha-ching, the market was simply a place that provided daily supplies such as matches, cooking oil, and food grains (CNKC:2:201-203). Commercial activities such as selling their products and buying implements and equipment were unimportant to the peasants of Sha-ching.

(2). Tu-chia-chuang and Hsiao-t'ien-chia-chuang (food grain vs. Tobacco)

Access to water produced different cropping patterns in Hsiao-t'ien-chia-chuang and Tu-chia-chuang. Access to water made irrigation possible for the peasants of Hsiao-t'ien-chia-chuang, and this was the major factor which made tobacco planting possible. In contrast, the peasants of Tu-chia-chuang could only produce food grains which maintained their level of subsistence.

The acreage devoted to sowing tobacco in Shantung province increased

rapidly after the dawn of the twentieth century due to the competition between the British American Tobacco Co. and the Nanyang Brothers Tobacco Co., and opening up of the province to railroad transportation. The competition between BAT and Nanyang Brothers was very keen; each company offered a set of incentives, such as advancing seeds or assuring price, to encourage the peasants to sell their products to their company. In the meantime, the railroad allowed the agents of the tobacco companies to ship tobacco to the factory efficiently. In Shantung province the acreage sown in tobacco had increased from 101,000 *shih mu* in 1915 to 1,599,000 *shih mu* in 1937 (Chen 1983:chapt3; Hsü 1983:214-19). I-tu county was one of the major tobacco producing counties in Shantung province at the turn of the twentieth century (YCTL:167).

The growing of tobacco in Hsiao-t'ien-chia-chuang was not under the direct encouragement of the BAT Co., but a decision made by the individual peasants. Around 1922-23 a peasant of Hsiao-t'ien-chia-chuang learned of the profitability of growing tobacco from his relatives who resided in the neighboring village Hou-chia-miao-tzu (about 1.5 kilometers from Hsiao-t'ien-chia-chuang). After he had learned the skill of growing tobacco from a hired laborer (ch'ang-kung) of his relatives and receiving instruction from his relatives, he started to grow tobacco in a small plot on his land in the village (YCTL:197). From that point tobacco was gradually adopted by the peasants of the village.

There was little doubt that tobacco was the most important cash crop to the peasants of Hsiao-t'ien-chia-chuang, although most of the land in the village was sown with food grain. Up to 1941, 29 out of 32 households devoted at least a plot of their land to produce tobacco (YCTL:100). The percentage of cultivated land sown in tobacco varied from household to household. The tobacco acreage, at the time of the investigation, was 9% of the total cultivated land of the village (YCTL:108). But, because tobacco

planting was rotated with wheat, soybean, sorghum and the other crops, and if the double cropping index is taken into consideration, the actual acreage sown in tobacco was about 29% of the total cultivated acreage (YCTL:168). In addition to tobacco, the percentages of the major crops which were sown in the village were as follows: wheat 29.3%, sorghum 25.4%, millet 14.95, soybeans 19.4%, and a small amount of vegetables 1.5% (YCTL:108).

The cropping pattern of Tu-chia-chuang produced only food grain for subsistence. Wheat (31.3% of the total acreage sown), sorghum (23.7%), millet (11.3%), soybeans (30.9%), maize (0.3%) composed the major food grains sown in the village. Most food grains were for consumption rather than for sale in the market. There were almost no cash crops planted in the village. Only a few varieties of melons and a small amount of tobacco (total 2%) were planted, partly for consumption and partly for sale in the market (YCTL:8).

The peasants of Tu-chia-chuang were not unaware of the growing market opportunities. Some of them did make an effort to diversify and commercialize their production; however, they failed because of the lack of irrigation. In 1938 right before the Sino-Japanese War, an agent of the BAT Co. came to the village to advertise the benefits of planting tobacco. Six peasant households raised some money to build a dry house and got seeds from the advertiser and started planting tobacco. Because the amount of irrigation applied was crucial to the yield and quality of tobacco, the lack of efficient irrigation caused the experiment to fail. In 1939, the peasants could only sell their tobacco on the local market at a much lower price than BAT was offering. The reason may have been that the BAT Co. was very selective concerning the quality of tobacco that they collected. In 1940 only three households still grew tobacco in the village. Low returns from growing tobacco finally made the peasants of Tu-chia-chuang decide to give up.

By 1941, there was no longer any household in the village that grew tobacco. The attempt of adopting tobacco in Tu-chia-chuang totally failed (YCTL:31).

The cropping patterns of the two villages indicate that Hsiao-t'ien-chia-chuang was more commercialized than Tu-chia-chuang. The critical factor in their different degrees of commercialization was the peasant's access to water. At the same time, commercialization also increased the Hsiao-t'ien-chia-chuang peasants' dependency on the market in terms of capital investments in irrigation, fertilizer purchases, and tobacco marketing.

3. Commercialization and Owner-tenant Relations

A. Sha-ching and Ssu-pei-ch'ai

The difference in owner-tenant relations and the social structures in Sha-ching and Ssu-pei-ch'ai resulted from different levels of land productivity. High land productivity in Ssu-pei-ch'ai attracted greater investments from landlords, and made Ssu-pei-ch'ai a village dominated by landlordism. In contrast, Sha-ching was a moderately differentiated village in which most land was in the hands of owner-cultivators; there was only one managerial farmer in the village.

Land productivity in Ssu-pei-ch'ai can be estimated based on rental rates. Two different rental arrangements existed in Ssu-pei-ch'ai: one was a fixed rental arrangement and the other was a share-cropping rental arrangement. The former arrangement was more favorable to the landlord, while the latter favored the peasant. For share-cropping, the rent was about 50% output, which usually came to about 20 catties of cotton or 5 *tou* of grain, usually wheat. This rate was regarded to be fair, or, at least, a very popular rent rate among the tenants in Ssu-pei-ch'ai (CNKC 3:182-186, 322, 337). This rental rate seems roughly equal to half of, or a little more than half of, the yield on one *mu* of fairly good land (CNKC:3:171). This rent enabled a

landlord in Ssu-peich'ai to have an income of 15-20 *yuan* per *mu* a year if the rent was paid in grain, or 20-26 *yuan* if it was in cotton (CNKC 3:325, 329, 332, 337).⁶ Therefore, the gross return from one *mu* of fairly good land in Ssu-peich'ai was slightly less than 40 *yuan* if grain (wheat) was grown, or somewhat less than 50 *yuan* if cotton was sown. In contrast, in the fields of Sha-ching village, wheat yields were 6 *tou* per *mu*, while the output of maize and sorghum was about 10 *tou* per *mu*. This meant that the peasant could earn 27 *yuan* per *mu* by growing wheat. The gross returns on maize and sorghum were about 31 *yuan* and 19.5 *yuan* respectively (CNKC 2:69).⁷ By comparison, the land productivity of Sha-ching was apparently much lower than that in Ssu-peich'ai. The rent, thus, was also lower in Sha-ching. In Sha-ching village rent was 10-12 *yuan* per *mu* for the highest quality land and 6 *yuan* per *mu* for low quality land (CNKC 2:91,93). Evidently, this return could not provide enough incentive to induce the landlords or the tenants to invest in the land of Sha-ching. It also explains why landlordism was not extensively developed in this village.

Land in Sha-ching village was predominantly owned by owner-cultivators. The role of the absentee landlord was insignificant in the village. At the time of the investigation, the total land held by small landowners outside the village was 426 *mu* (36% of the total cultivated land). Of these 426 *mu*, seventy four percent (307.4 *mu*) was farmed by small landowners residing in neighboring villages, Wang-ch'uan-ssu and Shih-men (CNKC:1:114,119).⁸ Twenty-six out of sixty-nine households in the village owned their own land, although the size of their plots might not have been enough to produce adequate food to support their household (CNKC:1:Appendix table).⁹ Only eight households in the village were pure tenants which means that all the land that they cultivated was rented (*ibid.*). According to statistical data derived from the Japanese survey, in Sha-ching the percentage of cultivated land rented out was 17.2% while tenants and

tenant/owner households accounted for 22.4% of total households. Only one managerial farmer, also the head of most well-to-do household, resided in the village (Huang 1985:Appendix table A.2;CNKC 1:96). This suggests that land ownership in Sha-ching was not polarized, since most peasants cultivated their own land in addition to that of others. Nevertheless, from another point of view, the village was differentiated in terms of wealth. Within the village there resided several wealthy peasants as well as poor peasants, although there were no long-term agricultural laborers in the village (CNKC 1:96).

In comparison, land in Ssu-pei-ch'ai was highly concentrated in the hands of several absentee landlords. The total amount of cultivated land in the village was 2,074.2 *mu*, of which 1,372 *mu* (66% of the total) was rented out. Almost all of the rented land belonged to absentee landlords, who resided in towns or in urban areas. Among these landlords Wang Tsan-chou was the most prominent. Wang owned about 347 *mu* of land in the village.¹⁰ This was about 17% of the village's total cultivated land and 25% of the rented land (CNKC 3:6,165,177-178). If all the land owned by the Wang lineage is taken into account, the Wangs controlled more than 60% of the rented land in the village (CNKC 3:6). Other major landlords who resided outside of the village were Wang Lo-yao, the owner of a coffin shop, who lived in Pei-kuan (a market north of the county seat), and who owned 234 *mu* of land; Wang Lo-k'uei, owner of a grain shop, who owned 89 *mu* land, and two of his sons, Wang T'ien-kuei, Wang Lien-kuei, who owned 9 and 27 *mu* respectively; Li Kuan-cheng, a small landlord who also lived in Pei-kuan, and who owned 77 *mu* of land (CNKC 3:177-186). No resident landlords or managerial farmers existed in this village. The distribution of the ownership of land in the village reveals that the concentration of land was a dominant factor in the development of the peasant economy.

In short, the effects of the different geological and ecological settings of the two villages are reflected in the different degrees of commercialization and market dependency. A by-product of the differences was the landlordism in Ssu-pei-ch'ai village and the commercialization of Sha-ching, characterized by owner-cultivators and no absentee landlords.

B. Hsiao-t'ien-chia-chuang and Tu-chia-chuang

The peasant economies of Hsiao-t'ien-chia-chuang and Tu-chia-chuang show another pattern present in the peasant economy under the impact of commercialization. The different levels of land productivity and different degrees of commercialization in Hsiao-t'ien-chia-chuang and Tu-chia-chuang did not result in the same consequences as in Ssu-pei-ch'ai and Sha-ching. Most peasants, in the highly commercialized Hsiao-t'ien-chia-chuang, were owner-cultivators. Interestingly, it was the peasants of Tu-chia-chuang, a village of subsistence production, that suffered from landlordism.

The effect of commercialization on the distribution of land ownership in Hsiao-t'ien-chia-chuang is somewhat contradictory when compared to that found in Ssu-pei-ch'ai. Among thirty three peasant households, 27 households (81.8%) were owner-cultivators. Five households (15%) cultivated their own land as well as rented plots of land to cultivate. Only one household (3.2%) did not own any land at all. This household was engaged in commerce and trade other than farming (YCTL:96).

Landlordism was not significant in Hsiao-t'ien-chia-chuang, although all the land rented by the peasants belonged to absentee landlords. There was no "landlord" in the village.¹¹ The tenancy situation of the village resulted from the peasants moving out of the village and selling their land to outsiders. After purchasing the land, the "absentee landlords"¹² then rented out the land to the peasants in the village (YCTL:99).

Rent in Hsiao-t'ien-chia-chuang was set at a fixed rate which roughly

equaled about 50% of the total output of the land. If the crop was tobacco, the rent rate had to be negotiated between the landlord and tenant. According to the customs of the village, rent in kind was standardized by one *lao-shih* soybean per *mu*¹³. In the case where rent was paid in cash on a time basis rather than an output basis, the rental rate was usually equal to the market price of one *lao-shih* of soybean (YCTL:99-100).

The high return from growing tobacco allowed the peasants of Hsiao-t'ien-chia-chuang to increase the productivity of their land and generate higher incomes. Although growing tobacco required a more intensive investment in irrigation, fertilizer, labor, marketing etc., the gross return of tobacco per *ta-mu* was apparently higher than that of food grain. The average gross return of tobacco per *mu* was 241.4 *yuan*, while one *mu* of wheat generated only 34.4 *yuan* (YCTL:136 TABLE). More importantly, the income generated by growing tobacco was in the form of cash which the peasants needed badly. This increase in cash income enabled the peasants of Hsiao-t'ien-chia-chuang to regain landownership from the absentee landlords.

According to the investigation, the impact of commercialization on the distribution of land between absentee landlords and owner-cultivators was a decrease in the rate of tenancy and an increase in the number of owner-cultivators in Hsiao-t'ien-chia-chuang. Hsiao-t'ien-chia-chuang adopted tobacco for cultivation around 1923-1924, and the distribution of land ownership of the village subsequently changed profoundly. When the peasants of Hsiao-t'ien-chia-chuang adopted tobacco as a crop for cultivation, 30% of the total amount of cultivated land of the village was owned by absentee landlords. Most of the landlords were merchants residing in Tung-kuan, the market town near the east gate of the county seat. After two decades of planting tobacco, the tenancy rate dropped significantly. There were not any tenant farmers in the village during the investigation.

Only five households cultivated the land of others in addition to their own and the total acreage of land in the village owned by absentee landlords decreased from 30% to 5% (YCTL:94).

While the peasants of Hsiao-t'ien-chia-chuang improved their livelihood and got rid of the straight jacket imposed by tenancy, their counterparts in Tu-chia-chuang suffered from high rents and were under the control of the landlords. The total land cultivated in Tu-chia-chuang was 318 *mu*, of which 132 *mu* was rented out (41.5% of the total). Among the 132 *mu*, only 17 *mu* (17.7%) belonged to peasants who resided in the village. Landlords, who resided at Pei-kuan, a market town north of the county seat, owned 46.30 *mu* (14.6% of the total cultivated land, 35.1% of the total amount of land rented out). Landlords, who lived in the county seat, held 23.4 *mu* of land in the village (7% of the total cultivated land, 17.7% of the total amount of land rented out). The remaining 45.5 *mu* was owned by peasants living in neighboring villages (YCTL:18).

Two forms of rental payment were popular in Tu-chia-chuang. One was a fixed rental arrangement (*liang-tsu*), the other was a share-cropping (*fen-chung*) arrangement. The rate for the fixed rental form was about one *lao-shih* per *ta-mu*, although it varied with the quality of land. Due to the poor quality of land and low productivity, the peasant whose rental contract stated a fixed amount of rent actually paid more than 50% of the land's total yield, and sometimes more than 65% of the land's total output (YCTL:19-20).

As the cases of Hsiao-t'ien-chia-chuang and Tu-chia-chuang show, the consequences of commercialization in North China during the first half of the twentieth century were not necessarily one's of involution and stagnation. In terms of income generation and the move from tenant farmer to owner-cultivator, the peasants of Hsiao-t'ien-chia-chuang did benefit from cash-crop growing (tobacco), and experienced a certain degree of rural economic growth. The evidence also shows that subsistence production may

not necessarily prevent landlordism. The small peasant economy's response to commercialization in North China in the early twentieth century could have gone either way — towards development or involution/underdevelopment.

4. Development or Underdevelopment?

Development or involution/underdevelopment may result from the effects of differing ecosystems institutions, market structures, and from population pressures. The cases of the four villages discussed above indicate each had its own reasons that caused its development or underdevelopment. In this section, the four villages will be used to reveal the specific reasons that caused development or underdevelopment.

With virtually same ecosystem, access to water was the determinant that limited the development of Sha-ching and Tu-chia-chuang. As we have mentioned, water is the most crucial factor in determining returns received from growing cotton and tobacco. Both cotton and tobacco require more sophisticated water application processes during growing as opposed to other crops, such as wheat, sorghum, millet and maize. Without improvements in water control and irrigation, the change to cash crops was impossible even though the market opportunities did exist in the villages.

In addition, landlordism and the subsequent rent payments which took away the peasants' agricultural surplus limited the peasant's accumulation of capital. As the cases of Ssu-pei-ch'ai and Tu-chia-chuang show, landlords controlled large amounts of the land in the villages (66% of the total cultivated acreage of the former, 42% of the latter). In the form of rent, a large amount of agricultural surplus generated by the peasants was transferred into the pockets of the landlords. The consequence of this surplus extraction was the deterioration of peasant's ability to accumulate capital and to invest in the land to increase output. Peasant production thus had to rely on credit provided by landlords and merchants. Due to the

peasant's inferior economic position as compared to that of the landlords and merchants, it was very easy for landlords and merchants to monopolize the market and take advantage of the poor peasants.

For example, one of the most prominent absentee landlords of Ssu-pei-ch'ai, Wang Tsan-chou, came to own 17% of the village's cultivated land by manipulating the credit market. Wang took advantage of the peasants' inferior economic position resulting from frequent natural disasters. He instituted a land-pawning system (*tien-ti*). Through this system and the credit he provided, he was able to accumulate a handsome amount of income and land in Ssu-pei-ch'ai within a few decades (Huang 1985: 175-176).

The same situation existed in Tu-chia-chuang. Most of the landlords in Tu-chia-chuang were merchants who resided in Pei-kuan or the county seat. Most of them had either granary shops, grocery shops, pawnshops or were money-lenders (YCTL:23). The peasants' cash income of 1940 indicates that 40.4% of their total income came from loans while cash income generated from agriculture accounted for only 35.6% (YCTL:85). The peasants' heavy reliance on credit provided an opportunity for landlord/merchant manipulation of the market.

In addition to institutional limitations, one of the major reasons for the underdevelopment of Ssu-pei-ch'ai may have been the effects of the increase in population. Land registration in Ssu-pei-ch'ai shows the the total amount of cultivated land of the village was 2053 *mu* (CNKC 3:5). At the same time, the population of the village was 730 people, among which 374 were male. The labor force can be further divided into families; the number family units was 232 (CNKC:3:APPENDIX TABLE). Thus the land/man ratio of Ssu-pei-ch'ai was 2.01 *mu*/per person, and the land/family unit ratio was 8.84 *mu*/per family unit. In comparison with Ssu-pei-ch'ai, Hsiao-t'ien-chia-chuang's data indicates the population pressure in their village was not any less serious. The land/man ratio of Hsiao-t'ien-chia-chuang was 1.65 *mu*/per person and

the land/family unit ratio was 6.71 *mu*/per family unit (YCTL:109-110).¹⁴ This shows a high population density as opposed to that found in either United States or Europe. As Huang points out, in the rural areas of twentieth-century America, the average family farm was 837 *mu*, and, in France, 135 *mu* (Huang: 1985:61). However, the question that emerges here is: why, in two villages with relatively high population densities would one experience a certain degree of development, while the other would not? The answer may lie in the different levels of labor intensity employed in the two villages.

As Smith points out, intensification in Japan's agricultural production since the seventeenth century allowed Japan's rural sector to absorb its surplus labor and to generate economic growth (Smith 1984: Chapt. 6 & 7). From the land/family labor force ratio we find that the labor intensity of Hsiao-t'ien-chia-chuang was significantly higher than that of Ssu-pei-ch'ai. Furthermore, growing tobacco requires much more intensive use of labor input. In the middle of the *Ch'ing* dynasty, a scholar noticed this phenomenon. *Pao Shih-ch'en* points out the labor required to grow one *mu* of tobacco equaled the labor required to cultivate 6 *mu* of rice, and 4 *mu* of cotton (Pao 1843). Compared with the labor force needed to produce sorghum, maize, and other food grains, in Hsiao-t'ien-chia-chuang, tobacco no doubt required a much higher level of labor input. From selecting seeds to marketing, growing tobacco required 85 units of man power/day and 0.6 units of animal power/day per *mu*, while wheat needed 4.3 units of man power/day and 3.25 units of animal power/day, sorghum required 3.21 units of man power/day and 3.25 units of animal power/day, and soybeans needed 4.65 units of man power/day and 0.7 units of animal power/day respectively (YCTL: Chapt. 7).

In response to this increase in the level of labor intensity, women in Hsiao-t'ien-chia-chuang started to participate in cultivation. This increased

labor intensification and land productivity. This change was quite unique for North China. Women working in fields and participating in production was unusual in North China villages before the 1949 Revolution. No woman was participating in cultivation among the other three villages we have discussed here except the women of Hsiao-t'ien-chia-chuang. Picking tobacco leafs, drying and processing tobacco was usually done by women in the village (YCTL: Chapt. 8).

Consequently highly intensive use of labor inputs generated a handsome return. The average yield of tobacco per *mu* in 1940 was 350-400 *shih-chin* (1 *shih-chin* = 500g) and the gross income of tobacco per *mu* was 220-250 *yuan* (YCTL: 171-172). Compared with the gross return, 50 *yuan* per *mu*, of growing cotton in Ssu-pei-ch'ai, the gross return from growing tobacco per *mu* was four times higher than that from growing cotton. Although growing tobacco required more commercial fertilizer (mainly soybean cake) than growing cotton, the net return from growing tobacco was still higher than that from growing cotton. Under such circumstances, the peasants of Hsiao-t'ien-chia-chuang should certainly have been better off than their counterparts in Ssu-pei-ch'ai.

5. Conclusion

In response to the opportunities of commercialization and those that result from an active market, the small peasant economy of the North China plain could have either moved in the direction of development or involution/underdevelopment. The cases of Sha-ching, Tu-chia-chuang, and Ssu-pei-ch'ai, showed different types or degrees of underdevelopment. Meanwhile, the case of Hsiao-t'ien-chia-chuang indicates one possible optimistic result in the development of the small peasant economy on the North China plain.

The ecosystem may have been the most important limitation to

development. The lack of access to water in the cases studied totally ruled out the possibility of development. If technology remained at the same level, the peasants would not have been able to break through the barrier imposed by water access. In addition, most of the villages studied had to suffer the conditions of landlordism; too little was left after the peasants paid their rent. This decreased the ability of the peasants to invest in improving land productivity. Under such circumstances, Chayanov's theory on peasant economies may fit the cases studied very well. The peasants did not willingly allow themselves to be exploited whereby increasing their degree of drudgery except if they could not maintain a level of subsistence (Chayanov: 1986: Chapt. 2)¹⁵.

Technological innovation could have been the solution to the limitation on land production created by the ecosystem. As Huang points out, technological innovation after the 1949 Revolution changed agricultural productivity in Sha-ching a great deal. The huge Mi-yun Dam was built with state investment funds and changed the ecosystem of Sha-ching considerably. As a result, irrigation and water control are possible today. Once the critical issue of access to water is resolved, land fertility can be significantly increased. This is because chemical fertilizer needs water to be catalyzed. Nowadays both organic and chemical fertilizer are heavily applied to the fields. The introduction of tractors in 1959 allowed the proportion of land devoted to the interplanting of crops to increase to 50% which had never been possible before (Huang: 1985: 179-181). According to a report of Jen-min-jih-pao, the Sha-ching area recently installed 71 sets of an automatic irrigation system. This system can irrigate 15,000 *mu* of land. Currently, Sun-i county is one of the major food production areas in the Peking area and is called the Ukraine of China. The level of land productivity of the Sha-ching village has reached about 700-1,000 catties per year. It is clear that technological innovation can rapidly increase land

productivity (Jen min jih pao: 1988: June, 4th.). A peasant of Sha-ching told me in the summer of 1988, now that land productivity per *mu* could reach 1,700-2,000 catties (700-800 catties of wheat and 1,000-1,200 catties of maize) in each of the two seasons (spring and fall).¹⁶

Institutional reform is also necessary for increases in development because the high level extraction of surplus by landlords (in the form of rent) may decrease the peasant's incentive to increase productivity. Moreover, it will limit the accumulation of capital in peasant households and consequently limit the possibility of peasant's re-investing in the farm. The case of Ssu-pei-ch'ai suggests that without eliminating landlord control over the peasants, the peasants could not have become better off. In contrast to Ssu-pei-ch'ai, the small peasants of Hsiao-t'ien-chia-chuang improved their livelihood by getting rid of the landlords.

Population was not necessarily an obstacle to development. As the case of Hsiao-t'ien-chia-chuang demonstrated, if there was an alternative labor market that could absorb the marginal laborer, development was then possible. Intensively using labor coupled with technological innovation, such as the application of soybean cake for fertilizer and irrigation, allowed the peasants of Hsiao-t'ien-chia-chuang to achieve significant growth. The increased labor requirements of tobacco planting not only absorbed the marginal laborer, but also gave the peasants of Hsiao-t'ien-chia-chuang a favorable return. Therefore, for the peasants of Hsiao-t'ien-chia-chuang, the chance of getting out of "vicious cycle" of underdevelopment seemed very promising.

In short, the key issues in the development of small peasant economy are access to water, technological innovation, and the elimination of institutional obstacles. Commercialization and the expansion of the market economy did not necessarily have negative effects on the development of small peasant economy, nor was the high population density a major barrier

to development, if the peasants could diversify the kind of crops planted and grow crops requiring more intensive use of inputs and which generate more revenue to absorb the marginal laborer.

Notes

1. The four flood disasters took place in 1913, 1919, 1928, and 1929. In 1929, the river overflowed twice in the summer, and caused a disaster in this area. This catastrophe was the most serious one since 1911. (CNKC 1:4, 21).
2. According to another investigation, the total number of wells in the village was ten, among which three were public wells and seven were owned by nine households (CNKC 2:293).
3. At the time of Japanese survey, there was about two hundred mu of barren land in the village because of submergence. (CNKC 3:27).
4. According to the former head of the village, Chang Lo-ch'ing, there were fifty-four wells in the village, among which forty-two (77%) were using for irrigation. The remainder were for drinking (CNKC 3:27).
5. The primary food grains in Su-pei-ch'ai were wheat (10%) sorghum (10%), beans (10%), maize, millet, and other grain (altogether 30%). (CNKC: 3:5-6, 36, 197-198).
6. There were two sets of weights used for measurement during the investigation. In the old measure, one catty was equal to 32 liang, which is roughly equal to 600g; the new catty, was equal to 16 liang or 300g (CNKC 3:170, 179, 327). The price of cotton varied from season to season. In 1940 it was as high as 1.3 *yuan* per catty (600g) in autumn, and in the summer the price was about 1 *yuan*, and in spring was around 0.8 *yuan*. In 1941 the price of cotton was around 0.54 *yuan* per catty (300g) (CNKC 3:37, 331, 335, 337, 340, 349). Here the measure of weight of cotton has been converted into old catties (600g). Because the

price fluctuated during the investigation, the average price of cotton — one yuan per catty (600g) — is taken to estimate the value of total yield per *mu*.

7. The price of maize seems to have skyrocketed in 1941, which resulted in an exceptionally high gross return on maize—even higher than from wheat. In 1940 the price of maize was 0.09 *yuan* per catty, but in 1941 it increased to 0.21 *yuan* which was about 2.4 times that in 1940. According to 1940's grain prices, the gross return on wheat was 31.5 *yuan*, maize was around 13.5 *yuan*, and sorghum was 15 *yuan*. (CNKC 2:69) Here, the exchange ratio of 1 tou to 15 catties is taken as a standard to calculate the price, because the lack of specific data on the exchange ratio between these two measurements.
8. According to the head of the village, the total amount of land in Sha-ching was about 13 ch'ing (one ch'ing equals 6.7 hectares), of which arable land was about 10 ch'ing, waste land about one ch'ing, and cemetery and land for housing about one ch'ing each (CNKC 1:91). According to other statistics, the total acreage owned by outsiders was 521.54 *mu*, of which 126.54 *mu* was owned by nineteen people who resided in the neighboring village of Shih-men, 191 *mu* by 21 villagers in Wan-ch'uan-ssu, 117 *mu* by 17 residents of the county seat, and 27 *mu* by two residents of Mei-ko-ying village. In total, this amounted to 44% of the arable land of the village (CNKC 1:119).
9. Some households in the villages did not own land, but they pledged land in to cultivate. For instance *Tu Shou-t'ien*, a peasant in Sha-ching village, did not own any land, but he paid a certain amount of money to the landowner and got the right to cultivated 4.5 *mu* of land. At the same time he rented in 6 *mu* land (CNKC 1: Appendix Table).
10. Based on the interview record of *Chang Lo-ching*, the head of Ssu-peich'ai village, and other villagers, the Japanese investigator made a table

of Wang Tsan-chou's landholding. This table shows that the total landholding of Wang in Ssu-pei-ch'ai was 345 *mu*. On the other hand, Wang told the Japanese interviewer he held about 300 *mu* of land in the village. However, these data are inconsistent with the appended map of landholding in which is shown that Wang owned 294.5 *mu*. The actual landholding of Wang may have been even higher than 345 *mu*, because of the imperfection of the data (CNKC: 3:165, 177-178, and the appended map).

11. Here the term landlord means the person who basically relies on rent as their major source of income.
12. The absentee landlords of Hsiao-t'ien-chuang were the merchants in the market town, or they were peasants in the neighbor villages.
13. The square measure *mu* used in I-tu area was larger than the standard measure. One *mu*, also called *ta-mu*, or *lao-mu* equaled two standard *mu* (also called *shih mu* or *kuan mu*), and one standard *mu* equaled to 0.164 acre.
14. The total population of Hsiao-t'ien-chia-chuang during the investigation was 159, 82 males and 77 females. Among the male population 47.7% were over 16 years of age and under 56. If the age between 16 and 56 is regarded as family labor force, the total family labor force would be 39 (YCTL: 100-101). The total land cultivated in the village during the investigation was 131 *ta-mu* (YCTL: 93). One *ta-mu* equals to 2 *kuan-mu*. Therefore the total cultivated land of Hsiao-t'ien-chia-chuang was 262 *mu*.
15. Chayanov's theory indicates that peasant family is the unit for production and consumption. Under this circumstance profit maximizing is not the first issue that peasant concerns but how their subsistence can be met. Unless forced by the subsistence need, peasant will not increase their degree of drudgery to maximize their output (Chayanov: 1986).

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Abbreviation

CNKC Chūgoku nōsōn kankō chōsa.

YLTL Kenkyū Shilyō (Yen-chiu tze-liao) 1942. *Santō shō Kyōsai yenzen chihō nōnsōn no ichi kenkyū* (A study on the village along the Chiao-chi railroad in Shantung).

Glossary

Chang Lo-ch'ing 張樂卿

Chiao-chi railroad 膠濟鐵路

Chuang-ching 磚中

fen-chung 分種

Hsiao-chung-ho 小中河

The Small Peasant Economy in North China: Development or Underdevelopment?

Hsiao-t'ien-chia-chuang 小田家莊

Huo-chia-miao-tze 侯家廟子

I-tu 益都

Kuan-mu 官畝

lao-mu 老畝

lao-shih 老石

liang 兩

liang-tsu 糧租

Mi-yun Dam 密雲水庫

Lung-ch'eng 樂城

Lung-wang 龍王

Mei-ko-ying 梅溝營

Mu 畝

Pai Ho 白河

Pao Shih-ch'en 包世臣

Pei-kuan 北關

Peking-Hankow Railroad 京漢鐵路

Pie-yang river 北陽河

Sha-ching 沙井

Shih-chia-chuang 石家莊

Shih-chin 市斤

Shun-i 順義

Ssu-pei-ch'ai 寺北柴

T'u-ching 土井

Ta-mu 大畝

Tien-ti 典地

Tou-yü 豆樞

Tu Shou-t'ien 杜守田

Tu-chia-chuang 杜家莊

Tung-kuan 東關

Wan-ch'uan-ssu 萬泉寺

Wang Tsan-chou 王贊周

Yu-ch'ung 油蟲

Yuan 元

民國以來華北小農經濟變遷的形態： 成長或低度開發？

潘敏德

摘要

近年來，學者對於近代小農經濟的變遷模式，提出許多不同的理論。「成長派」的理論認為：小農經濟並非落後的生產方式。他們認為小農生產的方式其實具有相當大的成長潛力。一家一戶的小農是具有企業精神的經營者。只要外在的條件如：技術，資本能夠配合，小農經濟的前景是十分樂觀的。主張小農經濟導致「低度開發」的理論認為：受制於人口壓力，世界經濟市場體系等因素。小農經濟的前景是悲觀的。這種經濟的發展終會陷入邊際效率遞減的陷阱之中，形成貧困與低度開發的結果。

本文的宗旨係企圖透過華北的四個農村在民國二三十年的發展為例在檢討小農經濟的發展形態。在本文所採的四個樣本村莊為河北省沙井村，寺北柴村，山東省杜家莊，小田家莊。經過對比研究這四個村莊的生態環境，農作物形態，農產品商品化程度，以及土地關係之後，我們發現灌溉技術，技術革新，及土地所有形態（地租關係）是影響小農經濟成長與否的關鍵所在。在三者之中尤以灌溉為要。

本文中的四個農村僅有小田家莊因具備灌溉條件。在推廣，商品化作物（煙草）之後，農民充分運用其農家勞動力獲取較高的收益，逐漸擺脫地主的控制，成為自耕農。其他的三個農村或因灌溉不足（如沙井，杜家莊），或因租佃制度不合理（如寺北柴），農民始終無法擺脫貧困的陰影。最近的資料顯示，在沙井村中因灌溉條件的改善，農民已能有效地提高生產效率。