

Bridging the Urban-rural Divide? A Case Study on Rural Land Transition in Sichuan Province, China

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ABSTRACT. Rising concern over urban-rural economic disparity in China in the early 2000s spurred a series of policy initiatives to improve people's quality of life in rural areas. A recently launched Rural Land Transition Program in Sichuan Province aims to increase land-use efficiency and rural incomes by consolidating fragmented land plots under large commercial firms for agricultural production. In this paper, we document the scheme of implementation of the land transition project through the pilot case of Renshou Village in Sichuan Province, drawing attention to its contested premise. The paper suggests that the goals of achieving greater economies of scale in agricultural production and increasing rural incomes via land consolidation have met with mixed success.

KEYWORDS. *Rural land transition, land consolidation, urban-rural disparity, rural land reform, China*

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1. INTRODUCTION

At the turn of the 21st century, following more than two decades of near double-digit economic development rates in China's eastern seaboard and industrial cities under Deng Xiaoping's mantra that "after the rich become rich, common prosperity will reach all people," the lack of priority given to the development of rural and interior regions of the country has emerged as a major policy issue in China. The dual structures in place for development in rural and urban areas have led to disparities in incomes, poverty distribution, and populations that threaten to disrupt social and political stability in China's rural areas. Deteriorating conditions in the countryside have sparked concern over China's ability to maintain sustainable growth and the potential of regional economic disparity to undermine social and political stability.

In response to worsening regional inequality, China's policy makers turned their attention, beginning in the 1990s, toward equalizing development in China's interior and rural regions, and these efforts have been expanded since the early 2000s (Yao, 2008). At the important national conference held in March 2003, the National People's Congress and the Chinese People's Political Consultative Conference, central government leaders expressed concerns about rural incomes and regional income disparities. To address these issues, the Chinese government, during the 2005 National People's Congress, proposed the construction of a Harmonious Society, and ratified this concept as part of the Eleventh Five-Year Plan in 2006, reflecting the leaders' attempts to integrate societal balance and harmony into China's economic development policies (Fan, 2006; Wu et al., 2005). Following these proclamations, China's government took a new set of policy actions to bridge the urban and rural divide. Some goals of the rural development programs include the elimination of certain rural and agricultural/forestry taxes, improvements in grain supply management via agricultural subsidies, the expansion of the financial system to make credit accessible in rural areas, the establishment of more rural social security programs, and the advancement of comprehensive and coordinated rural-urban development projects through a series of land reforms to increase rural land-use efficiency.

This paper focuses on a recent pilot policy effort to reduce urban-rural disparity in the central province of Sichuan. The pilot project is a Rural Land Transition Program (RLTP), in which farmers forgo property rights and household-level operation of their small land plots, which are then consolidated and transitioned to large commercial firms for agricultural production. An underlying assumption of the program design is that low marginal output values in the agricultural sector can be attributed to the small-scale nature of farming in China. The RLTP was designed to introduce efficiency to rural communities with the basic premise that if farmers give their land rights to the village collective, and the collective consolidates land fragments into one large land parcel to be leased to a commercial agricultural firm, greater land-use efficiency can

be achieved. Based on this premise, the most important goal of the RLTP is to increase land-use efficiency and agricultural production levels via land consolidation. Other goals of the RLTP are to increase farmers' income and to urbanize villages by improving villagers' mobility and social security benefits. On a voluntary basis, villagers can relocate to a residential section of a neighboring rural industry park through housing programs and choose to work for the new commercial agricultural firm or for other firms. In addition, this program aims to substitute a social security system for the previous land security system developed under the rural land reforms of the late 1970s. Under this pilot project, local governments match each participating farmer's annual social security contribution and contribute to a fund supporting the farmers' retirement pensions.

The design of the RLTP is based on the supposition that land consolidation enhances productivity and helps to mitigate urban-rural disparity. However, related academic literature has shown no consensus regarding the relation between farm size and agricultural productivity. The debates in the literature thus lead to an interesting research question by which we can document this program: How effective was this program in achieving its stated goals of increasing agricultural productivity and, subsequently, increasing the livelihoods of farmers and levels of urbanization? In addition, there is a range of important questions related to this land-transition program: How was the program implemented? What are the impacts of the program on farmers? What are the program's preliminary outcomes? We examine the relationship between land consolidation, crop yield, and farmer income based on previous findings indicating that land consolidation, when coupled with technology-based farming practices, leads to higher crop yields and higher farmer incomes through increased time for off-farm work. We attempt to answer some of the above questions in this paper by employing a case study based on information we collected from Renshou Village, a site located in the Chengdu metropolitan area, to describe the pilot program on rural land transition.

In the following sections, we first review the literature on the economic and social implications of land consolidation in order to understand the debates in the literature regarding the relationship between farm size and agricultural yields. We then provide a structured documentation of the Renshou Village case and present the program based on a recent survey of pilot project participants. Finally, we discuss our findings and offer concluding remarks.

2. LITERATURE REVIEW

As mentioned above, the premise of the RLTP is that agricultural yields per hectare increase when farm size increases. We thus focus our literature review on studies exploring the relationship between land consolidation and land productivity. The arguments for efficiency

gains via land consolidation are grounded on two issues: First, land fragmentation in current rural areas negatively impacts agricultural practices, and second, land consolidation can increase economies of scale and result in higher agricultural and labor productivity. We thus focus our literature review on these two areas and comment on how our study contributes to previous works.

2.1. Studies on land fragmentation

China's household and small-plot farming agricultural structure formed the foundation of the rural land and social structure for much of China's history (Brandt, 1997). Following the move toward land consolidation into rural co-ops under Mao Zedong, land fragmentation was re-institutionalized in China as part of the 1979 land reform policies, which replaced the collective system with the household responsibility system (HRS). Under the HRS, farming households have user rights to plots of land but do not own them; they lease the land from the village collective for periods of up to 30 years. The initial land redistribution occurred in the early 1980s and divided land among village households based on land quality and land-plot size. Many household land apportionments consisted of non-contiguous plots and, at times, plots with significant distances between them.

Studies have shown that although the HRS greatly increased the efficiency of agricultural production when it was first introduced as a result of changes in individual farmers' incentive to improve yields (Huang, 1998; Lin, 1992), it also resulted in many problems. First, owing to China's large population and limited arable land, the system reinforced a high labor-to-land ratio policy, and thus minute operational scales for agricultural production (Davis et al., 2001; Fan and Chan-Kang, 2005). Furthermore, the distribution process under the HRS apportioned households multiple small non-contiguous plots of land. A survey conducted in 1984 showed that, on average, a farmer owned 0.56 hectares of rural land including 9.7 plots, with the size of each plot averaging 0.06 hectares. Studies have found that China's small farm-plot size and fragmented land prevents farmers from realizing economies of scale and leads to technical inefficiency (Brümmer et al., 2006; Carter and Estrin, 2001).

The impact of land fragmentation on agricultural productivity has, however, been widely debated. Some studies examining land consolidation projects found that less fragmented land parcels may improve agricultural productivity as it induces greater technical progress (Brümmer et al., 2006; Monke et al., 1992). Such findings suggest that small farm size and land fragmentation prevent households from realizing scale economies, thus leading to technical inefficiency. Wu et al. (2005) described the relationship between efficiency and land consolidation as arising from the following sources: First, decreased distances between

consolidated farm plots result in reduced labor time and lower costs for non-divisible assets such as fencing and irrigation equipment, and increased scale efficiency in fertilizer and land supervision. Second, land consolidation allows for adjustments in crop structure, seasonal planting, and thus improved land quality, resulting in increased land productivity (Dong, 2000).

On the other hand, some studies have argued that fragmented farming configurations carry certain social and private benefits. Because of high population densities (Bentley, 1987), the extensive labor requirements for producing crops such as rice, and other land-use characteristics, land efficiency losses due to fragmentation may be modest (Brümmer et al., 2006; Wu et al., 2005). Another study has suggested that a private benefit for farmers with multiple scattered plots of land is the reduced risk of total loss arising from natural disasters (Nguyen et al., 1996). Furthermore, fragmented land parcels allow farmers to diversify crop mixtures across multiple growing conditions (Blarel et al., 1995; Buck, 1964). Therefore, land consolidation efforts may result in a less diversified crop composition and higher risks.

2.2. Studies on economies of scale associated with land consolidation

China's agricultural sector is still dominated by very small farms that comprise land areas of less than one hectare. In 1997, 83% of China's farms were less than 0.6 hectares in size, whereas only 0.24% of farms comprised more than 6.6 hectares (Fan et al., 1999). Given the small-plot nature of China's agricultural sector, much debate on increasing efficiency focuses on the strengths and weaknesses of efforts to increase marginal output per land area, or economies of scale.

Debate on the relationship between farm size and productivity has been prevalent in agricultural discussions since the 1960s. Fan and Chan-kang (2005) reviewed evidence concerning the relationship between farm-size productivity and poverty in Asia. This meta-analysis supports the widely held notion that there is an inverse relationship between farm size and land productivity (Fan and Chan-Kang, 2005; Sen, 1962) and suggests that economies of scale under traditional agriculture may not be increasing. The benefits of small-scale farming include lower transaction costs due to the use of family labor (Berry and Cline, 1979; Raghbendra et al., 2000) and higher labor-to-land ratios compared to those of more industrialized farming operations.

On the other hand, some studies have suggested that during the agricultural transition toward more science-based farming methods, labor becomes less important for determining land productivity, whereas other inputs such as fertilizer and pesticides play a greater role (Fan and Chan-Kang, 2005). A study in India following the Green Revolution (Deolalikar, 1981), for example, found that the inverse size-productivity relationship cannot be rejected at low levels of agricultural technology but can be rejected at higher technological levels. Such findings suggest

that the developmental stage is important for understanding productivity. A body of work examining land productivity under various developmental conditions supports the view that although the inverse relationship between plot size and productivity remains valid for traditional agriculture, it cannot be assumed to remain constant for agriculture undergoing technological development (Chattopadhyay and Sengupta, 1997; Deolalikar, 1981).

Given the continuing debate over increasing land-use efficiency and economies of scale in agriculture through land consolidation, and considering the recent surge in attention to integrated rural and urban development in China, we turn our attention to a novel Rural Land Transition Program (RLTP) taking place in China's interior regions. This study presents a case of land consolidation wherein farmers do not retain their land rights. Both immediate and long-term aspects must be considered to evaluate such a program and to determine if similar pilot programs can present a viable option for widespread adoption. To date, no studies of the RLTP exist. The purpose of this article is, therefore, to fill a gap in the literature regarding the performance of this pilot program, based on the following three policy areas: increasing land-use efficiency through land consolidation, equalizing income levels, and urbanizing rural populations. Using a case study of one pilot project site in Sichuan Province, we document the performance of the program and provide insights into the further development of China's land transition programs.

3. CASE DESCRIPTION

This section provides a detailed description of the pilot program. First, we specify the details of this pilot program, including why we selected this particular case for our study. Then, we present details of the program's implementation. Finally, we describe the distribution of benefits among the parties involved after the program was established.

3.1. Program details

In 2004, the central government released a policy statement addressing steps with which the nation could attain greater urban-rural integration. The overall aim of the integration was to include rural areas in China's path of economic development. As part of this specific policy initiative, the central government targeted two western cities, Chongqing and Chengdu, as demonstration sites to pilot a number of programs aimed at relieving economic hardship in the countryside. These two pilot-project cities have undergone land system reforms similar to other regions in China. Following the founding of the People's Republic of China in 1949, leaders instituted a socialist-style collective land system. After 1978, a set of land and economic reforms

were launched nationwide which stipulated that collective lands be contracted to households (Ding and Song, 2005). Since then, economic reforms have brought enormous changes to urbanized areas, whereas rural and interior regions still lag in terms of economic development. The two basic tenets of the strategies to reduce rural-urban disparities in Chongqing and Chengdu are 1) to promote the urbanization of rural areas and 2) to experiment with different forms of land transition via China's rural land property right reforms (News, 2008).

Established in 2006, the RLTP pilot project is located in Qionglai City, 65 kilometers southwest of Chengdu's urban center (Figure 1). Qionglai is known to have fertile soil, good agricultural climate, sound irrigation infrastructure, and abundant natural resources such as water and timber. The pilot-program village is Renshou Village, located 11 kilometers from Qionglai city center, in the eastern section of the municipality. Renshou Village has 1,060 households and 3,587 people. To participate in the rural-urban integration program, Renshou villagers had to forgo rights to their land, which they had leased from the village collective, and transfer those rights back to the village collective on what is considered a voluntary basis. Of the village's 389.76 hectares of arable land, 306.8 hectares were transferred to the village collective for use in the pilot project.

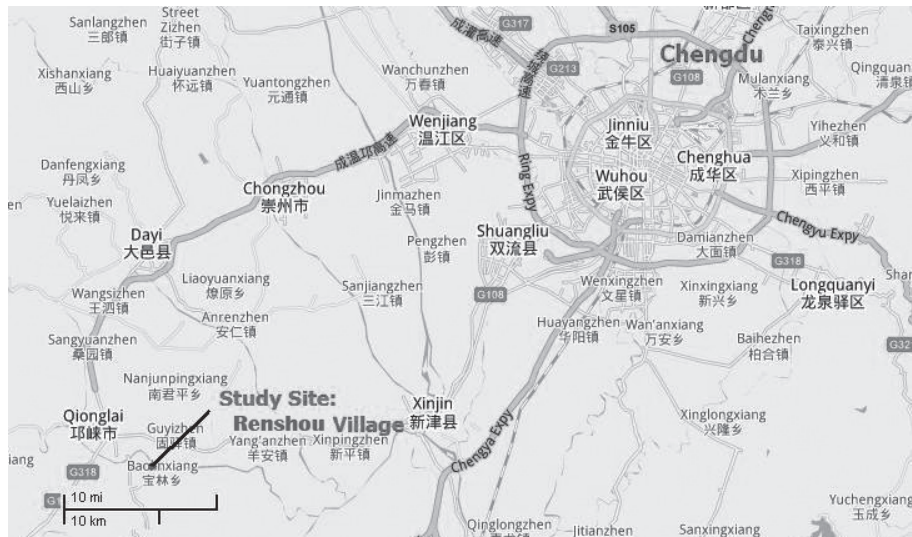


Figure 1. Location of Chengdu City and Renshou Village

We chose Renshou Village for our case study because it is considered to be representative of the villages in this region, and because it possesses a number of specific features. First, the village has an overabundance of people and an undersupply of land, leading to high farmer-per-

land-area ratios, low labor efficiency, and small on-farm incomes. Second, in addition to being under high land-stress from the demands of production, most farmers' land plots are not contiguous. Finally, owing to low on-farm incomes and the higher earning potential of city jobs, many farmers in the village have migrated to cities to work for most of the year, leaving their land plots underutilized.

Implementing the Rural Land Transition Program (RLTP)

Various parties are involved in the project: farmers, the village collective, a newly-established agricultural industry firm, and several governmental agencies. A schematic of the pilot project's organizational structure is shown in Figure 2.

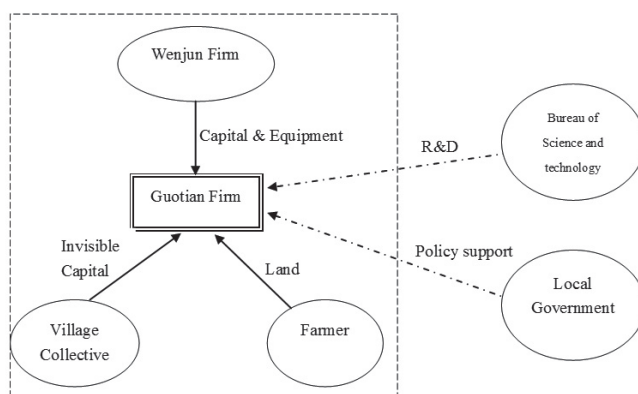


Figure 2. Organizational structure of newly established firm

To implement the program, all 1,060 village households had to agree to transfer their land back to the village collective, thereby allowing the collective to consolidate the village's land and negotiate a lease of the aggregated land with Guotian Firm, the pilot project agricultural industrial firm (described in detail below). The village collective's primary contribution and responsibility under the project guidelines was, therefore, to mobilize all households to participate in the program and to forfeit their leases on their historic household property. This was a precondition for the village's participation in the project, as the firm could negotiate only with the village collective leaders, rather than with individuals or households. Ultimately, all of the households participated in the land transfer agreement, with 306.8 hectares of arable land rights transferred to the village collective. Following the land rights transfer, land plots were consolidated into a single large farm with the aim of increasing land- and labor-use efficiency on the village land, which would free labor for non-farm jobs and lead to higher incomes and urbanization. The

assumption is that the consolidation of land minimizes the input of labor, machinery, fertilizers, and irrigation channels, thus increasing economies of scale and production efficiency.

At the same time, an industrial agriculture firm, Guotian Firm, was established by a privately held firm, Wenjun Firm. Guotian Firm was formed as a partnership, with 70% of the shares held by Wenjun Firm and 30% held by the village collective. Guotian and the village signed a 20-year land-use lease. A stipulation of the land transfer agreement is a binding commitment of the new firm to continue to produce a minimum volume of rice to fulfill the village's state grain quota. However, during non-rice seasons, the firm is free to diversify its crop portfolio and produce higher-profit specialty cash crops, such as specialty mushrooms, melons, sweet potatoes, and garlic.

Two additional government agencies are involved. The Chengdu Bureau of Science and Technology provided start-up capital and technical assistance, and the local Qionglai City government participated in the planning and implementation of the policy and the project. The total amount invested was 8.5 million RMB (approximately 1.25 million USD), of which 6 million RMB (approximately 0.88 million USD) was contributed by the Chengdu Bureau of Science and Technology to support research and development in pilot projects and the remaining balance provided by the privately held agricultural processing firm. Since the project focuses on scientific research to support agricultural and land transition development, with technical assistance from the Chengdu Bureau of Science and Technology, Guotian Firm established twenty hectares of village land as an agricultural demonstration district, where modern farming and irrigation equipment, cutting edge fertilizer and seed application methods, and recent agricultural science farming techniques were installed.

3.2. Distribution of benefits among parties after establishment

Under the pilot program, the newly established Guotian Firm has access to land for production and retains 70% of the firm's profits, whereas the village collective receives the remaining 30% of the profits. Farmers receive land rents, increased mobility, off-farm employment opportunities, and social security incentives. Specifically, Guotian Firm expands from its previous focus on the value-added processing of crops to include both agriculture and value-added processing. According to the development plan, the firm can increase profits for shareholders by developing production techniques for higher-value crops and increasing production efficiency on the village land.

The secondary Guotian Firm shareholder is the Renshou village collective. Renshou village collective benefits from the pilot project in two main ways. First, the 30% share of Guotian Firm's profits that the village collective receives goes toward its general fund to be re-invested in

village collective enterprises and to fund village-level services such as education, health, and infrastructure.

Renshou Village residents can benefit from the program in several ways as well. First, villagers are provided with relocation subsidies in order to be relocated to nearby residential communities. Second, each land-contributing household receives an annual land rent dividend, calculated based on the value of their previously held land plot's agricultural yield value from approximately one mu of land (0.067 ha). For illustration purposes, we estimate the value of 800 kg/mu of grain at 600 RMB (88.33 USD) per mu per year, based on the 2006 market price of rice. Third, for those farmers already working in other cities, the land transition program frees their obligation from the labor requirements of maintaining household farm plots.

Adding to the complexity of the story is the system of social security payments, composed of contributions made from several public and private sources to the villagers. There are three main sources for each farmer's social security fund: the village collective, the local government, and the individual villager. First, from its own funds, the village collective pays 201 RMB (29.44 USD) annually per villager to each villager's social security fund. Second, the local government matches the village collective contribution with another 201 RMB (29.44 USD) annually per villager. Third, the villager is required to make an annual payment of an additional 201 RMB (29.44 USD) to their own fund. A second farmer-derived payment exists, which is related to the farmer's annual land-rent dividend. Of the 600 RMB (88.33 USD) owed to the villager as their land-rent dividend (minus the 200 required personal social security contribution), the farmer has the option to contribute the remainder of the land-rent dividend (400 RMB, 58.58 USD) to their personal social security fund. Only if the farmer chooses to do so will he receive the 201 RMB from the village collective. That is to say, if the villager decides to receive his land rent payment in cash instead of putting it in his social security fund, he loses the 201 RMB contribution from the village collective. The social security contributions are redistributed back to the villagers as pensions upon their retirement.

Based on the above program description, two key factors are promoted as contributors to the program's long-term benefit flow. First, the creation of increased employment opportunities for villagers at Guotian Firm and in the nearby industrial park provides some employment security for villagers. As employees, villagers transition from earning land-based incomes to wage incomes. Second, the dividend payment to farmers who contribute land ensures villagers a minimum guaranteed income threshold. By agreeing to contribute their land rights, each person is entitled to an annual dividend generated by the Guotian Firm and distributed by the village collective. Although employment at Guotian firm is not guaranteed, many non-migrant farmers work at Guotian for a fixed daily wage (20 RMB/day). Because of the characteristics of those who remained in the village, the Guotian labor force consists mostly of older residents (those in

their 40s and 50s) who work in low-skilled labor positions. The firm reports that it hired approximately 20% of the in-residence village labor force.

4. SEVERAL INDICATORS OF THE PROGRAM AFTER ITS IMPLEMENTATION

In this section, we present a set of indicators of the pilot program based on data collected in a survey of farmers, village leaders, and firm owners in 2007, one year after the program was implemented. In 2009-2010, we interviewed the firm owners again for an update of firm earnings and agricultural output details. For the 2007 survey, we used a number of data collection and interview techniques. First, we surveyed 38 farmers in the program to gather information on income, crop yield, and other livelihood characteristics before and after the pilot program. The sampling approach for the farmer survey involved stratifying the population by income and randomly drawing respondents based on income group. We also interviewed village leaders and Guotian Firm owners about the project's organizational structure, implementation, earnings, and agricultural output. We structured our preliminary analysis of the program based on whether the goals of increasing land-use efficiency and agricultural output (both in volume and value), improving farmers' livelihoods, and expediting urbanization have been met.

- Increased land use efficiency and agricultural output

Based on the crop yield data we collected from firm owners, we tried to determine whether the consolidated farm performed better than the previous fragmented small-household plot system boosting agricultural output. We considered two facets of agricultural output: agricultural yield per unit of land and net crop value. Overall, agricultural output results were mixed. On the one hand, net grain profit decreased post-implementation for rice crop, but yields and profits in specialty cash crops increased.

In 2007, one year after the land transition program began, rice yields in Renshou increased by 11.7%, whereas in the greater Chengdu area, rice yields increased by only 9%. Furthermore, the rice crop value increased, indicating an increase in crop quality and a higher value yield. However, the survey results from 2009 indicate that crop productivity for Guotian, after two years of planting, took a different turn. Despite the success of the rice yield, rice crop profits declined by 406,000 RMB (\$59,456 USD) in 2009. The 2009 rice crop net loss is largely attributed to inefficient management practices of the new firm, high production costs from using new technologies, and high labor costs brought on by the guarantee hire policy, wherein the firm must retain 20% of the villagers as employees. Under the program, crop diversity increased as the firm moved toward higher margin specialty cash crops. Six cash crops, including sweet potatoes, mushroom varieties, and carrots were planted in 2006 by Guotian Firm on over 65 hectares of cultivated land. Use of green production techniques lessened the requirement for

fertilizers, which decreased input costs and also residual damage to the soil and surrounding water channels.

Considering the net effect on crop output for 2009, losses in the rice crop were quelled by the large profits reaped from the cash crop profits. The six cash crops harvested had a value of 1.79 million RMB (approximately \$262,000 USD). Thus, annual agricultural net profit increased by over \$200,000 between 2007 and 2009.

- Increased livelihoods for rural households

We evaluated the program's livelihood outcomes by examining the sample farmers' responses to questions regarding changes in income and income distribution. We asked villagers to report details of their income to allow for pre- and post-assessments of the program.

Based on results from the survey and interviews in 2007, we found that overall, farmer income did increase and income sources did diversify after the project's implementation (see Table 1). After the program began, the average farmer's annual income increased 14.9%. Income sources included crop income, migration remittances, family enterprise income, social security income, and wage labor. Both before and after the program began, wage-based income comprised the majority of household incomes, 54% in 2005 and 64.4% after the program's implementation in 2006. It is important to note that the main increase in average income comes from the category of wage labor income, which increased 37% between the two years. The composition of income shifted, with crop income equaling zero in 2006.

Table 1. Average Renshou Village annual per capita income and composition

	Total Income	Agricultural Income	Non- agricultural Wage Income	Household Enterprise Income	Other Income	Land Property Income
Per capita						
2005 (pre- program) income (RMB)	2761.2	701.56	1492.36	532.29	35	0
(%)	100	25.4	54	19.3	1.3	0
Per capita						
2006 (post- program) income (RMB)	3171.3	0	2042.5	407.64	98.85	622.35
(%)	100	0	64.4	12.9	3.1	19.6

We also gathered information on the composition of wage labor income (see Table 2). Average local labor wage income increased by more than twofold annually, largely owing to the increased

time for off-farm work after the villagers forwent their household farming responsibilities. This average includes income from Guotian Firm and employment wages from other local firms. Although migrant labor income increased, it decreased as a share of total income between the two years, indicating increased local employment.

Table 2. Changes in wage-derived labor income, pre- and post-Rural Land Transition Program

		Total Wage Income	Local Wage Income Including from Guotian	Guotian Firm Income, Part of Local Wage Income	Migrant Labor Wage Income
	Per capita				
2005 (pre- program)	income (RMB)	1492.4	168.75	0	1323.61
	(%)	100	11.3	—	88.7
	Per capita				
2006 (post- program)	income (RMB)	2042.5	510.6	(221.7)	1531.9
	(%)	100	22.5	(9.8)	67.7

The survey results for evaluating income social equity gains indicate changes in the distribution of income among different groups of village residents. We evaluate income equity based on how program benefits are distributed among and between different groups of villagers. Equity appears non-uniform in its distribution among villagers with different income and skill sets, and the results suggest a shift away from the uniform pre-program income distribution toward a more uneven income distribution among farmers. One group benefitting from income gains under the program are villagers already working in the cities. They gain from this program because they do not rely on land for income and are now free from maintaining land plots, while also obtaining additional social security and land rents. Other villagers benefitting from the program are the older residents and the infirm, who had very limited income before the program, as they could not participate in the migrant economy and struggled to increase agricultural returns from their land plots. Under the program, the older residents could obtain social security and land rents. The group left behind, however, are residents in their 40s and 50s, who earned modest agricultural incomes before the program and, after the program, are left with land rents and low-wages earned from working at Guotian Firm as their sole income sources if they elected not to participate in the social security program. According to their interview responses, these villagers have difficulty participating in the migrant or local employment sectors after the program's implementation

because the group contains low-skilled workers who can work in Guotian's fields or in the processing facility for very modest hourly wages. After negotiations between the village collective and Guotian Firm, it was decided that villagers in this group would be employed by the firm, which, under its financial structure, must include 20% of this group of villagers as part of its fixed work force. According to the firm, this is perhaps one factor hindering Guotian Firm's ability to operate profitably following two years of the RLTP program.

- Expedited urbanization of village residents

According to the program plan, indicators of urbanization include the increase in mobility and non-agricultural wage income of village residents. Evidence of allowing greater work force mobility appears in our survey results. As mentioned above, the shift in composition of income to higher wage labor earnings suggests increased off-farm obligations and mobility, which contribute to higher incomes.

Nevertheless, it is necessary to note that within the Chengdu area between 2005 and 2006, the urban to rural income gap did not change significantly (See Table 3). Average incomes increased for both urban and rural residents, but the gap between the two groups decreased by only 1%. Even following the implementation of the pilot project, the incomes of Renshou Village residents grew at a lower rate than the incomes of urban residents.

Table 3. Chengdu City urban and rural residents income disparity (2005-2006)

	2005 (pre-program)	2006 (post-program)	2005 - Rural Income as Percent of Urban Income	2006 - Rural Income as Percent of Urban Income
Chengdu City resident per capita income (RMB per person)	11,359	12,789		
Renshou Village resident per capita income (RMB per person)	2,761	3,171	24%	25%

5. DISCUSSIONS AND CONCLUSIONS

Rising concern over urban-rural economic disparity in China in the early 2000s spurred a series of policy initiatives to increase rural people's quality of life. China's government has launched a series of rural land reforms to increase land and labor efficiency by consolidating land plots and industrializing agricultural production. To address rural residents' long-term security, the reforms

also provide that in lieu of land-based income and residential security, farmers may participate in social security and housing programs. In this paper, we present a case study of Renshou Village, one pilot RLTP, to illustrate details of its implementation and to examine if alternative land use programs could increase crop per land unit productivity and raise farmers' incomes. Renshou Village is a representative village with fallow plots of land, low rates of labor-to-land productivity, and generally low crop productivity levels. By focusing on this typical village, research results are valid for understanding the impacts of such land transition programs in similar locales. Although case study findings have limited external validity, the representativeness of Renshou Village increases the transferability of findings. In addition, the main purpose of this paper is to document this important program, discuss its development, and provide a preliminary discussion of the program in terms of its design, implementation, and outcomes. Future studies need to investigate a sample of such programs to evaluate determinants of program success in a more rigorous manner.

Following the implementation of the Renshou pilot program, the long-term aims of the RLTP include expanding the program to other locales within Chengdu Prefecture in order to scale up and transfer operational expertise beyond the pilot site. Given the experimental and complex nature of the pilot program, evaluating the program over time and monitoring its performance and adherence to its original goals will help improve the program and tailor it to other sites.

According to the data we collected, the RLTP's goal of achieving greater economies of scale in production through land consolidation has been met with mixed success. For the primary village crop rice, there was only a modest gain in production efficiency following land consolidation. This result is consistent with those reported in previous literature, which demonstrated that economies of scale are modest for rice growing (Brümmer et al., 2006; Wu et al., 2005). We note that although rice yields did increase modestly, high marginal labor costs and other managerial inefficiencies led to a decline in rice-crop net returns. On the other hand, the large and diverse cash crop yields suggest a positive land-size to crop-yield relationship when technology-based farming practices are used, as was found in previous studies in China and India (Chattopadhyay and Sengupta, 1997; Fan and Chan-Kang, 2005; Deolalikar, 1981).

The impact of land consolidation on cash crop yields in Renshou Village supports previous findings on the role of farming technology in achieving a positive relationship between land size and land productivity. In this case, although rice crop profits fell following land transition, the newly introduced cash crops produced bumper yields and contributed to overall farm profitability. The introduction of modern farming and irrigation equipment, experimental fertilizer and seed application methods, among other techniques, helped increase cash crop yields. The introduction of technology on consolidated land plots led to greater quantities and a higher quality of crops per hectare, which is attributable to better crop rotation, a simpler

application of technology for soil and water management, and greater ease in moving equipment over a single farming area. Sources of gains in profitability for the cash crops can be attributed to the marketing and sales expertise of Guotian Firm, which expanded sales well beyond the farmers' existing supply chain by leveraging the firm's network of buyers and clients to reach new marketplaces.

The land-use efficiency gains of this program will benefit villagers through freed up time to engage in wage-labor work, contingent on off-farm work availability. As noted in the literature, the phase of technological development leads to freed up labor requirements (Wu et al, 2005), but off-farm work opportunities are critical to how land use efficiency leads to overall rural development gains. So long as technology continues to sustain high yields and villagers can work in the wage-economy, the program will have the intended results. Economic downturns and high unemployment rates will undermine the success of this type of program to reduce urban rural disparities.

Overall, we found that the long-term sustainability of the RLTP depends on at least two factors: maintaining profitability by the commercial agricultural firm and ensuring that all groups of farmers benefit from the program. Based on the evidence gathered from this case, the ability of Guotian Firm to operate profitably is questionable. First, the firm relied heavily on a large startup capital and support from the government for its first three years of operation. The firm's ability to maintain a stable revenue stream and to contain expenses will be necessary conditions for the program's success. Second, poor management and high labor costs have already contributed to a negative profit margin. Without instituting training programs wherein workers can learn new farming techniques and use new technology, the marginal productivity of labor will remain low and continue to cut into the firm's revenues as inflated labor expenses.

To improve the long-term viability of such projects, contingency plans should consider how the system can be transferred to another firm in the event where the firm is mismanaged or goes bankrupt. Ultimately, it is necessary to insure that the program remains financially solvent to provide employment opportunities and generate a revenue stream to meet social security payment obligations. Furthermore, the pilot project must be designed in such a way as to insure that all groups will benefit from the program if its goal is to achieve long-term success. For the group that is left behind, such as those residents in their 40s and 50s who rely on land rents as their sole income source if they elect not to participate in the social security program and who are excluded from the migrant and local employment sectors, tailored training programs are needed to secure employment and provide support in the process of urbanization.

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