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**Economic drivers of contemporary smallholder
agriculture in a transitional economy: A case
study of Hu Village from southwest China**

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Economic drivers of contemporary smallholder agriculture in a transitional economy: A case study of Hu Village from Southwest China

Abstract:

Based on an in-depth case study of a rural community, this paper documents the contemporary state of Chinese smallholder agriculture and the changes that it has been experiencing in the context of dramatic socio-economic transition through the lens of three main economic drivers (i.e., livelihood diversification, market conditions, and government interventions). Results reveal that the change in Chinese smallholder agriculture has been complex and multi-dimensional. All three factors exert profound influence and shape the current state of Chinese agriculture. Massive rural-urban migration has resulted in labour shortages which in turn have led to a reduction in agricultural diversity and land-use intensity, and a shift from traditional labour-intensive technologies to modern capital-intensive technologies. However, due to well-developed agricultural markets, input use levels are similar across farmer categories (such as income diversification) which have helped to maintain productivity. Furthermore, a reduction in profits from farming due to increasing input prices and decreasing output prices has exerted pressure on smallholders to increasingly turn to non-farm activities and has also triggered a thriving informal land transfer market which was previously non-existent. Policy implications include the need to strengthen local economies, improve market conditions, invest in rural infrastructures and facilitate smallholders' mobility.

Key words: China, smallholder agriculture, livelihood diversification, market conditions, government interventions, transitional economy.

1. Introduction

Smallholder agriculture has long dominated in the majority of developing countries, especially in East and South Asia and Sub-Saharan Africa (Lipton, 2010), with nearly 500 million farms worldwide being less than two ha (Wiggins *et al.*, 2010). Moreover, farm size has been continuously falling since the 1960s driven by population growth, technological progress (e.g. Green Revolution), thriving non-farm employments, and smallholders' risk management strategies (Lipton, 2010). Smallholder agriculture has made a considerable contribution to global poverty reduction (Hazell *et al.*, 2010), and its long-term persistence indicates its ability to survive (Lipton, 2010). Nonetheless, substantial evidence has demonstrated that large-scale capitalist agriculture has gained remarkable progress by means of various approaches in developing countries, and smallholder agriculture is confronted with enormous challenges and pressures (Hazell *et al.*, 2010). Within this context, in recent debates on the driving forces of smallholder agriculture, three dimensions have been identified: rural-non-farm economy, market conditions and government initiatives (Wiggins *et al.*, 2010; Hazell & Woods, 2008).

Apart from the two decades of collectivization in the Mao era, Chinese land has been constantly dominated by smallholder agriculture (Netting, 1993; Huang, 2010). Particularly, after the epoch-making rural reform in 1978, smallholder agriculture has retained its vigour and contributed immensely to food production and rural development in China (Gulati & Fan, 2008). To date, China still has more than 500 million farmers that work on small farms of less than one ha (NSBC, 2012). Against this backdrop, the paper utilizes both qualitative and quantitative data to document the changes in and contemporary state of Chinese smallholder agriculture through examining three economic drivers, i.e., livelihood diversification, market

conditions and government interventions. Understanding the economic drivers of Chinese smallholder agriculture is important in the present day because both the media and academia have recently raised grave concerns regarding a crisis of smallholder agriculture in China driven by massive non-farm employment, and an argument used in both policy and academic spheres for reform towards large-scale capitalist agriculture.

While fully aware of the necessity of 'looking beyond the economic' factors in investigating agrarian change as socio-cultural dynamics also significantly influence farmers' agency (Rigg, 2001: 121), to better link with literature, this paper sets the discussion within the economic domain. The remainder of the paper is organised as follows. Section 2 provides a brief review of theoretical debates regarding agricultural change and then the change trajectories and current state of Chinese smallholder agriculture. Section 3 describes the methodology used in this research and Section 4 presents the results. Finally, Section 5 provides some conclusions and draws policy implications.

2. Agricultural change and Chinese smallholder agriculture

Many of the current theoretical debates on the processes driving agricultural change derive from the seminal work of Esther Boserup (1965) which established the relationship between population density and agricultural change in primitive agricultural systems. Boserup's model has been criticized for its simplicity, and multi-faceted forces as drivers have been brought into the debate of agricultural change, including economic growth, social institutions, political factors, cultural repertoire, and globalization (Stone, 2001; Brookfield, 2001; Rigg, 2001; Ploeg, 2008; Birch-Thomsen *et al.*, 2010). Studies have illustrated that agricultural change may involve

multi-dimensional and often parallel processes, not only labour-driven intensification, but also technology-driven intensification (Ploeg, 2008; Ploeg *et al.*, 2013). As Brookfield (2001) rightfully contends, driven by livelihood diversification, agricultural change has taken multiple pathways so that 'intensification' alone can never fully capture the complexity of the processes involved. He highlights the capability of smallholders and further argues that the key for survival and successful change of smallholder agriculture has been adaptation and innovation of smallholders. Echoing with Brookfield (2001), in the context of Asian deagrarianization, Rigg (1998) finds that both intensification (of modern input) and disintensification (of labour input) have occurred in Asian agricultural change. The theory of agricultural change so far has underscored at least two points. First, agricultural change is complex, diverse, and multi-path. Second, agriculture is context-dependent, and the embedded socio-economic and political institutions can lead it to diverse changes.

Chinese smallholder agriculture has also experienced profound changes alongside the country's socio-economic transition. In his analysis of agricultural change in Yangzi Delta, Huang (1990) finds a steady labour-driven intensification process from the 1300s to the 1980s driven by high density and long-standing growth of population, which he terms as 'agricultural involution'. To satisfy the food demand of an expanding population, smallholders invest more labour in per unit of land to achieve overall output growth, but the returns of output per unit of labour used keep diminishing. This labour-intensification thus leads to 'growth (in terms of output) without development (in terms of labour productivity)'. Also, the prevalence of agricultural involution in pre-reform China has resulted in persistent resistance to large-scale capitalist agriculture as all family members can be absorbed into agricultural production, and thus hinders the development of hired labour market.

However, propelled by massive rural non-farm employment since the 1980s, Huang (2010) further asserts that Chinese smallholder agriculture has experienced de-involution, characterised by massive labour withdrawal from farming and an increase in labour productivity, which is considered as 'genuine development'. Indeed, the employment readjustment since the 1980s has reduced the Chinese agricultural population sharply from about 70 per cent of the total labour force in 1978 to 38 per cent in 2009 (Carter *et al.*, 2012). Simultaneously, as found in broad Asian contexts (Rigg, 1998), an increasing intensity of capital put, or capitalization, of smallholder agriculture has been also identified in China (Huang *et al.*, 2012). Be that as it may, under the context of contemporary de-involution, intensification by smallholders is still happening in China. For example, Ploeg *et al.* (2013) find six patterns of labour-driven intensification in two villages in northern China. This, again, in the context of China, affirms the conclusion that agricultural change is complex and multi-dimensional. Bearing the theoretical debates in mind, this paper applies both historical and cross-sectional data to interpret the changes in and contemporary state of Chinese smallholder agriculture at the local level through the prisms of livelihood diversification, market condition and government initiatives.

3. Methodology

3.1 Study area: the Hu Village

'Village study' has long been employed by social scientists to explore agrarian change, as 'the village' is considered to be 'a social, economic, bureaucratic, and eco-spatial container that conveniently encapsulated the transformations that scholars sought to illuminate and explain' (Rigg *et al.*, 2012: 5). However, this container is not isolated, but dynamically interacts with external forces. As Murdoch

and Marsden (1994) argue, rural communities (in the UK) can be considered as 'meeting points' where particular sets of economic, social and political processes intersect. In the context of China's transition, villages record the process of various external forces infiltrating rural society, and thus 'village study' is a powerful tool to understand the change in rural society driven by macro forces and to connect the micro with the macro (Di, 2009). Aiming to investigate how a set of forces exert influences on agricultural production, a 'village study' can be an appropriate approach. Be that as it may, as Rigg *et al.* (2012) further argue, no 'typical' village can be found to represent the agrarian change of a whole country. Rather, a village case study can be utilized to speak to wider changes as any specific village is nested in a national and regional context.

The case study area is Hu Village situated in Qingshen County, Sichuan Province in southwest China (see Figure 1). Hu Village is a large administrative community with 882 households (2938 residents) in 2010. The landscape of Hu Village is mixed with hills, flat land, and mountains. Situated in a subtropical monsoon humid climate, the average temperature of this region is 17.0 °C, very favourable for wide variety of crops including rice, wheat, corn, rapeseed, sweet potato, citrus, tea, etc. Hu Village is a genuine smallholder community with per capita cultivated land of 0.05 ha or 0.2 ha per household. Besides general crops like rice and rapeseeds, cash crops like citrus and mulberry have been long prevalent in Hu Village. Agricultural production in this region is large 'semi-subsistence', with rice and rapeseeds mainly for home consumption, and fruits and forest trees for commercial use. Moreover, the livelihoods of Hu villagers have been dramatically diversified in recent decades.

[Figure 1 about here]

According to multi-level official statistics, the income level of Hu villagers is slightly higher than the average of Qingshen County and that of Sichuan Province due to its flourishing migration economy. According to the village statistics, more than 70 per cent of residents aged between 18 and 45 worked in cities in 2010. Other income sources include local enterprises and a range of self-employed enterprises. Furthermore, agricultural (both input and output) markets have substantially developed in this region, and to facilitate agricultural modernization and improve smallholders' income, numerous development programs and policies regarding agriculture have been implemented. Therefore, Hu Village can be seen as a 'meeting point' of various forces influencing agricultural production, and thus suits the purpose of this research, to investigate the economic drivers of Chinese smallholder agriculture at the local level.

3.2 Data collection methods

This study utilized a mixed-methods approach, which combines both quantitative qualitative methods. The main author spent six months residing in Hu Village from March to September 2012. First, the village was divided into eight individual groups according to differences in landscape and socio-economic characteristics. Then an in-depth questionnaire survey was conducted adopting a cluster sampling strategy to avoid any geographical or socio-economic bias, with 30 households selected randomly from each group. Out of a total of 240 samples, a total of 225 households (covering 854 residents) were successfully surveyed using face-to-face interviews. The survey included questions on family demographic characteristics, land use practices and attitudes towards land transfer, inputs used and outputs derived from agricultural production, information on livestock enterprises, and off-farm economic activities and income earned. The information focused on the activities for the year

2011. In addition, 33 key informants were selected for in-depth interviews from a range of actors including five village cadres, five experienced farmers, ten migrants, three government officials (from the agricultural department), five agricultural marketers, and five non-farming residents. Of these, three village cadres and two government officials were interviewed three times for information on the implementation of agricultural policies. Historical data of agricultural and rural community change in Hu Village was also collected through in-depth interviews with village cadres and experienced farmers.

3.3 Household classification for analysis

Comparing the attributes and performances of different households using a livelihood perspective is a common approach to examine whether farmers' livelihood strategies influence agriculture (Kilic *et al.*, 2009; Qin, 2010). This study uses two cross classifications of rural households: (a) according to job types (a qualitative classification), i.e., farming, local non-farm diversification and migration (Démurger *et al.*, 2010); and (b) by degree of specialization in non-farm activities (a quantitative classification) (Kilic *et al.*, 2009), i.e., dedicated farming households (<20 per cent of total income from non-agriculture), I part-time farming households (20-49 per cent), II part-time farming households (50-80 per cent) and non-farming households (>80 per cent). These categories were used because most studies adopt only one classification, which may overlook the complexity of rural households. Table 1 presents distribution of the sample households according to the classification used in this research.

[Table 1 about here]

As can be seen from Table 1, the overall pattern of Hu Village is largely in accord with that of Sichuan Province, part-time farming households are the majority with substantial overlaps across classification types, thereby justifying a comprehensive cross-classification. The non-parametric Kruskal Wallis test is used to test significant differences amongst household categories with respect to several indicators of interest as appropriate.

4. Results

4.1 Livelihood diversification and smallholder agriculture

Livelihood diversification is one of the most notable characteristics of rural China alongside its recent socio-economic transition (Fan, 2008; Ploeg & Ye, 2010; Huang, 2010). The non-farm employment of Chinese smallholders took off from the 1980s with a rapid growth rate. Only 20 per cent of rural labour force undertook non-farm activities in 1988, growing to 41 per cent by 1995 (Rozelle *et al.*, 1999), and to 62 per cent by 2009 (Carter *et al.*, 2012). Among non-farm employment, rural-urban migration is the most pronounced and rapidly growing non-farm activity in China, from 35 million in 1990 (Fan, 2008), to 158 million in 2011 (NBSC, 2012). Sichuan Province is the leading region for migration in China, with nearly 22 million in 2011, amounting to almost 15 per cent of migrants nationally (NBSC, 2012).

Similar trends have also been reflected in Hu Village. Although no historical records exist, interviews indicated that livelihood diversification of Hu villagers commenced from the middle 1980s. In the beginning of the 1980s, land reform had just finished, and at that time, as an old village cadre remarked, 'every household concentrated on agricultural production, and almost no one went out'. This pattern was seen throughout China, and significantly contributed to the boom of Chinese

agricultural production in the early 1980s. Hu Village farmers started to take up large-scale non-farm employment in the 1990s. It is important to note that the process is not unilinear, and many farmers also returned from non-farm sectors to farming, from cities to the village. However, the primary tendency has been rural-urban migration and other local non-farm employment. As Table 2 shows, in 2011, only 36.3 per cent of adult villagers conducted agricultural production exclusively, with the majority (63.7 per cent) undertaking other economic activities, indicating a highly diversified portfolio of Hu Village smallholders today. This also suggests a process of agricultural de-involution, i.e., increase in labour productivity within the context of labour withdrawal from agriculture. Moreover, Table 2 also shows that migration is the most popular non-farm activity, taking almost half of the non-farm employment (30.8 per cent out of 63.7 per cent). Other local non-farm activities (self-employed individual and employee in local enterprises) have been also thriving (22.4 per cent in total).

[Table 2 about here]

These multiple job holdings of smallholders diversify household income sources. Table 3 shows that in Hu Village, agricultural income accounts for 38.9 per cent of total household income while non-agricultural income accounts for 61.1 per cent. This compares with the findings by Reardon *et al.* (2007) that the non-farm share accounts for 35–50 per cent of total household income in 54 developing countries, with Asia at 51 per cent (excluding China). The case of Hu Village also reveals that agriculture has become quite marginal in smallholders' income patterns. Clearly, migration is the most significant income generating activity for Hu Village households (40.8 per cent) while local non-farm business and employment accounts for only 20.3 per cent of total income. This explains why Hu Village has a much

higher non-farm share of rural income and contrasts with an Asian average of 11 per cent from remittances and up to 40 per cent from local non-farm business and employment (Reardon *et al.*, 2007). Moreover, the historical data for Sichuan Province given in Table 1 shows that rural households have kept moving towards further reliance on non-farm activities as non-farming households keep increasing. Interviews for this research also confirmed similar trends in Hu Village.

[Table 3 about here]

The results also show that 98.7 per cent of the sample households conducted agricultural production, suggesting that although most rural households increasingly rely on non-agricultural income, agriculture does remain critically important to rural livelihoods in China. Moreover, 83.6 per cent of the sample households received incomes from both agricultural and non-agricultural sources, as similarly found in a north China village (Ploeg & Ye, 2010). Also, Deininger *et al.* (2012), using a national sample (including Sichuan) in 2008, note that 64 per cent of households in rural China are economically diversified. Therefore, it is evident that for Chinese rural households, diversification has become a prevailing and dominant strategy, as seen in other developing countries (Davis *et al.*, 2010). The next section explores the impacts that livelihood diversification has had for smallholder agriculture.

4.2 Livelihood diversification as driving force of smallholder agriculture

The influence of livelihood diversification on smallholder agriculture is analysed through three aspects: agricultural productivity, land-use patterns and use of modern technology. It is interesting to note that although there are some visible differences in crop productivity and income across categories, the differences are not significant (Table 4).

[Table 4 about here]

As Table 4 indicates, although households divert their labour into various livelihood options, their agricultural productivity is similar to that of dedicated farmers. This finding is consistent with Xia and Luo (2012) reporting on Hubei Province, China. The main reason is probably due to the application of similar level of balanced fertilization by household categories although the source is different (i.e., chemical fertilizer vs organic manure). Taking the most important crop, rice as the example, through comparing the input levels among different household groups, results show that dedicated farming households used significantly less chemical fertilizers ($p < 0.05$), but at the same time, used significantly more manure ($p < 0.05$). Similarly, the migrant households applied significantly more chemical fertilizers, clearly attributed to a labour shortage, as compared with non-diversified households ($p < 0.01$) who in turn applied significantly more manure ($p < 0.05$), due to a relative abundance of labour. Results also show that the input pattern of households with only local non-farm activities is quite similar to that of households without job diversification, which indicates that local non-farm employment does not change the labour and material input use patterns of smallholder agriculture. Therefore, substitution between labour input and capital investment is the main reason that agricultural productivities are maintained across the board. This finding challenges the 'farm credit model' that non-farm activities release credit constraints on farms and lead to a higher productivity amongst diversified households (Davis, *et al.* 2009). In the Chinese case, given the minimum farm size, credit constraints have been largely overcome by long-term income growth driven by diversification. Very few farmers in Hu Village reported that they face credit constraints on farming. Nonetheless, according to the interviewees, the overall productivity at present is not the highest. Almost all farmers agree that productivity at the beginning of reform was the highest, when every

household cultivated land carefully and diligently. Therefore, contemporary productivity has remained stagnant or slightly reduced, a process termed 'deactivation' by Ploeg (2008:7) which involves 'levels of agricultural production actively contained or even reduced' due to labour flow out of agriculture.

Although globally traditional technologies have been progressively replaced by modern labour-saving and/or often capital-intensive technologies in agriculture (Rigg, 2001; Qin, 2010), variation was found among different types of households mainly driven by non-farm employment opportunities (Pfeiffer *et al.*, 2009; Takahashi & Otsuka, 2009). The convention is to use expenditure on farming inputs (often chemical inputs) per unit of land as the main independent variable to identify variation in technology adoption amongst diversified households (Kilic *et al.*, 2009; Oseni & Winters, 2009), however this measure cannot comprehensively capture the overall practices of technology use. This research used the four variables in Table 5 instead: expenditure on chemical input and machinery per ha to represent intensity of modern technology use; and the number of traditional farming practices and the frequency of manure application to represent intensity of traditional or labour-intensive technology use.

[Table 5 about here]

Results show that there is no statistically significant difference in chemical and machinery input use rates among household types, which is consistent with the findings of Qin (2010) reporting on Chongqing, China. This indicates that modern labour-saving technologies are desirable and used by all smallholders. The non-farming households applied significantly less traditional technologies ($p < 0.05$). The part-time farmers and non-farming households used significantly less manure ($p < 0.01$). Migrant households used significantly less manure than those without job

diversification and those with only local non-farm employment ($p < 0.05$). This indicates that the labour shortage effect driven by migration is evident, and that the shortage reduces the scope for smallholders to apply labour-intensive technologies. In addition, it suggests again that local non-farm employment does not reduce traditional technology use, probably because farmers working in the local area can still supply enough labour for agricultural production.

Historically, modern agricultural technologies (e.g., high yielding varieties of seeds, pesticides and various types of machineries) have been progressively adopted by farmers in the Hu Village agriculture in all dimensions since the 1970s, largely due to strong promotion from the state, ~~from seeds and pesticides to various forms of machinery in recent years~~. As Sturgeon (2013) contends in a similar context, Chinese smallholders have a strong and long-standing belief in the 'miracle of science' and have been enthusiastic to embrace modern technologies in pursuit of 'modernity' and 'development' in the process of rapid socio-economic transition. For instance, combine harvesters appeared first in 2005, and were quickly accepted by almost all the farmers, despite sometimes abnormally high costs being expensive. As a result, ~~over time~~, traditional technologies have gradually fallen into disuse by smallholders over time. The de-involution of Chinese smallholder agriculture has been accompanied by technology-driven intensification, rather than labour-driven intensification, wherein in which livelihood diversification played a vital role.

Besides technological changes, production patterns and land-use intensity have also changed, driven by livelihood diversification (Rigg, 2001; McKay, 2005). Three indicators are computed to represent agricultural pattern and land-use intensity. As shown in Table 6, these are: (a) multiple crop index^[1] (MCI) to examine land-use intensity; (b) crop diversification index (i.e., Herfindahl index^[2]); and (c)

agricultural diversification index (i.e. total varieties of four agricultural subsidiaries which include crop farming, livestock, forestry, and fishery) to examine the degree of diversification of different households. Results show that the MCI of non-farming households is significantly lower than for the other three household types ($p < 0.01$), suggesting that non-farming households unsurprisingly tend to use land less intensely than these other household types. The MCI of households with only migration is significantly less than households without any job diversification ($p < 0.01$), indicating that only migration households probably leave less labour to attend the land thus reducing land-use intensity.

[Table 6 about here]

The non-farming households also have significantly less crop diversity than other three household groups ($p < 0.05$), which indicates that non-farming households tend to specialize on specific crops, **and denotes a dependent relationship between labour availability on farm and crop diversity in smallholder households (Rahman and Kazal, 2015)**. In Hu Village, as non-farming households largely rely on non-farm activities, they often tend to focus on some particular crops (i.e. citrus, cash trees) to reduce labour intensity. Moreover, non-farming households again undertook significantly less agricultural subsidiaries than the other three types of households ($p = 0.00$), and this again suggests that non-farming households are more likely to move out of agriculture. However, interestingly, there is no significant difference between the categories of households with job diversification regarding crop and agricultural diversity. This implies that in Hu Village, the basic mode of smallholder agriculture has largely remained even with high level of livelihood diversification. Interviews revealed that land-intensity has generally reduced over the past decades.

For instance, there used to be more than five intercropping patterns in Hu Village and now only one (corn and sweet potato) is practised, but in a decreasing manner.

Overall, the historical data denotes a clear de-involution process of Chinese smallholder agriculture driven by dramatic livelihood diversification. The change has been complex, characterised by both intensification of modern technological inputs and disintensification of labour input and land use. The cross-sectional survey data shows that at present the majority of rural households maintain similar levels of agricultural production. Nonetheless, rural-urban migration has led to significant disintensification of labour inputs, resulting in less intensive and less diverse smallholder agriculture. In addition, a group of non-farming households is emerging and expanding. This conclusion casts a critical view to Huang's (2010) argument that although with long-term de-involution, agricultural involution (i.e., labour surplus) is still widespread in China today. This study shows that livelihood diversification has caused significant labour shortage effect on a substantial proportion of rural households, to which labour loss rather than labour abundance is the key. Furthermore, this research unpacks the labour shortage caused by diversified livelihoods, and shows that migration is more likely than local non-farm employment to lead to labour shortage within agriculture. Lastly, the aforementioned changes cannot be fully explained without referring to market conditions and government initiatives as will be shown in following sections.

4.3 Market conditions and smallholder agriculture

Squeeze of agricultural product and input markets

Since the reform, China's agricultural commodity markets have remarkably developed, and Chinese smallholders have been deeply integrated into domestic markets (Huang & Rozelle, 2006). China's WTO accession in 2001 also accelerated

the pace of smallholders' integration to international markets (Huang *et al.*, 2007). However, market integration has confronted smallholders with a profit squeeze caused by declining food prices and ever-increasing input prices driven by high and rising energy prices, whereas the subsequent output price rise has lagged behind in recent years (Hazell & Wood, 2008). The situation for Chinese smallholders is exactly the same for other smallholders in developing countries (Hazell & Wood, 2008), and is a fatal disincentive for all smallholders.

Table 7 shows the financial outcome from crop enterprises of Hu Village which shares the same fate. As can be seen, farmers can only make a minimum profit from rape and citrus and never gain cash from rice and corn due to their low level of commercialization. Hu Village agriculture still remains largely subsistence. In recent years, poor market prices have greatly diminished the production of cash crops, with many farmers stopping citrus cultivation, which further pushes the agriculture back to subsistence level. According to interviews with fertilizer and pesticide sellers in the village, the prices of fertilizers in recent years have risen by 10 per cent and pesticides by 5-10 per cent per year. The squeeze in profit is an important 'push' factor for farmers to seek non-farm activities.

[Table 7 about here]

Market accessibility

Market accessibility, which is identified as a significant issue for rural development in developing countries, has improved substantially due to infrastructure development, especially road quality. Permanent concrete roads were built to connect even the most remote households and the county road passes through Hu Village, with shuttle buses providing easy access to local markets. For instance, travel time is

approximately 30 minutes to reach Qingshen County and 15 minutes to reach the nearest two towns.

Moreover, market conditions have also been substantially improved within the village. For agricultural inputs, three fertilizer and pesticide shops and five commercial fodder sellers are present to satisfy farming demands in Hu Village. The most favourable outcome for farmers is that all the fertilizer sellers allow several months of credit as well as a free delivery service. Farmers only need to call the fertilizer seller to order and wait for delivery, which has greatly facilitated aged and/or female farmers who cannot carry heavy bags of fertilizers home from the market. This easy access to input markets facilitated a more capital-oriented agriculture driven by labour shortage.

For product markets, besides formal purchase markets in the towns and county, a large number of private traders and middlemen serve as 'floating markets' which has greatly facilitated farmers to market their various agricultural products. For instance, numerous middlemen for pigs in Hu Village connect large pig commercial enterprises and individual pig farmers, allowing farmers to buy or sell pigs, while the middlemen do all the necessary work, e.g., bring workers and tools to load pigs for delivery and/or pay farmers on the spot for the sale. For crops (e.g., rice or rapeseeds), small-scale grain traders constantly visit or pass through the village, or farmers can sell to local markets provided they have enough labourers.

Land transfer market

Driven by the increasing de-population of agricultural sectors, the land rental market in China has developed across the regions since the 1990s, as induced institutional theory predicts (Kung, 2002). The post-reform Chinese governments have always encouraged land transfer, most enthusiastically in recent years. The No.1 document

in 2013 by the Central Committee of the Communist Party of China particularly focused on encouraging land transfer and developing large-scale family farms to deal with decreasing farming populations. By 2012, 13.4 per cent of Chinese smallholder land had been transferred into 877,000 large-scale family farms, with an average size of 13.3 ha (Farmers' Daily, 5th June, 2013). Sichuan Province is notable on this aspect due to its large-scale rural out-migration. Land transfer in Hu Village presents both convergent and divergent patterns to these broader contexts.

There are two forms of land transfer which have occurred in Hu Village. One form is a large-scale commercial contract. In Hu Village, one farmer rented about 13.3 ha of flat land from villagers to cultivate medicinal herbs and rice. Taking advantage of a favourable policy for large grain cultivators, he signed contracts with about 100 households, with rents at 1875 USD per ha per year (or half of that for every six months). This is an epitome of the emergent large-scale capitalist agriculture nationwide.

The other form is informal exchange between households without monetary exchange. As Table 8 shows, nearly one third of households received land from relatives or friends, and such type of land occupies almost 20 per cent of the total farming land of the sample households in this research. The most prominent reason for handing over the land was that the owner had diverted all their labour for migration, suggesting that migration does trigger participation in land transfer (Kung, 2002). Viewed differently, the fact that 32.9 per cent of households received extra land in 2011 demonstrates that land is still attractive to some households.

[Table 8 about here]

Table 9 shows the pattern of attitudes towards land transfers according to employment status. As Table 9 shows, there is no significant association between

households' attitudes towards land and employment status, implying that economic diversification does not necessarily lead households to rent out land and that households concentrating on farming also do not necessarily want to cultivate more land. The key reason probably lies with the specific socio-economic conditions of the households. For instance, according to observations and interviews, the households that do not want to rent out land and who desire extra land are often those with adequate labour at hand, often middle-aged family members who, due to various reasons, could not manage to migrate or undertake other local non-farm activities with higher levels of remuneration. Households with older farming members, or those where a young wife is staying at home while the husband has migrated, are generally more willing to rent out land.

[Table 9 about here]

The informal land transfer is a strategy of farmers to deal with labour shortages and an imperfect hired labour market. The flourishing non-farm employment has absorbed most of the labour force and remarkably enhanced labour costs, so that smallholders are unable to hire labour due to either unavailability or high labour prices. This leads to the minimum of hired labour in agricultural production in China today, with hired labour only comprising 3 per cent of total agricultural labour, which results in the situation characterised as agricultural 'capitalization without proletarianization' (Huang *et al.*, 2012).

4.4 Government initiatives and smallholder agriculture

In transitional China, the state still plays a vital role in agricultural development through implementing schemes, policies and projects. Governments at all levels have made a great effort to modernize agriculture and enhance farmers' income through various subsidies and investments in infrastructure.

Agricultural subsidies

Agricultural subsidies have been a landmark agriculture support policy since the early 2000s, ending the thousand years of taxation on Chinese farmers (Huang *et al.*, 2011). To guarantee the effectiveness of the subsidy, the payments are meant to be distributed to individual farmers according to the actual sown area under crops (Yu & Jensen, 2010), but local governments often distribute payments according to the registered land area of the households which is inefficient (Huang *et al.*, 2011). Hu Village farmers received agricultural subsidies at 234 USD/ha in 2011. When asked about their opinions on agricultural subsidies, the most prevalent response of farmers was 'nothing'. Many respondents mentioned that the distribution method was problematic, i.e., whether cultivating grains or not, all farmers received subsidy. The mismatch in land cultivators and contractors driven by land transfer clearly leads to the conclusion that subsidy distributed by this method cannot stimulate farmers' farming incentives.

Another issue is the low amount of subsidy (i.e., 234 USD/ha). The subsidy amounts to only USD 56 for the average farm size of 0.24 ha, although it is slightly higher than the national average of USD 51 (Huang *et al.*, 2011). This amount of cash means too little for majority of Hu Village farmers, with many commenting that this money can buy only some kitchen sauces. Many farmers often forget to withdraw the subsidy when they buy fertilizers and pesticides. Thus, instead of driving farmers to undertake grain cultivation actively, the agricultural subsidy is more like a bonus to farmers, or 'an income transfer programme' (Huang *et al.*, 2011: 69).

Infrastructure construction

Researchers have found that rural infrastructure construction (e.g., roads, irrigation facilities) can trigger comprehensive rural development in developing countries (Hazell & Wood, 2008). Since the 2000s, the Chinese central government has intensified rural infrastructure construction, including transportation, irrigation, safe drinking water, education, health and cultural facilities. As a result of two main government infrastructure projects, by 2012, 90 per cent of households from all eight groups of Hu Village could access cement roads, and more than half of the paddy field area was also paved through. One county road passing through Hu Village was also rebuilt, further shortening the travel time from village to county and other townships. Today, even the remotest households are also connected with paved roads, with only around 10 minutes by walk to village centre, 20 minutes by bus to the nearest township, and 30 minutes to Qingshen County town. Geographical location is not an evident obstacle to market anymore. The advanced roads benefit agricultural production in various ways. The main positive impact stressed by farmers is that these changes significantly increased opportunities for mechanization, as cement roads substantially enhance the range of combine harvester operation. Many old farmers clearly express that without combine harvesters they might have left farming and given their land to others. Newly built roads enable them to manage more land and thus to reduce their dependence on non-farm income. In addition, the free delivery service provided by fertilizer and commercial fodder sellers also benefited from cement roads. As one seller told, 'Without hardened roads, it is impossible to deliver hundreds of kg fertilizers to remote and hilly paddy field by small motor vehicles, and the remote land might have been left idle'. Overall, the improved transportation reduced farmers' labour intensity, integrated farmers and

agricultural sector with the markets, and in a sense, improved the attractiveness of agriculture.

In addition, the land levelling project shifted about 6.7 ha of hilly area into flat arable land. The irrigation project reinforced concrete irrigation channels from reservoir to individual paddy field, which increased irrigation efficiency and reduced water loss in transit. These government projects are imperative indeed in an era of farming being increasingly marginalized and despised by farmers. Results for this research suggest that for contemporary Chinese agriculture, the government can exert a positive influence through improvements in agricultural infrastructure.

5. Conclusion

Through a case study of a village in southwest China, this paper has shown that alongside the overarching socio-economic transition, Chinese smallholder agriculture has experienced multi-dimensional changes. Driven by dramatic livelihood diversification, agricultural production has become significantly marginal in the economic portfolio of rural households. In a longitudinal sense, propelled by massive non-farm employment since the 1980s, Chinese smallholder agriculture has been experiencing long-lasting de-involution, in which it is becoming less diverse and less intensive than it was before. The agricultural de-involution has been accompanied by changes of both intensification of modern technologies and disintensification of labour and land use. Simultaneously, evidenced by cross-sectional data, the productivity and basic farming patterns have largely remained unchanged across the majority of rural households, which can be ascribed to enhanced income from livelihood diversification, improved input markets and favourable infrastructures. Additionally, an evident labour shortage in migrant and non-farming households, high

incidence of informal land transfer among households, and dominant willingness to rent out land suggest that even smallholders themselves expect a shift towards large-scale capitalist agriculture, which is furthered by squeezing agricultural profits and lucrative non-farm opportunities. As a consequence, both government and smallholders have endeavoured to foster a land transfer market and realize larger scale production to maximize profits from agriculture. In this sense, we argue that contemporary Chinese smallholder agriculture has arrived at a crossroad of evolution and is now presenting diverse forms of agricultural production (i.e., large-scale capitalist agriculture, expanded scale farms realized by informal land transfer, and original small farms) as reflected in Hu Village.

This research clarifies the public concerns about a smallholder agricultural crisis in current China, and concludes that, contrary to propositions from the mass media, food security in terms of land productivity or output is not the top priority at present as productivity levels are largely maintained. However, it is the potential of smallholder agriculture to enhance the economic status of smallholders in the future that needs serious consideration. In his analysis of small farms' role in rural development in Africa, Ellis (2005) argues that smallholder agriculture has limited potential for development and poverty reduction in the context of deagrarianization, and that the future lies more in farmers' mobility out of agriculture. In the context of transitional China, where livelihood diversification is no less dramatic than anywhere else and rural-urban transition is proceeding apace, development policies should further facilitate the mobility of smallholders and promote multi-dimensional initiatives to safeguard the wellbeing of people that leave farming on the one hand and to foster new agricultural operators that are interested in farming on the other. This research has shown that a substantial fraction of smallholders still want to expand

the land scale of their farming and build their livelihoods on a local basis, which in turn can better maintain a diverse and intensive agriculture than rural-urban migration. Therefore, to sustain productive smallholder agriculture, rural local economies should be strengthened in order to keep populations in farming without reducing their income levels. In addition, comprehensive socio-economic reforms are needed to enable smallholders' free mobility out of or entry into agriculture without reducing living standards. Agricultural market conditions, land transfer markets and infrastructures should be further improved to attract actors from either inside or outside rural communities, who are interested in agricultural production.

References

- Birch-Thomsen T, Reenberg A, Mertz O, Fog B (2010) Continuity and change: spatio-temporal land use dynamics on Bellona Island, Solomon Islands. *Singapore Journal of Tropical Geography*. 31, 27–40.
- Boserup E (1965) *The conditions of agricultural growth*. London: Earthscan.
- Brookfield H (2001) Intensification, and alternative approaches to agricultural change. *Asia Pacific Viewpoint*. 42 (2/3),181-192.
- Carter CA, Zhong F, Zhu J (2012) Advances in Chinese agriculture and its global implications. *Applied Economic Perspectives and Policies*. 34 (1),1-36.
- Davis B, Winters P, Reardon T, Stamoulis K (2009) Rural nonfarm employment and farming: household-level linkages. *Agricultural Economics*. 40, 119-123.
- Davis B, Winters P, Carletto G, Covarrubias K, Quinones E, Zezza A, Stamoulis K, Azzarri C, Giuseppe S (2010) A cross-country comparison of rural income generating activities. *World Development*. 38 (1), 48-63.
- Deininger K, Jin SQ, Xia F (2012) Moving off the farm: land institutions to facilitate structural transformation and agricultural productivity growth in China. The World Bank Policy Research Working Paper 5949.
- Démurger S, Fournier M, Yang WY (2010) Rural households' decisions towards income diversification: evidence from a township in northern China. *China Economic Review*. 21 (supplement 1), S32-S44.
- Di JH (2009) The choice of Chinese rural study units. *China Rural Survey*. 6,80-91.
- Ellis F (2005). Small farms, livelihood diversification, and rural-urban transitions: strategic issues in Sub-Saharan Africa. In *The future of small farms: proceedings of a research workshop*, Wye, UK, June 26 - 29, 2005. Washington, DC: International Food Policy Research Institute.

<<http://www.ifpri.org/events/seminars/2005/smallfarms/sfproc.asp>>.

Fan CC (2008) *China on the move: migration, the state, and the household*. New York: Routledge.

Farmers' Daily (2013) National family farms numbered 877 thousand with average scale more than 13.3 hectare. 5th June, 2013.

<http://www.farmer.com.cn/zt/jtnc/gddt/201306/t20130605_850351.htm>

Gulati A, Fan S (2008) *The dragon and the elephant: a comparative study of agriculture and rural reform in China and India*. India: UOP.

Hazell P, Wood S (2008) Drivers of change in global agriculture. *Philosophical Transactions of the Royal Society B*. 363,495-515.

Hazell P, Poulton C, Wiggins S, Dorward A (2010) The future of small farms: trajectories and policy priorities. *World Development*. 30(10), 1349-1361.

Huang JK, Rozelle S (2006) The emergence of agricultural commodity markets in China. *China Economic Review*. 17(3), 266-280.

Huang JK, Jun Y, Xu Z, Rozelle S, Li N (2007) Agricultural trade liberalization and poverty in China. *China Economic Review*. 18, 244-265.

Huang JK, Wang XB, Zhi HY, Huang ZH, Rozelle S (2011) Subsidies and distortions in China's agriculture: evidence from producer-level data. *The Australian Journal of Agricultural and Resource Economics*. 55, 53-71.

Huang PCC (1990) *The peasant family and rural development in the Yangzi Delta, 1350-1988*. Stanford, CA: Stanford University Press.

Huang PCC (2010) *Chinese hidden agricultural revolution*. Beijing: Law Press.

Huang PCC, Gao Y, Peng Y (2012) Capitalization without proletarianization in China's agricultural development. *Modern China*. 38 (2), 139-173.

- Kilic T, Carletto C, Miluka J, Savastano S (2009) Rural nonfarm income and its impact on agriculture: evidence from Albania. *Agricultural Economics*. 40(2), 139–160.
- Kung JKS (2002) Off-farm labor markets and the emergence of land rental markets in rural China. *Journal of Comparative Economics*. 30 (2), 395–414.
- Liao HL (2012) The part-time work of farmers and its impact on the use rights transfer of the agricultural land. *Management World*. 5,166-188.
- Lipton M (2010) From policy aims and small-farm characteristics to farm science needs. *World Development*. 38 (10),1399-1412.
- Mckay D (2005) Reading remittance landscapes: female migration and agricultural transition in the Philippines. *Danish Journal of Geography*. 105(1), 89-99.
- Murdoch J, Marsden T (1994) *Reconstituting rurality: class, community and power in the development process*. UCL Press.
- Netting RM (1993) *Smallholders, householders: farm families and the ecology of intensive, sustainable agriculture*. Stanford University Press.
- National Bureau of Statistics of China (NBSC), 2012. China Statistical Yearbook. Available at: <http://www.stats.gov.cn/tjsj/ndsj/> (accessed 24 Jan 2013).
- Oseni G, Winters P (2009) Rural nonfarm activities and agricultural crop production in Nigeria. *Agricultural Economics*. 40,189-201.
- Pfeiffer L, Lopez-Feldman A, Taylor JE (2009) Is off-farm income reforming the farm? evidence from Mexico. *Agricultural Economics*. 40(2), 125–138.
- Ploeg JD. van der (2008) *The new peasantries: struggles for autonomy and sustainability in an era of empire and globalization*. London: earthscan.
- Ploeg JD van der, Ye J (2010) Multiple job holding in rural villages and the Chinese road to development. *Journal of Peasant Studies*. 37 (3), 513-530.

- Ploeg JD, Ye J, Wu H, Wang C (2013) Peasant-managed agricultural growth in China: mechanisms of labour-driven intensification. *International Journal of Sociology of Agriculture & Food*. 21 (1), 155-171.
- Qin H (2010) Rural-to-urban labour migration, household livelihoods, and the rural environment in Chongqing Municipality, Southwest China. *Human Ecology*. 38, 675-690.
- Rahman S (2008) The economic determinants of crop diversity on farms in rural Bangladesh. *Journal of International Agricultural Trade and Development*. 5 (1), 51-69.
- Rahman S, Kazal, MMH (2015) Determinants of crop diversity in the regions of Bangladesh (1990-2008). *Singapore Journal of Tropical Geography*. [\(in press\)](#)
Doi:10.1111/sjtg.12086.
- Reardon T, Stamoulis K, Pingali P (2007) Rural nonfarm employment in developing countries in an era of globalization. *Agricultural Economics*. 37 (1), 173-183.
- Rigg J (1998) Rural-urban interactions, agriculture and wealth: a southeast Asian perspective. *Progress of Human Geography*. 22 (4), 497-522.
- Rigg J (2001) *More than the soil: rural change in Southeast Asia*. London: Prentice Hall.
- Rigg J, Salamanca A, Parnwell M (2012) Joining the dots of agrarian change in Asia: a 25 year view from Thailand. *World Development*. 40 (7), 1469-1481.
- Rozelle S, Guo L, Shen M, Hughart A, Giles, J (1999) Leaving China's farms: survey results of new paths and remaining hurdles to rural migration. *The China Quarterly*. 158, 367-393.
- Stone GD (2001) Theory of the square chicken: advances in agricultural intensification theory. *Asia Pacific Viewpoint*. 42, 2/3, 163-180.

Sturgeon, JC (2013) Cross-border rubber cultivation between China and Laos: Regionalization by Akha and Tai rubber farmers. *Singapore Journal of Tropical Geography*. 34, 70-85.

Takahashi K, Otsuka K (2009) The increasing importance of nonfarm income and the changing use of labour and capital in rice farming: the case of central Luzon, 1979–2003. *Agricultural Economics*. 40(2), 231–242.

Wiggins S, Kirsten J, Llambi L (2010) The future of small farms. *World Development*. 38 (10), 1341-1348.

Xia QL, Luo F (2012) Empirical analysis on the influencing factors of land use efficiency and policy suggestions: taking the case of Hubei Province. *Issues in Agricultural Economy (Monthly)* (5): 15-21

Yu W, Jensen HG (2010) China's agricultural policy transition: impacts of recent reforms and future scenarios. *Journal of Agricultural Economics*. 61(2), 343-368.

Endnote

[1] Multi-cropping index, the ratio of total sown area of crops to cultivated land area in the current year, is one of the most important indices to measure agricultural land use intensity and widely used in China.

[2] Herfindahl index is a popular indicator to represent the concentration of crop diversity, the equation is $DH = \sum \alpha_j^2$, $0 \leq DH \leq 1$, α_j = area share occupied by individual crop in total sown area. A zero value means perfect diversification, and a 1 value means perfect specialization (Rahman, 2008).

Table 1. Household types of sample households (%)

	Dedicated farming	I Part-time	II Part-time	Non-farming
Percentage of sample households	21.3	21.3	39.2	18.2
Sichuan Province in 2008	17.9	21.7	49.8	10.6
Sichuan Province in 2000	22.6	36.4	38.7	2.3
Sichuan Province in 1996	28.8	51.7	18.4	1.1
<i>Household job diversification</i>				
No job diversification	70.2	0	0	0
Only local non-farm employment	25.5	37.5	22.5	30.6
Only migration	4.3	35.4	46.9	37.5
Both local non-farm employment and migration	0	27.1	30.6	31.9

Note: Sichuan data is from Liao (2012)

Table 2. Job holdings of 656 sample respondents in 2011

Jobs	Percent
Dedicated farmer	36.3
Migrant	30.8
Self-employed individual	12
Employee in local enterprise	10.4
Part-time agricultural worker	6
Government official	1.5
Total	100

Note: 656 (adult respondents) = 854 (total respondents) – 198 (students, kids, and retirees)

Table 3. Household income distribution in 2011

	Total Household Income (USD)	Percentage of Total Household Income
Agricultural income	2550	38.9
<i>Crops</i>	885	13.5
Rice	406	6.2
Rape	184	2.8
Corn	66	1.0
Sweet potato	105	1.6
Citrus	125	1.9
<i>Livestock</i>	1423	21.7
Pig	1259	19.2
Cattle	7	0.1
Rabbit	33	0.5
Chicken	72	1.1
Duck	53	0.8
<i>Silkworm</i>	203	3.1
<i>Fishery</i>	39	0.6
Non-agricultural income	4006	61.1
Local enterprise and employment	1331	20.3
Migration remittance	2675	40.8
Total	6556	100
Number of sample	225	

Note: The exchange rate of RMB = 6.4 in 2011.

Table 4. Agricultural output performances in different household types in 2011

	Rice (kg/ha)	Rape (kg/ha)	Corn (kg/ha)	Citrus (kg/ha)	Gross value of crops (USD/ha)
Total	6750	2160	5445	26235	2337
<i>Household income diversification level</i>					
Dedicated farming	6720	2100	5190	31470	2259
I part-time	6795	2190	5565	27630	2430
II part-time	6765	2160	5430	25230	2238
Non-farming	6615	2175	5700	24990	2482
Kruskal Wallis test (<i>p</i>)	0.97	0.89	0.74	0.32	0.24
<i>Household by job diversification</i>					
No job diversification	6765	2115	5340	30465	2173
Only local non- farm employment	6900	2160	5490	26085	2505
Only migration	6660	2145	5535	24690	2268
Both local non- farm employment and migration	6705	2145	5460	29955	2367
Kruskal Wallis test (<i>p</i>)	0.51	0.56	0.97	0.12	0.64

Table 5. Technological usage difference among different household types in 2011

	Chemical input (USD/ha)	Machinery input (USD/ha)	Traditional technology usage	Manure usage frequency
Total	666	184	3.67	7.23
<i>Household income diversification level</i>				
Dedicated farming	686	177	3.68	8.23
I part-time	703	203	3.87	8.50
II part-time	637	172	3.67	6.65
Non-farming	678	210	3.24	5.14
Kruskal Wallis test (<i>p</i>)	0.92	0.77	0.02	0.00
<i>Household job diversification</i>				
No job diversification	703	197	3.54	7.82
Only local non-farm employment	658	149	3.68	8.05
Only migration	649	206	3.76	6.54
Both local non-farm employment and migration	678	177	3.60	6.76
Kruskal Wallis test (<i>p</i>)	0.88	0.55	0.58	0.04

Table 6. Land-use intensity, crop diversity and agricultural diversity in different household types in 2011

	MCI	Crop diversity (Herfindahl index)	Agricultural diversity
Total	2.20	0.30	2.92
<i>Household income diversification level</i>			
Dedicated farming	2.42	0.27	3.02
I part-time	2.02	0.28	3.02
II part-time	1.99	0.30	2.96
Non-farming	1.79	0.36	2.50
Kruskal Wallis test (<i>p</i>)	0.01	0.02	0.00
<i>Household job diversification</i>			
No job diversification	2.31	0.31	2.86
Only local non-farm employment	1.99	0.30	2.95
Only migration	1.78	0.30	2.94
Both local non-farm employment and migration	1.88	0.30	2.91
Kruskal Wallis test (<i>p</i>)	0.01	0.28	0.80

Table 7. Main crops market conditions of sample households in Hu Village in 2011

	Total output (kg)	Market price in 2011 (USD/kg)	Sold quantity (kg)	Commercialization level (%)	Cash inputs (USD)	Net Revenue (USD)	Net cash income (USD)
Rice	1085	0.38	137	12.6	103	308	-51
Rape	258	1.1	94	36.4	44	230	55
Corn	190	0.36	5	2.6	19	68	-17
Citrus	1104	0.11	887	80.1	32	89	65

Table 8. Informal land transfer inter-household of Hu Village in 2011

	% of sample households	Size (ha)	% of farming land	From relatives (%)	From friends (%)	Due to migration (%)
Land Receiving	32.9	0.05	18.9	20.4	12.5	32
	% of sample households	Size (ha)	% of farming land	To relatives (%)	To friends (%)	Due to migration (%)
Land Giving	10.3	0.03	8.2	8.1	2.2	3.5

Table 9. Crosstabulations between willingness of cultivating extra land and renting out land and household job diversification status in 2011

		No job diversification	Only local non-farm employment	Only migration	Both local non-farm and migration	Total
Willingness to cultivate extra land	No	35 (29.7)	40 (42.4)	53 (54.4)	31 (32.5)	159
	Yes	7 (12.3)	20 (17.6)	24 (22.6)	15 (13.5)	66
	Total	42	60	77	46	225
	Chi-square=4.077 df=3 p-value= 0.253					
Willingness to rent out land	No	9 (11.5)	16 (15.2)	25 (21.2)	12 (12.6)	62
	Yes	33 (30.4)	44 (43.5)	52 (55.8)	34 (33.3)	163
	Total	42	60	77	46	225
	Chi-square= 12.198 df=9 p-value=0.202					

Note: the expected count is in parentheses.