Recommendations for Large-scale Farmland Operation in Hilly Areas Based on Long Tail Theory

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Abstract At the background of urban and rural integration, this paper analyzed and discussed factors restricting large-scale farmland operation in China's hilly areas from the qualitative perspective. It recognized large-scale farmland operation on the basis of the long tail theory. Finally, it came up with recommendations for developing large-scale farmland operation in hilly areas.

Key words Urban and rural integration, Hilly areas, Large-scale farmland operation, Long tail theory

1 Introduction

Urban and rural integration is a key project for building a moderately prosperous society in all aspects. However, at present, output rate of rural farmland is low, land resource utilization efficiency is not high, agricultural labor productivity fluctuates, and farmers have difficulty in increasing income and efficiency. These problems greatly obstruct healthy development of rural social productive force, and seriously hinder integrated urban and rural development and regional development. In view of these actual problems, some scholars moderate scale operation of rural land is an inevitable choice for modern agriculture[1]. In theoretical circles, some scholars confirm the existence of farmland large-scale economy, and take developing and realizing large-scale rural farmland operation as important measures for realizing agricultural modernization, increasing agricultural productivity and promoting farmers' income increase[2-4]. Some scholars discussed the necessity for large-scale operation of rural land from achievements made in some pilot areas, such as southern Jiangsu model, Guangdong model, and Zhejiang model, *etc*[5-9]. Some scholars doubt or worry about large-scale operation of rural land at present stage, especially in the 1990s. Some scholars proved, from the empirical perspective, that there is nearly no scale economy in China's grain production in production technologies and land system at that time, and stated that land segmentation has negative influence on grain yield and the influence is very significant in statistics[10-11]. Foreign scholars, on the basis of practical experience of developed countries, stated that widespread extension of large-scale operation in China is nearly no helpful for improvement in rural productivity; instead, it may bring a series of very serious risks and consequences for agriculture[12]. Professor Luo Biliang contended that agriculture is not an industry with remarkable scale in essence, and the scale of farmland family operation is still efficient[13]. Xu Qing and Tian Shichao et al believed that land segmentation is resulted from distribution on basis of person rather than labor, and further stated that land segmentation has both negative and positive influence on farmers' income[14-15]. At the current background of China energetically implementing integrated urban and rural development, many scholars do not consider the influence of particularity of hilly areas on implementation of large-scale farmland operation. In view of this situation, we analyzed and discussed measures for implementing large-scale farmland operation in hilly areas from factors restricting large-scale farmland operation.

2 Factors restricting large-scale farmland operation in hilly areas

If large-scale farmland operation is oriented towards maximizing benefits and properly making optimum allocation of production factors, terrain and landform are major geographical factors influencing large-scale farmland operation. In hilly areas, the cost and technologies for implementing large-scale farmland operation are much higher than plain areas. This limits development of large-scale farmland operation in hilly areas to a great extent. For example, Chongqing Municipality is a typical mountain area and the mountain area accounts for 86.9% of the total land area[16]. It takes on characteristics of "six mountains, three hills and one dam". Mountain and hilly areas account for about 90%. High elevation difference in terrain leads to not flat land. In addition to specialty of farmland and other types of land (such as slope, soil fertility, soil thickness, and soil type), all increase the difficulty in developing large-scale farmland operation in hilly areas.

Both quality and quantity of farmland in hilly areas are very limited, and large agricultural population restricts development of large-scale farmland operation. For example, in Chongqing Municipality, the population density is 2.79 times the national average level (Chongqing: 396 people/km^2; the whole country: 142 people/km^2), and its farmland per capita is only 1.4 mu, far low-

Received: May 20, 2014 Accepted: July 5, 2014
Supported by Fundamental Research Funds for the Central Universities (SWU1209377) of Southwest University; Enterprise Management to Foster Discipline of Rongchang Campus (RCQG207001) of Southwest University.
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er than the world average level. Implementing large-scale farmland operation must be based on effective transfer of numerous rural labors. Besides, it is required to rely on setting up and improving rural land circulation mechanism and social security mechanism. The development of large-scale farmland operation is inseparable from wide application of science and technology. Agricultural machinery level in hilly areas is much lower than that in plain areas, and terrain of hilly areas greatly restricts widespread extension of current agricultural machinery and technology. Therefore, in hilly areas, replacement function of agricultural machinery and technology for labor will be greatly weakened, and a lot of agricultural labors can not be liberated from land. Furthermore, under the condition of household contract responsibility system, there will still be widespread rural land segmentation and decentralized operation in hilly areas. Therefore, this will greatly limit development of large-scale farmland operation in hilly areas to a great extent. Apart from poor agricultural production condition in hilly areas, agricultural production mode is also very backward. But it is still small peasant economic operation mode. At present, the essence of issues concerning agriculture, farmers, rural areas and is the conflict between small peasant economy and market economy. In this situation, to really solve the issues concerning agriculture, farmers, rural areas, we must completely eliminate small peasant economy[17]. Therefore, to develop large-scale farmland operation in hilly areas, it is also required to completely eliminate small peasant economy.

Large-scale farmland operation not only needs consolidation of land parcel and main part of property right, but also needs support of huge funds. Since the reform and opening-up, although there is remarkable change in all areas of the whole country, the income gap between urban and rural areas is constantly widening[18]. There is still no effective improvement in urban and rural dual economic structure in less developed areas and hilly areas, and the pulling force of urban areas for rural areas is not high. Besides, the development of secondary industry especially the tertiary industry lags behind. Insufficient agricultural input and imperfect rural financial system lead to difficult financing and consequently restrict development of large-scale farmland scale operation.

From the composition of people engaged in agriculture of hilly areas, the base number of people engaged in agriculture is large, human – land conflict is outstanding, and there is a great gap between the quality of people engaged in agriculture and the quality required for large-scale farmland operation (as listed in Table 1, Table 2, and Table 3). Table 1 indirectly reflects that most of those rural labors who fail to move out have low educational level. Table 2 reflects that those rural labors who move out are mainly young and middle aged people. 75.97% of those rural labors who move out are mainly young and middle aged. On the contrary, those who stay at rural areas are mainly the old, weak, sick and disabled (collectively called 386199 troops). Table 3 further indicates that those rural labors who move out are mainly men labors. Those are mainstay of agricultural production. This is not favorable for long-term development of agriculture and will hinder development of large-scale farmland operation to a certain extent.

Table 1 Educational level of rural labors who are migrant workers (2004 – 2006)

Year	2004	2005	2006
Illiterate or semiliterate	1.00	1.51	1.59
Primary school	12.38	10.32	8.56
Junior middle school	66.62	69.53	69.73
Senior middle school and above	20.00	18.64	20.12

Table 2 Age structure of rural labors who are migrant workers (2004 – 2006)

Year	2004	2005	2006
16 – 30 years old	51.76	52.68	55.25
31 – 40 years old	24.21	22.07	21.46
41 – 50 years old	16.27	16.74	14.91%
Older than 50	7.76	8.49	8.38

Table 3 Proportion of migrant rural labors in 100 rural labors (2004 – 2006)

Year	2004	2005	2006
Proportion of men labors	69.41	67.58	66.9
Proportion of all labors	87.07	84.88	86.5

Note: the data in Table 1, Table 2 and Table 3 were selected from *China Statistical Yearbook*, *China Statistical Yearbook* 2008, *China Labor Statistical Yearbook*, and survey data of Rural Survey Organization of the National Bureau of Statistics.

3 Discussion of large-scale farmland operation based on understanding and application of long tail theory

If large-scale farmland operation is the gathering degree of certain quantity and quality of production elements, it will be inseparable from increase in quantity of farmland. However, this not means the larger the better. Instead, when promoting large-scale farmland operation, it is also required to consider production capacity, production environment and economic benefits of production organizations, *i. e.* operation at moderate scale. The scale is a basic standard for judging whether agricultural land scale is economic or not. In other words, large scale may bring large scale economy or not bring large scale economy; small scale also may bring scale economy. The key lies in whether the proportion of quality and quantity of input elements is proper in given social production condition. At the same time, this optimum proportion will constantly change with development of social productivity and progress of science and technology, as well as geographical environment. However, limited land resource and equalized existing farmland system will cause rural areas of China have difficulty in getting rid of trouble of small peasant economy. Due to the drive of urban and rural income gap, numerous farmers migrate out. This will reduce rural land use efficiency. Rural land even becomes idle or desolate. Certainly, strengthening rural land circulation and centralization will be helpful for increasing benefit and efficiency of land operation. Nevertheless, in the practice of rural land circulation, due to drive of economic benefit, the real farmland circulation is not wide. In other words, non-agricultural circulation of farmland is

wide. Even, the situation is worsening, which is deviating from the strategic objective of national grain security and 1.8 billion mu farmland red line[19]. Obviously, the number of farmers is a decisive variable promoting farmland circulation and large-scale operation, while the rising trend of the number of farmers is the shackle of large-scale farmland operation. In mainland China, people engaged in agriculture reached 32.91 million in 1999 and the figure gradually dropped at an annual rate of 1%. However, the number of rural households is still rising at the rate of about 1%, and reached 250 million in 2005[19]. Therefore, it will take at least ten years for farmland circulation and large-scale operation to make substantive breakthrough, so China's farmland circulation and large-scale operation will still be a long and slow process[19]. The economic globalization becomes increasingly intense. If it is still subjectively assumed that gathering small segmented land is large-scale farmland operation, is this be able to realize real benefit? Is this helpful for China to establish itself in an unassailable position? Is this be able to get rid of the monopoly of ABCD (A: Archer Daniels Midland; B: Bunge; C: Cargill; D: Louis Dreyfus) companies?

Therefore, to completely change the current situation of low rural land output efficiency, low land resource utilization efficiency, fluctuation of agricultural labor productivity, difficulty in increasing farmers' income, hilly areas of China should use new thought or theory to guide and develop large-scale rural land operation. Such thought or theory is long tail theory (the schematic drawing is shown in Fig. 1).

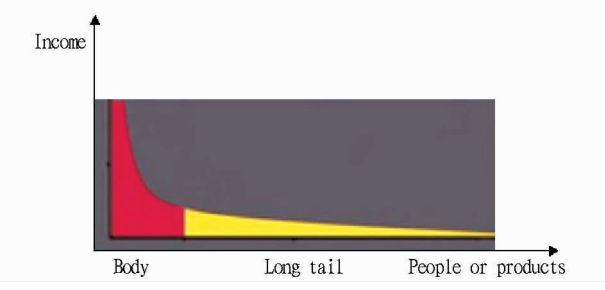

Fig. 1 Schematic drawing for long tail theory

In statistics, a long tail of some distributions of numbers is the portion of the distribution having a large number of occurrences far from the "head" or central part of the distribution. The distribution could involve popularities, random numbers of occurrences of events with various probabilities, *etc.* A probability distribution is said to have a long tail, if a larger share of population rests within its tail than would under a normal distribution. Power Laws and Pareto characteristics can be described by normal distribution curve. In the past, due to high transaction cost, people only care about important thing or people (body in Fig. 1), but neglect those things with high cost but low benefit (long tail in Fig. 1). However, with development of modern science and technology, especially the advent of network times, transaction cost greatly drops and the realization of personalized demand becomes possible, people start to care about the long tail part, *i.e.* long tail economy.

The long tail theory is different from neoclassical theory: the latter takes scarcity as normal state, follows 80/20 rules, and seeks "short head" of large-scale production; the former takes abundance as normal state, follows reverse 80/20 rules, and seeks "long tail" of multiple variety production. The long tail theory explains economics of abundance. When the supply-demand bottleneck disappears and all products are obtained by people, the long tail story will naturally occur. Our society is increasingly abundant, and we have condition to become small appreciators from shoppers of careful calculation and strict budgeting, then we can heartily show our unique taste. Massclusivity, sliver casting, and mass customization can be used to describe various new consumption behavior and all of them point to the same direction: longer tail[20]. According to this theory, present market is starting to change from centralized product market to decentralized product market, a big number (product in long tail) multiplied by a relatively small number (sales volume of each type of long tail product) will be a huge number. The restriction of geographical position and regional limitation for development of modern market is gradually weakening, and even becomes development characteristic of each type of long tail product. Before the industrial revolution, most culture was local, and economy was mainly farming. Broad land brought scattered population. Then, the distance became a barrier between people. Cultural integration and propagation of new concept and new trend was limited. However, this situation has been changed[20].

The first agritainment in Chengdu City of Sichuan widens channels for increase of farmers' income and development of rural economy. This reflects broad development space of characteristic operation of rural economic development. Thus, developing characteristic large-scale farmland operation has theoretical basis and real survival space.

4 Recommendations for large-scale farmland operation in hilly areas

The higher development speed of socialist market economy, the higher erosion strength for China's rural small peasant economy, and the issues concerning agriculture, farmers and rural areas are inevitable result of China developing market economy[17]. Therefore, large-scale farmland operation in hilly areas should open up new ways different from plain areas. In other words, it should strive for expanding and enriching the long tail with the aid of modern science and technology, and advanced market cultural concept. Specifically, it is recommended to start from following aspects.

4.1 Oriented toward market, to grasp and satisfy personalized demand of consumers Since the reform and opening up, although urban and rural income gap is constantly widening, people's consumption concepts or ideas are substantively changed. They are no longer willing to be satisfied at primary level of demand, such as physiological needs. The times of original production and promotion ideas is gone for ever. At the same time, demands of customers have new development. In current situation of economic globalization, gradual establishment and improvement of buyer market, constant penetration of knowledge and network economy into every social aspects, scheme demand, experience demand, virtual demand and green demand appear at the historic moment. We are entering an unlimited selection age. This will

provide broad space for survival and development of characteristic large-scale farmland operation.

4.2 Consistent with agricultural structural adjustment and industrial distribution In less developed areas of China, especially hilly areas, blindly imitating operation mode of developed areas leads to convergence of industrial structure between regions. Neglect of comparative advantages and characteristic will lead to difficulty in product sales, low market competitive power, and increase of output without increase of income. Although hilly areas have diverse landform, different elevation has different climate conditions, this provides favorable condition for large-scale characteristic farmland operation in hilly areas and lays foundation for extending and enriching the long tail.

4.3 Having high efficient integrator to make vast consumers rapidly and conveniently find and enjoy various characteristic products At the same time of strengthening infrastructure construction in hilly areas, it is required to build a modern talent team and establish perfect, convenient and swift information platform and logistics system. Besides, it is recommended to change farmers' thoughts and ideas and undertake agricultural production and operation using Scientific Outlook on Development.

5 Conclusions

To realize urban and rural integration and accelerate integrated development of urban and rural economy, government should further increase investment in rural infrastructure, shorten physical distance between urban and rural areas, build rural information highway, gradually set up modern agricultural talent training system conforming to scientific development, and completely eliminate small peasant awareness. In a considerable long term, rural labor transfer should take road of combining external and internal aspects together, and promote sustainable development of agricultural modernization. In addition, it is recommended to establish and improve reform and construction of rural land market and household registration system.

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