

## Is “Family Farms” the Way to Develop Chinese Agriculture?

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“家庭农场”是中国农业的发展出路吗？

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### Abstract

Early in 2013 China's Party Central sounded the call for developing so-called “family farms.” A great deal of discussion ensued, in which the dominant view has been to call for developing scale economies in “family farming” through greatly increased transfers of land, in the belief that large-scale farms would help raise both labor and land productivity. The slogan used, “family farms,” is borrowed from American rhetoric and reflects the way American agriculture is mistakenly imagined by many people. This article demonstrates that such a vision runs counter to the logic shown by the history of agricultural modernization throughout the world. It mistakenly tries to force China's reality of “lots of people and little land” into an American model predicated on its opposite of “lots of land and few people,” and it mistakenly tries to apply economic concepts based on the industrial machine age to agriculture. The vision/policy is also based on a misunderstanding of the realities of contemporary American agriculture, which has long since come to be dominated by agribusiness. The determinative logic in American agricultural modernization has been to economize on labor, in contrast to the path of modernizing development that has already taken hold in practice in Chinese agriculture of the past 30 years, in which the dominant logic has been to save on land, not labor, in what I term “labor and capital dual intensifying” “small and fine” agriculture. The American “big and coarse” “model” is in reality utterly inappropriate for Chinese agriculture. It also runs counter to the insights of the deep and weighty tradition of scholarship and theorizing about genuine peasant family farming. The correct path for Chinese agricultural

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development is the appropriately scaled, "small and fine" genuine family farms that have already arisen quite widely in the past 30 years.

#### Keywords

man-land relations, agricultural modernization, American "big and coarse" agricultural model, Chinese "small and fine" agricultural model, appropriate scale, theory of peasant economy

#### 摘要

中共中央于2013年年初提出要发展“家庭农场”，之后全国讨论沸沸扬扬，其中的主流意见特别强调推进家庭农场的规模化，提倡土地的大量流转，以为借此可以同时提高劳动和土地生产率。其所用的口号“家庭农场”是来自美国的修辞，背后是对美国农业的想象。本文论证，这是个不符合世界农业经济史所展示的农业现代化经济逻辑的设想，它错误地试图硬套“地多人少”的美国模式于“人多地少”的中国，错误地使用来自机器时代的经济学于农业，亟需改正。它也是对当今早已由企业型大农场主宰的美国农业经济实际的误解。美国农业现代化模式的主导逻辑是节省劳动力，而中国过去三十年来已经走出来的“劳动和资本双密集化”小而精模式的关键则在节省土地。美国模式不符合当前中国农业的实际，更不符合具有厚重传统的关于真正的小农经济家庭农场的理论洞见。中国近30年来已经相当广泛兴起的适度“小而精”规模的真正家庭农场才是中国农业正确的发展出路。

#### 关键词

人地关系、农业现代化、美国“大而粗”模式、中国“小而精”模式、适度规模、小农经济理论

Early in 2013 China's Party Central sounded the call for developing so-called "family farms." A great deal of discussion ensued, in which the dominant view has been to call for developing scale economies in "family farming" through greatly increased transfers of land, in the belief that large-scale farms would help raise both labor and land productivity. The slogan used, "family farms," is borrowed from American rhetoric and reflects the way American agriculture is mistakenly imagined by many people. This article demonstrates that such a vision runs counter to the logic shown by the history of agricultural modernization throughout the world. It mistakenly tries to force China's reality of "lots of people and little land" 人多地少 into an American model predicated on its opposite of "lots of land and few people," and it mistakenly tries to apply economic concepts based on the industrial machine age to agriculture. The vision/policy is also based on a misunderstanding of the realities of contemporary American agriculture, which has long since come to be dominated by agribusiness. The determinative logic in American agricultural modernization has been to economize on labor, in contrast to the path of modernizing development that has already taken hold in practice in Chinese agriculture of the past 30 years, in which the dominant logic has been to save on land, not labor, in what

I term “labor and capital dual intensifying” “small and fine” 小而精 agriculture. The American “big and coarse” 大而粗 “model” is in reality utterly inappropriate for Chinese agriculture. It also runs counter to the insights of the deep and weighty tradition of scholarship and theorizing about genuine peasant family farming. The correct path for Chinese agricultural development is the appropriately scaled, “small and fine” genuine family farms that have already arisen quite widely in the past 30 years.

American style industry-ization of agriculture would actually turn many (Chinese) peasants into hired agricultural laborers, reduce the numbers employed in agriculture, and destroy in the end China’s rural communities. It is a path that goes against both China’s past history and its present reality. The “small and fine” 小而精 agricultural modernization model that has already been developed in practice in the past 30 years, by contrast, is one that would maintain genuinely appropriate-scale small family farming, provide more employment opportunities in agriculture, and even help stabilize and rebuild China’s rural communities. It could also become a road toward a “small and fine” green agriculture that is even higher-yielding in value and healthier for people.

### **Two Models from the History of Agricultural Modernization: “Lots of Land and Few People” vs. “Lots of People and Little Land”**

Agricultural economist Yujiro Hayami and his collaborator Vernon Ruttan did a great deal of quantitative work in the 1970s and 1980s to compare the historical experiences in agricultural modernization of a number of major countries. What they gathered and computed included century-long data pertaining to the main concern of this article: man-land relations and modes of agricultural modernization. They generated data on output per unit land and per unit labor in terms of wheat-equivalents and also on tractor use and chemical fertilizer use per unit labor. Their quantitative work was on the whole quite rigorous and credible, but because they were concerned with too many questions and theoretical concepts and gathered data across too wide a range of topics, they failed to highlight their own data about man-land relations, much less bring out clearly the implications of those data for modes of agricultural modernization (Hayami and Ruttan, 1971: see appendices A, B, and C, pp. 309-47 for the data; also Hayami and Ruttan, 1985: appendices A, B, and C, pp. 447-91). Their data were later re-arranged and summarized by the Danish agricultural economist-theorist Ester Boserup (Boserup, 1983: 401; see also Boserup,

1981: 139) who, because of her longstanding concern with issues of man-land relations and how those related to technological change (Boserup, 1965, 1981), focused particularly on Hayami-Ruttan's data relevant to those issues. Unfortunately, Boserup's article also addressed so wide a range of questions about agriculture throughout different regions and different time periods that she too failed to lift out from the data any clear and focused concepts (Boserup, 1983; tabulated re-arranged data appear on p. 401; see also Boserup, 1981: table on p. 139). Subsequently, the "cultural-ecology" theorist Robert McC. Netting took note of the importance of the data as re-arranged by Boserup, reproducing her table in full in the introduction to his book, and pointed out correctly the central importance of the relatively labor-intensive, small-scale family farm, especially in Asian agriculture. But because Netting's main concerns were with "cultural ecology," he too failed to express clearly the economic logic contained in those data (Netting, 1983: see p. 25 for the data). For these reasons, we need to re-examine in detail the data that Hayami and Ruttan presented more than 40 years ago and clarify what those tell about the two main models of agricultural modernization in the world. What follows is first the tabulated data. For the sake of clarity of discussion, I will compare the U.S. with Japan, then move on to the other countries included—England, Denmark, France, Germany, and India, and finally discuss the comparison data I have reconstructed and added for China.

As can readily be seen, the American experience represents the model of agricultural modernization of countries with "lots of land and few people." In the 1880 and 1970 data shown in Table 1, we can see clearly that the U.S.'s resource endowment in land (relative to number of people engaged in agriculture) was especially rich: in 1880, each male farm labor unit in the U.S. cultivated 25 hectares (375 Chinese mu), compared to 1 hectare (15 Chinese mu) in Japan, or a multiple of 25 to 1. Thereafter, the American path of agricultural modernization consisted mainly of using machinery to expand the amount of acreage cultivated by each labor unit. In 1970, the amount of machinery used was 45 times that of Japan: one tractor per male farm labor unit compared to one for every 45 male labor units in Japan. Accompanying that change was the sharp difference in cultivated acreage per male labor unit: 165 hectares in the U.S., compared to 2 hectares in Japan, or a multiple of 82.5 to 1. What the American combination of factor use of land and labor meant was that output per male labor unit (or "farm labor productivity") was much higher than in Japan—6.5 times in 1880, and increasing to 10 times in 1970, but that its output per unit land was much lower—just one tenth that of Japan in 1970. In terms of the combination of land use relative to labor, the American model

Table 1. Man-Land Relations and Technological Change in Seven Western and Non-Western Countries and China, 1880 and 1970

	Cultivated acreage per male labor unit (hectare)		Output per hectare (in wheat equivalents, in tons)		Output per male labor unit (in wheat equivalents, in tons)		Chemical fertilizer used per hectare (kilograms)		Numbers of male labor units per tractor	
	1880	1970	1880	1970	1880	1970	1880	1970	1880	1970
<b>U.S.</b>	<b>25</b>	<b>165</b>	<b>0.5</b>	<b>1</b>	<b>13</b>	<b>157</b>	/	<b>89</b>	/	<b>1</b>
England	17	34	1	3	16	88	/	258	/	-
Denmark	9	18	1	5	11	94	/	223	/	2
France	7	16	1	4	7	60	/	241	/	3
Germany	6	12	1	5	8	65	/	400	/	-
<b>Japan</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>10</b>	<b>2</b>	<b>16</b>	/	<b>386</b>	/	<b>45</b>
India	-	2	-	1	-	2	/	13	/	2600
<b>China*</b>	<b>1.5</b>	<b>0.7</b>	<b>1.7</b>	<b>2.7</b>	<b>2.6</b>	<b>1.9</b>	/	<b>157</b>	/	<b>960</b>

\* For the method and sources used in computing the data on China, see the Appendix to this article.

Sources: Boserup, 1983: 401; 1981: 139; Hayami and Ruttan, 1971: 309-347, Appendices A, B, C; Hayami and Ruttan, 1985: 447-91, Appendices A, B, C; Netting, 1993: 25.

was “extensive” (in labor use), but “intensive” in land use, making for high labor productivity but low land productivity—a model which we characterize for our purposes here as “big and coarse.”

Seen from the other end, what Japan represents is the opposite, the “lots of people and little land” model. The amount of land cultivated by each male farm labor unit in Japan in 1880 was just 1/25 of that in the U.S., and its proportion shrank further to just 1/82.5 by 1970. What each male labor unit produced was just 1/6.5 of that in the U.S. in 1880, which shrank further to just 1/10 by 1970. Its per unit land productivity, on the other hand, was 6 times that of the U.S. in 1880, and grew to 10 times in 1970. From the standpoint of its mix of land and labor use, Japan’s agriculture was clearly much more “labor intensive,” which accounts for why its land productivity was relatively high, while its labor productivity was relatively low. It was clearly what we term here a “small and fine” model of agriculture and agricultural modernization.

Among the modern capital inputs in agriculture, we need to distinguish between two different kinds of input. One is machines (or “machine capital”), mainly tractors, the crucial factor for expanding output per unit labor by

expanding the scale of production per laborer. As we have seen, in 1970 the extent of tractor use per unit labor in American agriculture was 45 times that of Japan (and 960 times that of China in that year). That was because mechanization and saving labor were central to American agricultural modernization. Its necessary pre-condition, in turn, was the “factor endowment” of “lots of land and few people,” the distinctive feature of the “New World” or, to borrow a phrase from Chinese, the “basic national condition” 基本国情 of the U.S. But this does not mean that such an agricultural economy of scale is necessarily the common characteristic of all agricultural modernization. What Japan shows is instead the basic national condition of “lots of people and little land,” like China’s. What it relied upon mainly was not labor-saving machinery but land-saving chemical fertilizer to enhance land productivity (more below). China was similar to Japan in its starting baseline in 1880 of “lots of people and little land,” but faced even harsher pressures later on: as shown in Table 1, in 1970 its average amount of cultivated acreage per male cultivator was just 0.66 hectare (10 mu), one half of that of Japan. Even in 2013, after 30 years of vigorous urbanization, China still has not yet reached the 1970 dimensions of Japan, namely 2 hectares per farming male labor unit; even today, China has at most 1 hectare per male labor unit on average (not counting females, as in Table 1) (Huang Zongzhi [Philip C. C. Huang], 2010: 75, 122). If compared to the U.S., the contrast is just that much greater. That means China faces even stronger imperatives than Japan to save on land use.

The second kind of modern capital input in agriculture, chemical fertilizer (and also scientific seed selection), is quite different in nature from farm machinery. Its main purpose is to enhance the productive power of the land more than of labor as with machinery. Its use is linked to some degree also to the intensity of labor input: it can be applied rather coarsely entirely by machine and/or automation, or it can be more finely applied by hand, or by some combination of machine and human labor. It might be applied just once to a cropping, or two or three times. We need to note here also that different crops require different quantities of fertilizer. As is well known, vegetables require much more fertilizer and labor than grain crops, as do fruits (Huang and Gao, 2013: 48, Figure 5). Japan’s use of chemical fertilizer in 1970 was 430% that of the U.S., showing precisely its central concern with maximizing output per unit land, very different from the American model of maximizing output per unit labor. Japan’s greater and finer use of chemical fertilizer per unit land tells mainly about the greater proportion that higher-value labor-intensive “small and fine” crops occupy in its total agriculture. The logic here is the same as the expansion of high-value products in China’s recently arisen “new agriculture”: generally much more

chemical fertilizer is used and applied more finely, illustrating well the difference between the “small and fine” Chinese path of agricultural modernization as opposed to the “big and coarse” model of American agriculture. It is a model of “(mainly non-mechanical) capital and labor dual intensifying” agriculture. Already in 1970, China’s use of chemical fertilizer per unit land exceeded that of the U.S. (157 kilograms per hectare as opposed to 89 kg, as shown in Table 1), and today has approached the level of Japan in 1970, reaching 375 kilograms per hectare (see *Zhongguo nongcun tongji nianjian*, 2011: Table 3.4, 7.1; for the difference between fertilizer use [and improved seeds] in grain as opposed to vegetable crops, see Huang and Gao, 2013: 48-49).

Here we need to bring in a basic logic of agriculture that is commonly overlooked. As economic historian-theorist Anthony Wrigley has made clear, agriculture in the final analysis is based on “organic” sources of energy, very different from the “inorganic, mineral-based energy” sources of mechanized industry. A human labor unit can, through the use of animal power, expand its energy input maximally to about 8 times its own (human) power, but that is very far indeed from the amount of inorganic energy that can be generated from the 200 tons of coal that a single miner can extract in a year (Wrigley, 1988: 77). I need to point out in addition here that the productive power of land (aptly termed 地力 in Chinese, in its long and weighty tradition of agricultural studies 农学) is also reliant mainly on organic sources of energy. Even when modern inputs like tractors, chemical fertilizer, and improved seeds are applied, output per unit land remains severely constrained by limitations in the productive power of the land—its potential for increase is far more limited than industry’s potential with machine-generated inorganic energy. Compared to industrial production, agriculture is far more severely constrained by its given man-land ratio resource endowment and cannot break through those constraints to the degree possible in industrial production. This is a fundamental difference between agriculture and industry.

But economists today typically apply theories and concepts derived from inorganic industrial production indiscriminately to agriculture, treating agriculture as if it were just another “industry” of the machine age, with the implicit assumption that agricultural output can be expanded many, many times in the manner of mechanized industry. (For a more detailed discussion, see the General Preface 总序 to my three-volume work in press—Huang Zongzhi [Philip C. C. Huang], n.d., in vol. 1.)

The reality is that human energy and animal energy cannot be compared to the mechanical-industrial energy of tractors that is computed in terms of hundreds of horsepower. Although the American model of using tractors for

agricultural modernization can overcome the limitations of human energy, it cannot overcome the limitations of the land's growing power, because crop production is a matter of biological growth. It may be expanded several fold by the use of fertilizer or by the increased frequency of cropping from one to two or three crops a year, but not to the extent of the multiples of modern industrial production. The reason American agriculture is able to reach ten times Japan's per unit farm labor productivity in 1970 (and several hundred times China's today) is not just because of the use of machinery but, even more, is because of its abundance of land relative to labor to an extent unimaginable for Japan or China today. If the U.S. did not have that kind of land endowment relative to labor, its agricultural labor productivity could not have reached the dimensions that it has, no matter how many tractors there might be. (For a more detailed discussion, see Huang Zongzhi [Philip C. C. Huang], n.d.: "General Preface" to the three volumes, in vol. 1.) In the final analysis, the basic determinative factor in agricultural development is the man-land ratio factor endowment.

Of course, the American and Japanese models of agricultural development are relatively "extreme" examples (though China's man-land ratio is even more "extreme" than Japan's), and the majority of developed countries fall in between the two. Table 1 includes data on England, Denmark, France, and Germany. It can readily be seen that those countries fall in between the U.S. and Japan: with England closest to the U.S., with average cultivated acreage per farm labor unit in 1880 close to that of the U.S. (though by 1970 it amounted to just 1/5 that of the U.S., because of differentials in tractor development and in the changing man-land ratio in agriculture). Germany's was still lower. Even so, the average acreage cultivated per laborer in Germany in 1970 was still six times that of Japan. Clearly, when compared with Japan and China, the developed European nations were on the whole endowed with a considerably more generous land-man ratio; they are still basically a "lots of land and few people" model.

Table 1 shows also that, in terms of its man-land ratio, the nation closest to Japan is India. In 1970, its average cultivated acreage per laborer was similar to Japan's: two hectares per male labor unit. But it obviously lagged far behind Japan in agricultural modernization: in 1970, use of tractors and chemical fertilizer was still basically non-existent (on average just 1 tractor for 2600 laborers), lagging even behind China (which had one big or medium-sized tractor, or four small-sized tractors, for every 960 laborers). As I have written elsewhere, Japan's modern economic development started earlier than China's, and it further benefited from the fact that it had already entered the condition of low demographic growth by the 18th and 19th centuries, such that when vigorous industrialization and the modern inputs of tractors, chemical fertilizer, and



scientific seed selection came in the first half of the 20th century, the size of its agricultural population remained basically constant, this in sharp contrast to China (and India), where the productivity gains from modern inputs in the 1960s and 1970s were accompanied by rapid population growth (as a result of advances in healthcare) and further labor intensification (involution) in agriculture, such that the gains were erased by expansions in labor input. Between 1952 and 1978, China's agricultural output expanded about three fold, while its population increased by 2/3 and, because of the mobilization through the collective system of women for agricultural production and of all laborers for water-control work during the slack season, agricultural labor input per unit land actually increased even more, by three to four fold. Therefore, in terms of incomes per labor day, there was little or no advancement (Huang Zongzhi [Philip C. C. Huang], 2010: 5; see also Huang, Gao, and Peng, 2012: 157-59).

Yusheng Peng and I have shown in detail how, since the 1980s, the severe pressures on land have been mitigated because of the confluence of three historic tendencies—namely, the decline in the birth rate, the shift toward more “capital and labor dual intensifying” agricultural production as a result of increased incomes that have brought structural changes in food consumption patterns from the 8: 1: 1 ratio of grain: vegetables-fruits: meat toward a 4: 3: 3 pattern typical of the Chinese urban middle and upper-middle classes and Taiwan, and the massive migration of peasant-workers into the cities for urban employment. As agriculture changes more and more from low-value grain production to a larger and larger proportion of higher-value vegetables-fruits and meat-fish-poultry production, there has come the full development of the “small and fine” “new agriculture” that has driven (what I term) the “hidden agricultural revolution.” The gross output value of agriculture has risen six fold in the last 30 years, or at a rate of 6% a year, far greater than in agricultural revolutions of the past, such as the 18th-century English agricultural revolution, which saw output double in 100 years at a rate of 0.7% a year, or the “green revolution” of the 1960s and 1970s, which saw increases of 2 to 3% a year (Huang Zongzhi [Philip C. C. Huang], 2010: Chap. 5; see also Huang Zongzhi [Philip C. C. Huang] and Peng Yusheng, 2007).

In the same time period, India saw similar changes, though not at the same rate as China. Moreover, because of China's distinctive “household contract responsibility system” 家庭联产承包责任制, China has not experienced the same degree of “proletarianization” as Indian agriculture (in which 45% of the labor force in farming are landless laborers, compared to just 3% in China in its distinctive process of “capitalization without proletarianization” in agriculture (Huang, Gao, and Peng, 2012: esp. 157-59). Nevertheless, in terms of belated

agricultural development because of the constraints imposed by a harsh man-land ratio as well as the pattern of a “small and fine” model of agricultural modernization, the two countries share certain basic similarities.

Compared to Japan, China has also shown striking differences. In Japan agricultural laborers have reached about 20% of the farm labor force, compared to China’s “capitalization without proletarianization” figure of about 3%, again because of equitable land distribution through the household responsibility land system (Huang, Gao, and Peng, 2012). Even so, in terms of the contrast between a “small and fine” as opposed to the “big and coarse” American model of agricultural modernization, China and Japan are basically similar. Finally, if compared to the patterns of (South) Korea’s and Taiwan’s agricultural development, which are similar to Japan’s, China’s and India’s have come 30 to 40 years later, that because of the distinctive historical backgrounds of Korea and Taiwan (of earlier agricultural modernization, albeit under Japanese colonial authority) and also the more severe man-land ratio problems of China and India.

The main point here is that we must not mix up industry based on machines using inorganic energy with agriculture relying on organic energy sources. In the latter, factors of production, especially the man-land ratio and the limitations in productive power/energy of human labor and land, are given pre-conditions of natural resource endowment. The supply of labor (relative to land) in a given agricultural system may be scarce, but it may also be relatively ample or even over-abundant, this contrary to the basic assumption of neo-liberal economics that all productive factors are scarce resources that market mechanisms would allocate in optimal ways. The historical reality is that man-land ratios are largely given natural pre-conditions and not determined by market allocation. And those pre-conditions have been determinative for the course of agricultural modernization. That makes agricultural systems and agricultural development very different from what present-day conventional economics assumes them to be.

Because of the determinative importance of man-land relations for agriculture, what the history of agriculture demonstrates is not a uniform pattern of development, but rather two distinctly different patterns shaped by the man-land factor endowment. Of course, tractors of the machine age have greatly expanded the amount of land that a single human labor unit can cultivate, as shown by American agriculture in which one labor unit cultivates thousands of (Chinese) mu. But the necessary precondition for that kind of agriculture is “lots of land and few people,” something beyond the pale of possibilities for China with its “lots of people and little land.” We must not assume that China

can, simply by way of market allocation of resources, mimic American agriculture. The path of agricultural modernization appropriate for China given its “basic national condition” is not the American-style “big and coarse” path but rather the “small and fine” path first evidenced in Japan.

What has been explained above is in truth a matter of common sense but, under the hegemonic power of neo-liberal economic discourse (for a detailed discussion, see Huang Zongzhi [Philip C. C. Huang], 2012a: 61-65, 68-70), many people have come to think that (neo-liberal) economics is a “hard” science, something that mere laymen cannot understand. “Experts” in neo-liberal economics have of course helped propagate that feeling, the better to enhance their own value. The result is, under the oppressive power of supposed “scientific discourse,” many people have come to think that economics is something that they themselves cannot judge by their normal sense of truth and reality, but must rather defer to the explanations of the “experts.” Through all this, what is completely obscured is the fact that the thinking of most of these so-called experts has in fact come to be dominated by abstract theories that are divorced from reality, by the assumption that all economies, both industrial and pre-industrial, obey the same principles / logics of (industrial) economics, completely overlooking the fundamental realities and characteristics of agricultural production. It is this kind of unknowing misapprehension that underlies the pervasive belief that Chinese agricultural development must follow the American model of (economies of) large-scale production.

### **The Misunderstood and Misleading American “Model”**

China in the past made the mistake of imitating the Soviet model for agricultural modernization. Collective organizations (production brigades and communes), even though certainly accomplishing a good deal (especially in community water control, health services, education, and brigade-commune industries), did constrain peasant creativity and choke off the dynamic forces of a market economy. In the Great Leap Forward period, China suffered also from the misguided belief that “bigger is better.” In the marketized present, China has discarded the over-planned and over-controlled economy of the past. However, today it is in danger of once more going too far in imitating a given model and believing too much in a given ideology—namely, what is commonly assumed to be the most “advanced” American model and its “universally applicable” “science” of economics.

The vigorous support that the Chinese government has given in recent years to the so-called “dragon-head enterprises” 龙头企业 is one example. That

kind of policy assumes that China must imitate the American model of agribusinesses and their scale economies in order to drive Chinese agricultural development, disregarding basically what has been the truly important and major dynamic of Chinese agriculture in recent years, namely the “new agriculture” of high-value “small and fine” family farming. In reality, even most of the nominally large-scale agriculture of dragon-head enterprises of recent years has in reality operated on the basis of the “small and fine” family farms through agreements and contracts between the large firms and the small family farms (which can be called “contract farming”—see Forrest Zhang, 2008, 2013). This is because the labor of the small family farms remains to this day less expensive and more “efficient” than hired laborers (more discussion below). The really important thing that large firms have provided has not been so much “horizontal integration” of hired laborers in large-scale agricultural production for economies of scale, but rather “vertical integration” from production to processing to marketing. The critical weakness of such arrangements, however, is that most of the market profits have gone to benefit the commercial capital of the large firms rather than the peasant producers. (For more detailed discussion, see Huang Zongzhi [Philip C. C. Huang], 2012b: 94-96; Huang, Gao, and Peng, 2012.)

Under the state’s favoring of “dragon-head” firms, the alternative path of relying on cooperatives to lend small family farms vertical integration in production-processing-marketing has not really received appropriate support. When it comes to agricultural cooperatives, the PRC government has been either too controlling or too *laissez faire*, when what is really needed is for the state to take the lead and to provide resources, but for the peasants themselves to control and manage the coops for their own interests and benefit. That is what was done in Japan and in Taiwan. Their historical starting point, under Japanese rule, was the administration of agricultural development by basic-level local governments. Subsequently, under American occupation (or decisive American influence), local governance was democratized through the agricultural coops—by the government’s yielding of its powers and resources of agricultural administration to self-governing peasant coops, thereby both to drive the development of the coops and also to democratize village and rural governance, leading ultimately to the democratization of the entire political system. This was the consequence of historical coincidences, but it is a demonstrated model that works and that China today would do well to adopt deliberately. I have discussed this question in more detail elsewhere and will not belabor the point here (see Huang Zongzhi [Philip C. C. Huang], n.d., v. 3, Chap. 10; see also Huang, 2011).

The Party Central's call in its Document Number 1 of February 2013 for developing "family farms" 家庭农场 has brought a vigorous response from local governments throughout the country, and the media have also joined in eagerly to spread the message. The guiding idea is to overcome what is considered the main weakness of small-sized farms, low efficiency, and to encourage the formation of large farms and circulation of land. The Ministry of Agriculture has set the definition of "family farms" concretely at the scale of "big" farms over 100 mu, with the intention of supporting the formation of such "large-scale" farms as the models for agricultural development. This push for farms with scale economies is in complete disregard of the basic logic of Chinese "small and fine" agriculture. It is at bottom the same idea as the earlier policy to aggressively support dragon-head (agricultural) enterprises—that is, to use large farms with supposed economies of scale to drive China's agricultural modernization. The underlying vision is the imagined American model. That is why the rhetoric used comes from American agriculture's usage of the term "family farm," not from China's own peasant economy.

Here, we must first emphasize that American agriculture is in reality not at all what the current slogan of "family farms" imagines it to be. In an earlier day, American agriculture did indeed comprise mainly family farms in the conventional meaning of the term, namely, farms that rely mainly on the family's own labor. In the past half century, however, those have long since been replaced by large-scale farm enterprises relying on machine capital and hired labor. By the statistics of the U.S. Department of Agriculture, half of the output value of American agriculture is produced by the largest 2% of its farms, 73% by the largest 9% of its farms, averaging in size more than 10,000 Chinese mu (1676 acres) (USDA, 2005: Figures 3, 5). Each year the two million farms in the U.S. hire some 600,000 to 800,000 (legal) agricultural laborers (with U.S. citizenship or permanent residence) and another one to two million Mexican migrant farm-workers on a short-term or seasonal basis (Rodriguez, 2011; see also "Facts about Farmworkers," 2013).

American history and culture do indeed show a deep attachment to "family farms," viewing them as the bedrock and symbol of the American "national character," but in truth, family farms have been supplanted by large-scale agribusiness farms. Today, the "family farm" in the U.S. is more constructed myth and cultural symbol than economic reality. The article "The Triumph of the Family Farm" in the July-August 2012 issue of the *Atlantic Monthly* has been widely cited and quoted in China, but it presents as its sole example of a so-called "family farm" one that farms 33,600 Chinese mu (5600 acres) with three full-time farmers (the owner plus two full-time employees), and lots

of hired short-term and seasonal farmworkers (Freeland, 2012). It is in fact a highly capitalized, mechanized, and automated agricultural firm, a far cry from an actual family farm.

But in the American statistical system, the definition used for a “family farm” is only that the owner and his family members and relations hold one half or more of the title of the farm (USDA, 2013: 47). This definition has created serious misunderstandings among Chinese readers. In China, as well as for the majority of agricultural researchers throughout the world, the commonly used definition for a family farm is a farm that uses mainly its own family labor. Even the Chinese Ministry of Agriculture in its current advocacy of developing “large” “family farms” uses that basic definition (“Nongyebu . . .,” 2013). By that definition, most so-called “family farms” in the American official definition are in fact not family farms. They can at most be called “agricultural enterprises owned partly by families.” Thus, when the American Department of Agriculture asserts that 96% of its farms are family farms, it is using its own peculiar definition and not what most people understand by the term (USDA, 2013: 47). This fact in itself shows that the American agricultural model is not suitable for China.

The so-called “large farms” of China and the U.S. are indeed entirely different. We have already considered the great difference in scale: what the U.S. Department of Agriculture defines as a “large farm” averages 1676 acres (or more than 10,000 Chinese mu), whereas what the Chinese Ministry of Agriculture defines as a large farm is just more than 100 mu. The very different conceptions of scale may be further illustrated by the machinery used in American agriculture: in 1970, tractors and planters could plant 40 acres (240 Chinese mu) in a day; by 2005, they could do 420 acres (2520 mu) in a day, and by 2010, fully 945 acres (5670 Chinese mu), or 24 times that in 1970. The newest and largest tractors cost as much as \$500,000 U.S. In that same year, harvesters could do 12 times what those in 1970 did (USDA, 2013: 23; Freeland 2012).

The large American farms are mainly grain-growing farms. In 2007, “field crops,” which include, in addition to cereals, also cotton, hay, tobacco, and the like, accounted for fully 96.4% of all “harvested crops” (USDA, 2013: 11, Table 1). This fact is closely related to the basic characteristic of American agriculture: precisely because its natural endowment in land (relative to labor) is so abundant, its main path of modernization has been through machinery use and economies of scale, and the “big and coarse” “field crops” on large, open fields are precisely those most amenable to large-scale production with tractors, planters, harvesting combines, automated irrigation and fertilizer application, and herbicides for weeding, all for the purpose of saving on relatively

scarce and expensive labor. This is precisely the kind of agriculture described in the *Atlantic Monthly* article referred to above, the key to which is at bottom the great abundance of the U.S.'s land endowment. Such agriculture is the dominant content of American agriculture, which is traceable to the "big and coarse" mode of modernization discussed above.

Of course, this is not to say that American agriculture is all "field crops." The remaining 3.6% of the cultivated area is devoted to high-value crops: mainly vegetables, fruits and melons, tree nuts, and flowers and plants, or the "small and fine" portions of American agriculture. They are the relatively labor-intensive and also (non-machinery) capital-intensive parts of American agriculture. They do not rely mainly on machinery, but rather must use definite amounts of hand labor to harvest, to pick fruit, for finer application of fertilizers and herbicides, and so on. For the relatively labor-scarce U.S., such needs cannot be met by its own labor alone. That is why U.S. agriculture relies also on one to two million seasonal and migrant laborers from outside each year, many of them so-called "illegal" immigrants.

American immigration policy has therefore long been entangled in the conflicting tugs of banning and yet not banning illegal immigration. Historically, California agriculture relied first on Chinese laborers in the 19th century, then Japanese laborers in the early 20th century, and finally Mexican laborers, including a high proportion of so-called illegal immigrants. On the one hand, many Americans object to illegal immigration, because they feel that such immigration takes away employment opportunities from American citizens. On the other hand, agribusiness (as well as the construction industry) widely uses cheap laborers. That is why, regardless of what the stated policy might be, the actual control of illegal border crossings has been sometimes tight and sometimes loose. The widespread reliance on illegal migrants has long become a necessary part of American agriculture (and construction). The key is simply real need for such, especially for the high-value agriculture that is relatively labor-intensive (Chan, 1986; see also Huang, 1990: 66). By the statistics of the American Department of Agriculture, in 2007 the 3.6% of cultivated area used for high-value agriculture accounted for 36.8% of the total output value of American agriculture (USDA, 2013: 11, Table 1).

Even though this high-value agriculture produces 10 times the value of its proportion of the cultivated area, the fact that it nevertheless accounts for a mere 3.6% of all harvested acreage attests to the basic characteristic of a great abundance of land in American agriculture: its structure is predicated not on land-saving but rather on labor-saving. Its main concern is not to maximize output per unit land, but rather to maximize output per unit labor. Even though

its big, open-field crops produce one half less in output value than its proportion of land (63.2% vs. 96.4%), they still occupy an overwhelming percentage of all land farmed, fully 27 times as much farmland as the high-value crops. By contrast, grains today in China have shrunk to only 56% of all sown acreage, and just 15% of the total output value of agriculture, while non-grain farms produce 85% (Huang Zongzhi [Philip C. C. Huang] and Gao Yuan, 2014: Table 2). The governing logic of Chinese agriculture is thus the opposite of American agriculture: its concern is to maximize output per unit land, not per unit labor. They represent two entirely different paths of agricultural modernization.

American grain production is of the “big and coarse” variety relying mainly on machinery, while its high-value agriculture is relatively “small and fine” agriculture that relies mainly on cheap immigrant labor. Among the latter, even the small, genuine family farms that use the family’s own labor employ seasonal short-term immigrant labor. The larger the scale of the high-value agriculture farm, the more labor it employs (but no systematic, accurate data exist because employment of “illegal” immigrant labor occurs in a kind of grey area of the law and is difficult to quantify). By formal, reported records, “small” high-value agriculture farms (of less than 50 acres, or 300 Chinese mu) employ 7%-24% of their labor, while larger high-value agriculture farms over 100 acres (600 Chinese mu) employ more than one half of their labor, in addition to the unreported short-term labor. As for the cereal farms, even the large ones, according to recorded data, employ just 20% (in wheat farming) to 36% (in soybean farming) of their labor, plus their unrecorded seasonal labor (USDA, 2013: 18-19, Tables 6, 7).

For Chinese agriculture with its “lots of people and little land,” neither of these two American modes of farming is feasible. American grain farming’s reliance on its rich endowment of land, and machine capital to almost completely replace human labor, is not something that China can imitate. As for its extensive reliance on cheap immigrant labor for high-value crops, that too is not something China can imitate. China does not have this kind of land endowment or this kind of cheap immigrant labor. Chinese family farms can hire some local labor and labor from other areas of China, but it does not have access like the U.S. to foreign labor whose wages can be that much cheaper than for its own citizens, nor can it hire such laborers to an extent that nearly equals in number its own citizens engaged in farming. In a word, the American model is simply not feasible for China.

Even the relatively highly mechanized open-field grain agriculture of China today still differs in basic ways from American “field crops” farming in the



extent of its mechanization and automation. Mechanization in Chinese “big field” 大田 agriculture is still limited to tasks that are performed by the relatively more expensive “principal labor units” (i.e., males in their prime) and not those that are performed by the cheaper family “auxiliary labor units” (i.e., women and the elderly), and therefore differs considerably from the work arrangements of the highly mechanized and automated large agribusiness farms in the U.S. Mechanized big-field grain agriculture in China thus still relies mainly on (auxiliary) hand labor for the smaller tasks like weeding, fertilizing, applying herbicides, watering, and such. It too operates to some extent by a “labor and capital dual intensifying” farming mode. (For detailed evidence and analysis, see Gao, 2014)

Many people’s misunderstandings and imaginings about the American model come not from history or contemporary reality but rather from misleading economic theories. Many believe that with the market allocation of resources, economic entities would reach optimal scales, concretely manifested in the economies of scale of large firms and large farms, and they thereby come to the conclusion that Chinese government policies must favor and support the dragon-head enterprises and “large” “family farms.” Some go further and insist on supposedly necessary linkages of modern farming with private property rights and much higher degrees of transfers of land. What such people want, in the final analysis, is their imagined American model, which they mistakenly equate with “family farms.”

What needs government support today is not farms that might turn into American-style agribusiness farms of thousands or tens of thousands of mu, but rather the ten mu to “several tens” of mu “small and fine” farms, farms that are genuine family farms using mainly family labor. In the high-value “new agriculture,” like tented or hothouse vegetables, fruit orchards, or farms combining crop raising with (small-scale) animal husbandry, relying mainly on the family’s own labor, a few mu to ten-plus mu is in fact already “appropriate scale.” Those have in fact been the mainstays driving the “hidden agricultural revolution” of the past 30 years. Outside of those, in the low-value grain farms, the partly mechanized-automated and partly family hand-labor based farms are already at optimal scales when they reach 20 to 100 mu. This is the situation in China today, one that will remain in the near to intermediate-term future.

Here we need to explain that “appropriate scale” and “scale economies” are two very different concepts. “Appropriate scale” differs from the excessive labor intensification and/or underemployment of farm labor that results from China’s land scarcity (relative to labor supply), what I term “involution,” and refers to full

and optimal employment of the available farm labor force under current conditions. Such appropriate scale is entirely different from the notion of “bigger is better” which arises from simplistic understandings of the concept of “economies of scale.” It refers rather to a scale that is appropriate and optimal under different given objective conditions. More will be said below on this point.

### Empirical Examples

After the issuance of the Party Central’s Document Number 1, many “investigative reports” on so-called “family farms” have appeared from various localities. At present, one cannot yet obtain comprehensive and systematic information for the entire country. Nevertheless, on the basis of some of the better and more empirically detailed reports, the basic economic logic of the question at issue seems to me already fairly clear. What follows is a preliminary discussion.

First, according to media reports, the Party Central’s issuance of its document is directly linked to a “test point” 试点 cum investigation project of the highest levels conducted in July 2012 at Shanghai’s Songjiang 松江 district’s Maogang town 泖港镇, under the leadership of the Rural Economic Research Section of the Center for Development Research of the State Council 国务院发展研究中心农村经济研究部 and involving some 18 ministries and commissions, including the Central’s Office of the Leadership Small Group for Rural Work 中央农村工作领导小组办公室, the National Development and Reform Commission 国家发改委, and the Ministry of Agriculture. As reported in the media, the focus was on grain (rice + wheat) production, and the purpose was to break through small-scale production into large-scale production, predicated on the notion that such change would raise both land and labor productivity. The media report made very clear that the term “family farms” is deliberately intended to be an imported one, borrowed for the purpose of capsuling the guiding ideas behind this investigation. There can be no doubt that, for many of those participating in the investigation, the inspiration for the whole project is the imagined American model (“Shanghai shi jiaoku de jiating nongchang,” 2012).

However, from the detailed empirical examples cited in the media report, we can actually see clearly that 100 plus mu “large” “family farms” in fact produce lower unit area net incomes and output than smaller farms. The main case example cited for Songjiang is farmer Li Chunhua 李春华. He acquired contract responsibility for 200 mu of land to grow rice. In addition to the typical production costs for fertilizer, herbicide, improved seeds, watering, and

such, expenses that are basically the same as those for smaller family farms, Li also had to pay for renting in responsibility land (700 yuan per mu) and for hiring labor (250 yuan/mu). Therefore, his net earnings were only 184 yuan per mu, much lower than for the smaller farms that did not have to pay for rent and labor (more below). Outside of that, Li grew winter wheat on 1/3 of the land he farmed, obtaining about 200 yuan per mu in net earnings (but small farms also grow winter wheat). In addition, over and above his receipts from the two crops, he obtained 450-500 yuan per mu of subsidies from the government. Altogether, then, he netted a total of about 1000 yuan per mu. (According to the media report, "Of the 26.07 million yuan total in 2011 of agricultural subsidies provided by the different levels of governments to such farms, the central government accounted for 14%, the Shanghai municipal government 40%, and the Songjiang district government 46%, and the data gathered on 100 family farms by the investigative team showed that each averaged 59,746 yuan in subsidies, amounting to 498 yuan per mu farmed" [ibid.].) In other words, Li Chunhua's earnings did not come so much from the superior economic productivity of his farm, but rather mainly from the subsidies he received from the government.

This report did not specifically compare output per unit land between Li's "large" farm and the smaller farms, but we can see from investigative reports on other localities that the "large" farms reach at best the level of unit area output comparable to the small farms; more commonly, they fall short of the small farms.

He Xuefeng's on-site field investigation in Anhui's Pingzhen 平镇 shows first of all the same situation as in Songjiang: the farm of an agricultural firm and of a "large" "family farm" have net incomes per mu much lower than the small "middle peasant" family farm: 315 yuan vs. 520 yuan vs. 1270 yuan. As might be expected, the agricultural firm must pay rent to lease responsibility land (whereas the small family farm cultivating its own responsibility land does not have to pay any rent) and regular wages for hired labor. For hired labor, the large firm must pay regular wages (90 yuan/mu), plus wages for the work supervisor (80 yuan/mu), whereas the "large" "family farm" pays only wages for (short-term or auxiliary) labor (50 yuan/mu). By contrast, the small, genuine family farm pays little or no wages, relying mainly on its own family labor (He Xuefeng, 2013a: Table 3, 4, 5). That is why the net income per mu is substantially higher for the small family farm than for the agricultural firm and larger farm.

As for unit area output, the farm land of the agricultural firm produced a total of 1100 catties of grain (rice + winter wheat) per mu, the "large" "family

farm” 1600 catties, and the small middle-peasant family farm 1800 catties. Because the largest farms adopt a coarser mode of production, whereas smaller farms tend to be more meticulous, the latter generally obtain higher yields (*ibid.*). The logic here is the same as in the two main patterns of agricultural modernization discussed above.

But the head of the Ministry of Agriculture’s Cultivation Section 农业部种植司司长 claimed before the media that “family farms” using only 7.3% of the farm land have produced 12.7% of the nation’s grain. What he sought to emphasize was that farms enjoying scale economies are far more efficient than small farms, whether in unit area output or unit labor productivity (“Zhongliang dahu he shengchan hezuoshe: zhongle 1/10 de di, chanle 1/5 duo de liangshi,” March 25, 2013). This of course runs completely counter to what we have discussed above about the history and logic of agriculture. It clearly comes from an assumption derived from a particular kind of theoretical persuasion and has nothing to do with genuine statistics. In fact, for an important official of the Ministry of Agriculture to make such a declaration bears additional testimony to the ideological influences behind the slogan “family farms.”

We can look also at the findings of Chen Yiyuan from southern Hunan’s “Pingwan” county “平晚”县. Here the local authorities have set apart 1800 mu as a showcase for double-cropped rice. The main case example of Chen’s investigation comes from one Yi Tianyang 易天洋 who has contracted (in 2012) for 200 mu of that land. We know from earlier research that in the mid-1960s, Shanghai’s Songjiang (a county at that time) pushed vigorously for double-cropped rice (the slogan of the time was “eliminate single-cropped rice!”), but that resulted in severely diminished marginal returns: early and late rice require about the same amount of fertilizer and labor input as single-cropped rice, but produced substantially lower yields (both in quantity and quality) per unit labor, and was therefore (in my terms) “involutionary.” Subsequently, in the de-collectivization period, the county pursued de-involutionary policies, eliminating most of the double-cropping, in order to reach more appropriate levels of labor input (Huang, 1990: 225, 239-40, 241-43). But today, because of the government’s emphasis on maximizing per unit land yields in grain, the southern Hunan government is trying to push double-cropping of rice. Chen Yiyuan’s materials show that double-cropping of rice is in fact not economical, and farmer Yi does it mainly for two reasons: one is for the sake of earning government subsidies (150 yuan/mu), and the other is in order to maximize his personal take by maximizing his own sown acreage, despite the diminished returns per cropping. The price paid is reduced returns per unit sown area and per unit labor, but those are of no concern to Yi, since he wants only to maximize

his own personal income, by increasing the amount of acreage sown, thereby reaping the largest possible return for his invested capital (for contracting 200 mu). In year 2011, Yi had contracted to farm 131 mu, obtaining net earnings of just 545 yuan per mu (roughly comparable to the “large” “family farms” in He Xuefeng’s investigation), much lower than the small-scale family farm, but his personal income for the year was 60,000 yuan, substantially more than that of the small family farmer. Chen’s second main example, Yi Longzhou 易龙舟, tells basically the same story, only his scale of operation is even larger, at 270 mu, and his personal earnings therefore also correspondingly larger (Chen Yiyuan, 2013: 142-43).

What these two case examples illustrate is the real logic of the large-scale “family farm.” This is not what economics would call the “optimal allocation of resources,” but rather the twisting of economic logic by government actions. Chen Yiyuan points out that the consequence of government actions “is to push out those who farm just their own responsibility land” (Chen Yiyuan, 2013: 143). He Xuefeng puts the matter more dramatically, calling such actions “government support for large farms to beat the small farms” (He Xuefeng, 2013b). This kind of action is only good for those who own/control capital, but from the point of view of combining land and labor in appropriate scale combinations for the optimal allocation of given resources in “lots of people and little land” China, it is in fact un-economic behavior.

The appropriate-scale economy for open-field (grain) agriculture is actually evidenced not in the “large” “family farms” pushed by the government, but rather in the “middle peasant” small peasant family farms that have arisen in recent years. They are comparable to the owner-cultivator middle peasant farms after the Land Reform. Today, many of them use mechanized plowing, planting, and harvesting like the large farms (but do not own their own farm machinery but rather hire in such work) and supplement that with (relatively inexpensive and fine/meticulous) maintenance of the fields by the family’s own labor, in fertilizer application, watering, insecticide-herbicide application, weeding, and so on. When such farms reach the scale of 20 to 50 mu, they are already at the point of full use of the family’s labor and are best suited for China’s “basic national condition,” for high efficiency land use as well as for providing the family with full employment and “modest prosperity” 小康.

These are family farms in the true meaning of the term. In the 2012 symposium on “China’s New Age Small Peasant Economy” that I organized, there was already a good deal of detailed evidence for and theoretical discussion of such farms (Huang Zongzhi [Philip C. C. Huang], ed. 2012). These middle peasant farms are already modernized to a considerable extent and are relatively high

income farms, even though they remain some distance from the large American family farm enterprises in their degree of mechanization and automation. They are a combination of “big and coarse” machine plowing-planting-harvesting with “small and fine” maintenance. For the latter, they are to some degree a “capital and labor dual intensifying” operation. With the size of the farm labor force diminishing fairly rapidly since the turn of the century, such farms may well come to account in the future for the majority of farms in China.

These middle peasant farmers are also those who are most concerned with local community affairs. They are people who can be relied upon to form the core for stabilizing and restoring village communities (Huang Zongzhi [Philip C. C. Huang], ed. 2012). In my view, these are the farms that the government should actively support by encouraging and supporting cooperatives to lend them better services for vertical integration from production to processing to marketing, so that they can obtain a larger proportion of the benefits from the market. The government should also set up ways for these farms to obtain credit and raise capital more easily in order to maximize the numbers of peasants who can attain “modest prosperity” 小康. In a still longer term perspective, the government should also encourage such farms to enter into still higher-value green agriculture, which is generally also “small and fine” farming. That is the best direction for development that would benefit the majority of the rural Chinese people.

As for the “new agriculture,” there have also arisen spontaneously large numbers of appropriate-scale farms all over the nation. The 2012 symposium mentioned above contains multiple examples. Here we might add the example of vegetable farming in Handan city’s Yongnian county 邯郸市永年县 in Hebei. The report, done by the study group from Shanxi’s Changzhi city, seems on the surface to be a response to the call for developing American-style large “family farms,” but ironically provides examples for an entirely different practice. As the report points out, that locale has since the 1980s developed a 150,000 mu area of garlic growing and an 80,000 mu area of “facilities vegetables” 设施农业 (i.e., with modern facilities/apparatuses like plastic tents and hot houses). Those are not operated as large farms of scale but rather in small and medium-sized plastic tents of 1 to 3 mu in size, appropriate for individual families doing their own farming. As the report also points out, these tented vegetable farms have the following advantages: “First, they need relatively little capital and show results quickly. The tents are made of bamboo frames that cost about 6000 yuan for one mu, and can be used for three years, which means a cost of only 2000 yuan per year, plus production costs of 1500 yuan. Second, they can be flexibly cropped, allowing five or six crops a year, growing

such products as cabbage, celery, tomatoes, Chinese lettuce, squash, and so on, more than 70 varieties in all. Third, they use land efficiently, requiring little space in between, such that effective land use exceeds 95%. Fourth, they incur little risk, because fog and cold weather and such have little effect on them" ("Guanyu fu Hebei sheng Yongnian xian xuexi kaocha shucai chanye fazhan de baogao," 2013). What the report does not spell out is that this is obviously something that a high proportion of common Chinese peasants possess the means to undertake, making it entirely different from the large "family farms" of over 100 mu, which only a very small minority of peasants with substantial capital can undertake.

Furthermore, the locale has already acquired a considerable reputation for "pollution free" 无公害 brands, with 198 varieties of "green, organic food products certified to be pollution free." And the vertical integration from production to processing to marketing is provided mainly by peasant coops, of which there are 236 specialized vegetable coops that together control about 40% of all vegetable growing and account for 60% of all peasant coops. "Their members enjoy not only technical, informational and marketing services, but also selling prices about 5 to 10% higher than typical market prices" (ibid.). This is a model that closely resembles what this article advocates, a model that is well-suited to China's "basic national condition" and that is consistent with the economic logic shown by the agricultural history of countries throughout the world. It is a model that can provide a path to "modest prosperity" for the majority of Chinese farming people.

### Misunderstanding the Theory and Reality of Family Farms

The publicity and touting that the media have given so-called "family farms" since early 2013 in fact came with deeply laden misunderstandings of history and of related theory. One major misunderstanding, even in academic circles, is equating "peasant economy" with pre-commercial "natural economy," and assuming the theory about "family farms" of A. V. Chayanov, the most important theorist of peasant economy, to be limited to a self-sufficient, pre-market natural economy. (This is true even of a theorist as well-known as Robert McC. Netting [Netting, 1993: 16; Chap. 10].) Following that line of thought, numerous scholars outside China who study Chinese agriculture have opted to use the word "farmer(s)" rather than "peasant(s)" to translate the Chinese word *nongmin* 农民. Even the English language publications from China have opted for the same word. "Farmer" is of course the standard term used in American

agriculture and American history. Such a choice is related to what has been discussed above: the assumption, especially among “mainstream” neo-liberal economists (including “institutional economics” that holds that private property rights are crucial to all economic development), that modern economic concepts—which are based largely on industrial economies—are applicable also to Chinese agriculture. They believe that Chayanov’s theories are irrelevant because they apply only to pre-market natural economies that no longer exist.

This is, first of all, a fundamental misunderstanding of economic history. Peasant economies historically were not purely natural economies, but rather have long been partly commercialized and partly self-sufficient economies. In the deep and weighty tradition of “peasant studies,” a fundamental concept and point of departure is precisely that “peasant economy” is partly commercialized and partly self-sufficient (see, for example, the classic text of Eric Wolf, 1969). This point is very obvious for China: in the Ming and Qing, by way of the “cotton revolution” (in 1350 no one in China wore cotton cloth; by 1850, almost everyone did) and also the spread of silk production, Chinese agriculture underwent quite vigorous commercialization, such that Songjiang prefecture became the nation’s major cotton producing area that “clothed the empire” 衣被天下, and peasants nearly everywhere in China participated in trading grain for cotton cloth, forming a national market for cotton cloth. And areas like the Taihu basin, where peasants raised silkworms and reeled silk thread and urban workers wove and processed silk fabrics, came to supply the upper classes throughout the country with the silk products they were accustomed to wearing (while peasants wore mainly cotton cloth garments). Even in grain, there came to be sharper and sharper distinctions between “fine grains” (like rice and wheat) and “coarse grains” (like millet, corn, sorghum, and sweet potatoes as a substitute for grain). The former had long been commercialized and is properly considered an “economic (i.e., commercialized) crop” 经济作物. In North China, fine grains and cotton made up the two mainstays of its market economy. Such examples are among the main empirical contributions of the “incipient capitalism” scholarship in China of the 1950s to the 1980s and of the preceding two generations of international research on China’s rural economy and are common knowledge among economic historians. Only those who ignore history would make the misguided equation between peasant economy and natural economy.

Even at the level of theory, Marx and Engels early on employed the concept of “petty commodity production” (by those who owned their own means of production; also termed “simple commodity production” or “simple commodity exchange”) and saw that peasants engaged in commodity production and



commodity exchanges in periodic markets and towns. The concept of “incipient capitalism” employed by Chinese scholars in the 1950s to the 1980s was used to expand Marx-Engels’ original concept of pre-capitalist “petty commodity production” in order to encompass Chinese historical experience of the Ming-Qing period. Indeed, there were also scholars who argued for incipient capitalism in the Tang and Song (led mainly by Naitō Torajirō of the so-called “Tokyo School” in Japan), and even in the Warring States period (Fu Zhufu). I have discussed these theories and their supporting evidence in my earlier volumes, especially the Yangzi Delta volume, and will not repeat those here.

Even neo-liberal agricultural economics early on used market economy theory to comprehend and analyze (Western) family farms and viewed pre-modern agricultural economies as efficient economic systems in which resources were allocated by market mechanisms (Schultz, 1964). That kind of theory made the mistake of simply applying an economics “science” based on the machine age to agriculture, without understanding the differences between an economy based on organic energy and one based on inorganic energy—namely, the differences between factors whose productive power is of limited inflatability, like human labor power and land productive power, and those that can be greatly expanded, like machines, technology, and capital. It therefore also failed to see the crucial importance of the man/land ratio for agriculture. But it does grasp the reality of commodities and market economy in peasant economy.

As for the substantivist (distinguished from Marxist and neo-liberal “formalist” theorists) theorist Chayanov, his point of departure was a precise grasp of the partly commercialized peasant economy of the late 19th and early 20th centuries. Readers of his work need only take note of the large quantities of empirical evidence for such discussed in his book. For Chayanov, the fact that peasant economies were commercialized to a considerable extent was a given that went without saying. But he elected to focus on the non-commercialized parts of peasant economy in order to bring out the distinctive logic of the way family farms are organized. This is something that good theorists often do: to isolate parts of empirical reality in order to highlight, illustrate, and explain the hidden logic that they contain. What Chayanov was most concerned with was how the family farm organization of peasant economy differs from the enterprises of capitalist economy.

First, Chayanov explains how the family farm is at once a production unit and a consumption unit, and its economic choices are predicated on both; a capitalist enterprise, on the other hand, is only a production unit, and its economic decisions will not be affected by the consumption needs of its employees

and workers (Chayanov, 1986 [1925]: "On the Theory of Non-Capitalist Economic Systems," pp. 1-28). Even though Chayanov did not focus on "lots of people and little land" peasant economies in his research, he did insightfully point out that if a family farm does not have sufficient land appropriate for the given labor supply of the family, it can be pushed to put more and more labor into the land it does farm (for diminishing returns to its labor) until the consumption needs of its family members are met. But a capitalist enterprise will not do so, because when the marginal returns to labor shrink below its marginal cost, it will cease to put in more labor (hire additional labor), because that would mean operating at a loss. In short, a family farm is different, because it must meet the consumption needs of its family members (*ibid.*: 118). Moreover, because the labor it puts in is the family members' own labor and not hired labor, it does not engage in calculations of costs and returns to its labor in units and time. Rather, it is mainly concerned with whether its final harvest meets the family's consumption needs. On that basis, Chayanov built his famous theory of the equilibrium point between the drudgery of labor and the satisfaction of consumption wants, in order to clarify the non-capitalist nature of the economic decision-making and behavior of family farms (*ibid.*: esp. 82-84). His purpose was not to argue that all of the family farm's actions are to be explained in this way, but rather to explain that such a logic carries considerable sway in the peasant economy.

In addition, Chayanov provided a systematic analysis of the economic conditions and stimuli under which a family farm would enter into handicraft production (including the portions that are sold) to augment its crop production (*ibid.*: Chap 3) and under what conditions and what logics a family farm would invest more capital (fertilizer, animal power) to raise its output and returns (*ibid.*: Chap. 5). What Chayanov wanted to prove is that such decisions of the family farm are based on different logics from those of a capitalist unit of production and will be influenced by the distinctive organization of the family farm as both a production and a consumption unit, and hence by considerations not just of production but also of consumption, and also as a unit that does not employ labor but rather one that deploys its own given family labor. All this is not to argue that the family farm operates in a natural economy unrelated to market forces, only that as an economic decision-maker it behaves differently from a labor-employing capitalist enterprise.

Chayanov was indeed opposed to the single-minded pursuit of profit maximization of capitalist enterprises. He did indeed consider them inhumane, but he did not for that reason reject market economy or operating for profit. The vision that he proffered in the end was of agricultural cooperatives comprised

of family farms to provide vertical integration from production to processing to marketing, not for the sake of profits for capital, but rather to distribute more equitably profits earned from the market to small peasant members, not just capitalist firms or the owners of capital (*ibid.*: Chap. 7, esp. pp. 263-69). All this was certainly not because he considered peasant economy to be a mere natural economy without market exchange and commodities. As someone theorizing at the turn of the 19th and 20th centuries, Chayanov most definitely would not have thought that way, for that would mean utter ignorance of contemporary realities.

Chayanov's key contribution actually consists in the fact that his theory is particularly well suited for understanding a "lots of people and little land" peasant economy, even more than for comprehending the relatively land abundant peasant economy of his native Russia. My three-volume study has demonstrated in detail how population pressure drove "involutionary commercialization"—in order to meet the household's consumption needs, peasants turned from stable but relatively low-value grain cultivation to higher-value cotton and silkworm-mulberry cultivation, plus cotton spinning and weaving and silk thread reeling. What came with that shift was lower (i.e., diminishing marginal) returns in value per workday, but higher returns per unit land (Huang Zongzhi, n.d., v. 2; Huang, 1990). The family production unit under such pressures showed exceptional resilience and economic "rationality": it could efficiently and inexpensively combine two kinds of production, almost like twin crutches, to sustain its livelihood—by combining cropping and handicrafts in the Ming and Qing and farming and off-farm work today (Huang, 2011a). These are insights based on knowledge of a high degree of commercialization of the peasant economy and of the semi-proletarianization of peasants, most certainly not on an equation of peasant economy with natural economy. Of course, the empirical reality of many members of Chinese peasant households taking on urban employment as semi-proletarians ("semi" because they remain closely tied to their peasant households) is not something that Chayanov could have foreseen in the early 20th century.

These observations are an augmentation and extension of Chayanov's theory, and to some degree also a revision of his work from the standpoint of Chinese realities. But Chayanov's focus on the distinctive organizational characteristics of the family farm is the point of departure for such a line of analysis.

In short, to view Chayanov as a "natural economy" theorist is to misunderstand his work completely. It is also to fall into the trap of a misconception that is shared by Marxism and neo-liberal (as well as classical-liberal) economics: namely, that economic development can only progress in a unilinear fashion

from pre-capitalist to capitalist, pre-market to market economy. That view was in fact the main foil of my second volume, on the Yangzi Delta (Huang, 1990). To be sure, contrary to (formalist) classical and neo-classical economists, Marx and Lenin advocated a socialist revolution by the proletariat, adding to the view of unilinear development from pre-capitalism to capitalism the theory for and belief in the necessity of proletarian socialist revolution. But they and neo-liberal economists share basically the same historical view of unilinear change from pre-capitalism to capitalism. What Chayanov pursued was an alternative possibility, one that he considered more equitable, humane, and democratic. For that reason, he has been considered an enemy by neo-liberal economists and was killed by Stalin who considered himself a Marxist-Leninist.

Given the reality of an average of less than ten sown mu per labor unit (male and female) in present-day China, Chayanov's theory provides us with a host of inspirations and insights. First, his line of thinking can be extended to help explain the special characteristics of family farms under the pressures of "lots of people and little land," why family labor today is still cheaper and more efficient than hired labor, and why even agribusiness firms today still prefer to operate by "contract farming" with small family farms rather than hiring wage labor in the manner of traditional capitalist entities. His line of thinking can also help explain why the family production unit comprising both principal and auxiliary labor is especially well suited for "capital and labor dual intensifying" new-style small farms that require irregular but multi-faceted, intensive labor input and why such units are rational and efficient. It can also help explain why an agriculture based on such units needs today not "horizontal integration" into large-scale farms based on wage labor, but rather vertical integration services to link production to processing to marketing. The latter is what the government most needs to do today with the voluntary and self-governing participation of peasants, not the either/or choice between over-controlled collectives and laissez-faire capitalism. The mistakes of collectivization in the past do not mean that one must now follow the extreme of a purely American model. In light of China's "basic national condition," "small and fine" genuine family farms, coupled with government-led but peasant-controlled cooperatives, with voluntary participation by peasants for their own self-interest, is the best possible road for the future. (For more detailed discussion, see Huang Zongzhi, n.d.: esp. Chap. 10, and Huang, 2011b.)

The unrealistic call for large-scale "family farms" runs completely counter to the peasant economy tradition of scholarship discussed above. It is a vision born of capitalist economics, with Americanized rhetoric. It derives from a

mistaken idea of the American model, advocating an agriculture based mainly on mechanization and economies of scale, but erroneously equating that with what it terms “family farms.” It completely ignores peasant studies and theories of family farming, as well as the realities of China’s (hidden) agricultural revolution of the past 30 years. In the end, it is a hollow vision that hangs in thin air.

What is needed today is a “feet on the ground” grasp of the realities of the “triple problem of agriculture, peasants, and villages” 三农问题 and not to err once more by subscribing to abstract theoretical visions and unrealistic plans and policy decisions. What is needed is genuine concern for the interests of the peasant majority. The starting point needs to be a realistic grasp of the “lots of people and little land” “basic national condition” of China and real understanding of the “small and fine” path of agricultural modernization. Only by starting from the reality of genuine family farms that are “small and fine” can genuine family farming of truly appropriate scales for China be developed. Such a direction is the one that can, through “capital and labor dual intensifying” small-scale agriculture, provide full employment opportunities for China’s peasants. It also can help rebuild China’s rural communities. From a longer-term perspective, it can lead quite naturally to a green agriculture based similarly on small family farms and provide the Chinese people with healthy food products. It is a road that is very different from an American-style industry-ized and capitalism-ized agriculture that today threatens the food safety of the entire world.

## **Appendix: Method of Computation and Sources for the Data on China in Table 1**

### *A. Data for 1880*

Cultivated acreage per male labor unit: the 1880 population and total cultivated acreage data come from the average of Perkins’ numbers for 1873 and 1893 (Perkins, 1969: 16). Conversion from population numbers to male laborer numbers is based on the ratio between the two in China in 1952 (Zhongguo tongji nianjian, 1983: 103, 122).

Output per hectare: the number used here is Perkins’ number for grain output in 1853, which is essentially the same as his figure for 1933 (243 catties/mu and 242 catties/mu).

Output per male laborer: the figure used here is simply cultivated acreage (per male laborer) x output (per mu).

### B. *Data for 1970*

Cultivated acreage per male labor unit: the total cultivated acreage of that year divided by one half of the total agricultural workforce of that year. The number for cultivated acreage comes from *Xin Zhongguo liushinian tongji ziliao huibian*, 1949-2008, cited from *Zhongguo zixunhang* data; the number for laborers comes from *Zhongguo tongji nianjian*, 1983: 122.

Output per hectare of cultivated acreage (in wheat equivalent, in tons): the output data for China are data for sown acreage, from *Zhongguo nongcun jingji tongji daquan*, 1949-1986: 148-55. The acreage under rice that year was about double that of corn; the sown acreage for wheat (as winter crop) was about one half of the sum of rice + corn. To compute the output per cultivated mu of grain (treated here as rice, wheat, and corn):  $2 \times [(\text{rice output per mu} + \text{wheat output per mu} \div 2) + (\text{corn output per mu} + \text{wheat output per mu} \div 2)]$ , divided by 3, to give the approximate output per cultivated mu of grain.

Output per male labor unit: the input of women's labor under the collectives was greater in China than in other countries, but here we do not consider female labor units, only male labor units.

Chemical fertilizer applied per hectare (in kilograms): the total amount of chemical fertilizer used nationwide comes from *Zhongguo nongcun jingji tongji daquan*, 1949-1986: 340. Cultivated acreage data come from *Xin Zhongguo liushinian tongji ziliao huibian*, 1949-2008.

Number of male labor units per tractor: the figure for the total number of tractors comes from *Zhongguo nongcun jingji tongji daquan*, 1949-1986: 304. Four small tractors are counted as equal to one big or medium-sized tractor. The figure for the total number of male labor units is obtained as explained above.

## References

- Boserup, Ester (1983) "The impact of scarcity and plenty on development." *Journal of Interdisciplinary History* 14, 2: 383-407.
- (1981) *Population and Technological Change: A Study of Long-Term Trends*. Chicago: Univ. of Chicago Press.

- (1965) *The Conditions of Agricultural Growth: The Economics of Agrarian Change under Population Pressure*. Chicago: Aldine.
- Chan, Sucheng (1986) *This Bitter Sweet Soil: The Chinese in California Agriculture, 1860-1910*. Berkeley: Univ. of California Press.
- Chayanov, A. V. (1986 [1925]) *The Theory of Peasant Economy*. Madison: Univ. of Wisconsin Press.
- Chen Yiyuan 陈义媛 (2013) “资本主义家庭农场的兴起与农业经营主体分化的再思考——以水稻生产为例” (Rethinking the rise of capitalist family farms and differentiation among farming entities—with rice cultivation as the example). *开放时代*, no. 4: 137-56.
- “Facts about farmworkers.” (2013) National Center for Farmworker Health. <http://www.ncfh.org/docs/fs-Facts%20about%20Farmworkers.pdf>
- Freeland, Chrystia (2012) “The triumph of the family farm.” *Atlantic Monthly*, July/August. <http://www.theatlantic.com/magazine/archive/2012/07/the-triumph-of-the-family-farm/308998/>
- Gao Yuan (2014) “Large farms vs. small farms: grain production in Northwest Shandong.” *Rural China*, v. 11, no. 2 (October): 222-243.
- “Guanyu fu Hebei sheng Yongnian xian xuexi kaocha shucai chanye fazhan de baogao” 关于赴河北省永年县学习考察蔬菜产业发展的报告 [Report on the study-observation of vegetable production in Yongnian county in Hebei province] (2013) <http://www.sxscw.org/newsView.aspx?id=1434>
- Hayami Yujiro and Vernon Ruttan (1985) *Agricultural Development: An International Perspective*. Revised and expanded edition. Baltimore: The Johns Hopkins Univ. Press.
- (1971) *Agricultural Development: An International Perspective*. Baltimore: The Johns Hopkins Univ. Press.
- He Xuefeng 贺雪峰 (2013a) “一个教授的农地考察报告” (Report of one professor from farm land observations). *广州日报*, Oct. 30. [http://www.snzg.net/article/2013/1031/article\\_35640.html](http://www.snzg.net/article/2013/1031/article_35640.html)
- (2013b) “政府不应支持大户去打败小户” (The government should not support big households to defeat small households), May 17. <http://news.wugu.com.cn/article/20130517/52525.html>
- Huang, Philip C. C. (2011a) “The modern Chinese family: in light of economic and legal history.” *Modern China* 37, 5 (Sept.): 459-97.
- (2011b) “China’s new age small farms and their vertical integration: agribusiness or coops?” *Modern China* 37, 2 (March): 107-34.
- (1990) *The Peasant Family and Rural Development in the Yangzi Delta, 1350-1988*. Stanford: Stanford Univ. Press.
- Huang, Philip C. C. and Yuan Gao (2013) “The dynamics of capitalization in Chinese agriculture: private firms, the state, or peasant households.” *Rural China* 10, 1 (April): 36-65.
- Huang, Philip C. C., Yuan Gao, and Yusheng Peng (2012) “Capitalization without proletarianization in China’s agricultural development.” *Modern China* 38, 2 (March): 139-73.
- Huang Zongzhi 黄宗智 [Philip C. C. Huang] (n.d.) *中国乡村: 明清以来的社会经济变迁* (*Rural China: social economic change from the Ming and Qing*), 3 vols.: Vol. I, 华北的小农经济与社会变迁 (*The peasant economy and social change in North China*); Vol. 2, 长江三角洲的小农家庭与乡村发展 (*The peasant family and rural development in the Yangzi Delta*); Vol. 3, 超越左右: 从实践历史探寻中国农村发展出路 (*Beyond the left right divide: searching for a path of Chinese rural development from the history of practice*). Beijing: 法律出版社.
- , ed. (2012) “中国新时代的小农经济” (*China’s new age small peasant economy*). *开放时代*, no. 3: 5-115. [www.lishiyushehui.com](http://www.lishiyushehui.com)

- (2012a) “我们要做什么样的学术?——国内十年教学回顾” (What kind of scholarship do we want to do? Looking back on ten years of teaching in China). *开放时代*, no. 1: 60-78. [www.lishiyushehui.cn](http://www.lishiyushehui.cn)
- (2012b) “小农户与大商业资本的不平等交易: 中国现代农业的特色” (Unequal transactions between small peasant households and big commercial capital: the special characteristics of modern Chinese agriculture). *开放时代*, no. 3: 88-99. [www.lishiyushehui.cn](http://www.lishiyushehui.cn)
- (2010) *中国的隐性农业革命* (China's hidden agricultural revolution). Beijing: 法律出版社.
- Huang Zongzhi 黄宗智 [Philip C. C. Huang] and Yuan Gao 高原 (2014) “大豆生产和进口的经济逻辑” (The economic logic of soybean production and imports). *开放时代*, no. 1: 176-88. [www.lishiyushehui.cn](http://www.lishiyushehui.cn)
- Huang Zongzhi 黄宗智 [Philip C. C. Huang] and Yusheng Peng 彭玉生 (2007) 三大历史性变迁的交汇与中国小规模农业的前景 (The confluence of three historic tendencies and the future of Chinese small-scale agriculture). *中国社会科学*, no. 4: 74-88. [www.lishiyushehui.cn](http://www.lishiyushehui.cn)
- Netting, Robert McC. (1993) *Smallholders, Householders: Farm Families and the Ecology of Intensive, Sustainable Agriculture*. Stanford: Stanford Univ. Press.
- “Nongyebu: jiating nongchang rending biao zhun fuchi zhengze zhiding gongzuo qidong” 农业部: 家庭农场认定标准扶持政策制定工作启动 [Ministry of Agriculture: the standard for determining what is a “family farm” and the initiation of the work for fixing policies to give aid to them] (2013) July 23. <http://finance.sina.com.cn/china/20130723/120116214584.shtml>
- Perkins, Dwight H. (1969) *Agricultural Development in China, 1368-1968*. Chicago: Aldine.
- Rodriguez, Arturo (2011) “Statement of Arturo S. Rodriguez, President of United Farm Workers of America,” before the Senate Committee on the Judiciary’s Subcommittee on Immigrants, Refugees, and Border Security. October 4. <https://www.google.com/#q=Statement+of+Arturo+S.+Rodriguez%2C+President+of+United+Farm+Workers+of+America>
- Schultz, Theodore W. (1964) *Transforming Traditional Agriculture*. New Haven: Yale Univ. Press.
- “Shanghai jiaoku de jiating nongchang” 上海郊区的家庭农场 [Family farms in suburban Shanghai] (2012) <http://stock.sohu.com/20130523/n376788529.shtml>
- USDA (United States Department of Agriculture), Economic Research Service (2013) “Farm size and the organization of U.S. crop farming,” ERR-152. <http://www.ers.usda.gov/publications/err-economic-research-report/err152.aspx#.Uo0gt8SfvY>
- (2005) “U. S. farms: numbers, size and ownership,” in “Structure and finance of U.S. farms: 2005 family farm report,” EIB-12. <http://www.ers.usda.gov/publications/eib-economic-information-bulletin/eib24.aspx#.Uo0fp8SfvY>
- Wolf, Eric R. (1969) *Peasants*. Englewood Cliffs, N. J.: Prentice Hall.
- Wrigley, E. Anthony (1988) *Continuity, Chance and Change: The Character of the Industrial Revolution in England*. Cambridge, England: Cambridge Univ. Press.
- Xin Zhongguo liushinian tongji ziliao huibian, 1949-2008 新中国六十年统计资料汇编 1949-2008 (Compendium of statistical materials on 60 years of the new China 1949-2008), accessed from 中国咨讯行. <http://www.infobank.cn/IrisBin/Text.dll?db=TJ&no=448125&cs=8428474&str=%B8%FB%B5%D8%C3%E6%BB%FD+%C0%FA%C4%EA>
- Zhang, Forrest Qian 张谦 (2013) “Comparing local models of agrarian transition in China.” *Rural China* 10, 1 (April): 5-35.
- Zhang, Forrest Qian and John A. Donaldson (2008) “The rise of agrarian capitalism with Chinese characteristics: agricultural modernization, agribusiness and collective land rights.” *The China Journal*, no. 60 (July): 25-47.
- Zhongguo nongcun jingji tongji daquan, 1949-1986 中国农村经济统计大全 1949-1986 [Comprehensive statistics on China's rural economy 1949-1986] (1989) 中华人民共和国农业部计划司编. Beijing: 农业出版社.



Zhongguo nongcun tongji nianjian, 2011 中国农村统计年鉴 2011 (Statistical yearbook of rural China). Beijing: 中国统计出版社.

Zhongguo tongji nianjian, 1983 中国统计年鉴 1983 (Statistical yearbook of China). Beijing: 中国统计出版社.

“Zhongliang dahu he shengchan hezuoshe: zhongle 1/10 de di, chanle 1/5 duo de liangshi” 种粮大户和生产合作社: 种了1/10的地产了1/5多的粮食 [Big grain-growing households and the production coops: farming 1/10 of the land to produce 1/5 of the grain] (2013) March 25. [http://www.guancha.cn/Industry/2013\\_03\\_25\\_134016.shtml](http://www.guancha.cn/Industry/2013_03_25_134016.shtml).