

PART V

Development Comparison: Choice of
Microeconomic Policies

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Planning and Market Mechanisms: The Case of China's Agriculture

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Introduction

The introduction of agricultural responsibility systems by the Chinese Communist Party and the government finally brought about the decollectivization of people's communes in 1984. Judging from a new theory of sharecropping, it seems that the *bao gan dao hu* system is a pure rental system, while the other responsibility systems, including the *bao chan dao hu* system, are sharecropping systems. Moreover, the saving of transaction costs led to the transition from the other responsibility systems into the *bao gan dao hu* system.

The people's commune is regarded as an organization of the unitary form in terms of "economics of internal organization." But the commune system eventually collapsed partly due to information impactedness or asymmetric information, and partly because production teams as basic accounting units of the commune could not transcend the limits of peer groups. The system failed to introduce monitoring and discriminated wages.

On the other hand, after the separation of the commune management from the government administration, cooperative economic organizations, such as economic cooperative units and agriculture-industry-commerce integrated enterprises appeared. Whether monitoring and discriminated wages can be introduced will determine whether these cooperative economic organizations can be transformed into firms. The introduction of monitoring and discriminated wages, however, implies the establishment of hierarchical organizations.

The Chinese Communist Party and the government emphasize that producers in agriculture should be farm households and regional cooperative economic organizations. In this regard, it is necessary to define the regional cooperative economic organizations as organizations which supply public goods such as water,

electricity, farm machinery, land development services, etc. Also, the government contends that the peasants should expand the scale of operation of farms and create family farms. The government, however, did not clearly mention the relationship between family farms and the economic cooperative units.

1. The decollectivization of the People's Commune

In October 1983, the central organ of the Party and the State Council issued a "Notice Concerning the Separation of Government Administration and Commune Management As Well As the Reestablishment of Township Government."¹ The separation was completed at the end of 1984 throughout the country except in Tibet autonomous region, and thus the number of township governments amounted to 75,870. In 1987 the number of township governments totaled 58,016, including 3,248 minority township governments. The number of town governments amounted to 10,280, including 174 minority town governments. The number of villagers' boards totaled 830,302.

What brought about the decollectivization of the people's commune? The major cause was the diffusion of agricultural responsibility systems. The rejection of the "Dazhai" model by the Chinese leadership led to the introduction of the responsibility systems.

The Third Plenum of the 11th Central Committee of the CCP held in December 1978 drafted two important documents: "Decisions on Some Questions Concerning the Acceleration of Agricultural Development (Draft) (hereafter the Decisions)² and "Sixty Articles Relating to Commune Management (Draft)."³ The Third Clause of the Second Article concerning the Twenty-five Policies and Measures to Develop Agricultural Productivity in the Decisions states:

Economic organizations at all levels in a people's commune must carry out the principles of "from each according to his ability, to each according to his work," "more pay for more work" and "equal pay for equal work between men and women," strengthen norm management, pay wages according to quantity and quality of work, establish a necessary reward-penalty system and criticize egalitarianism. They can record work points according to the norm or can let the masses discuss work points according to working hours, or can also make contract with a working group for a job, pay wages related to output quotas under a unified accounting and distribution system by a production team. *Bao chan dao hu* (fixing output quota for each household) is not permitted and *fen tian dan gan* (individual farming) is not permitted. With reference to distribution of grain rations to all commune members, they can generally adopt the method of using the ratio of 3 to 7 or 4 to 6 as that of distribution of grain between grain for work points and that of grain rations.

The "Decisions" were approved at the Fourth Plenum of the 11th Central Committee of the CCP held in September 1979, but the sentence, "*Bao chan dao hu* is not permitted" was rewritten as follows; "Except for special demand for sideline production, remote mountainous regions, and isolated farms with inadequate transportation, *bao chan dao hu* is not permitted."⁴ This new sentence was put

after the sentence, “*Fen tian dan gan* is not permitted.” Upon revision, this means that *bao chan dao hu* is permitted under certain conditions. Another revision is the passage: “... the method of using the ratio of 3 to 7 or 4 to 6 as that of distribution of grain between grain for work points and for basic grain rations or they can also...,” was changed into, “... they can adopt the method to combine grain for work points with basic grain rations, which is used in general” We can infer, therefore, that this revision implies the approval of distribution according to work, because the Party Committee of Xiyang county said, “... under the general circumstances, it is possible to use the ratio of 3 to 7 as that of distribution of grain between grain for population and for work points, or accounting units keeping high-level reserves of grain by adopting the distributing ratio of 4 to 6.”⁵

These documents are all based on distribution according to work. Thus, in order to alleviate the egalitarian distribution based on the “Learning from Dazhai Movement,” the Third and Fourth Plenums allowed peasants to adopt distribution according to work and the system of *bao chan dao hu* under some limited conditions. The “Dazhai Model” aimed at realizing distribution according to work but it resulted in the vicious equality of income distribution. The real problem was the assessment of work points by *zi bao gong yi* (self-assessment and public discussion). Namely, production teams had the disadvantages of peer groups as mentioned by Williamson.⁶ For example, a leader of a production team in Heilongjiang province was called “*dou bing dui zhang*” (the “bean cake” leader), who was a middle-ranking manager who faced pressure from higher-ranking managers and the rank and file. Alternatively most peasants did not want to become a leader of the production team. In addition, the “*zi bao gong yi*” took too much time, and too high transaction costs in assessing work points of each commune member. In order to transform a production team as a peer group into a part of a hierarchical organization, it is necessary to introduce monitoring and discriminated wages into the production team. However, neither a discriminated wage system was introduced due to the “*zi bao gong yi*,” or a monitoring system due to the difficulties in monitoring agricultural labor. As a result the decollectivization of the people’s commune occurred. The saving of transaction costs induced the peasants to adopt the responsibility systems which entailed lower transaction costs, including monitoring cost, than the production team.

Despite the fact that the people’s commune was a hierarchical organization with activities involving agricultural and industrial production, marketing, education, and militias, the production team as a basic accounting unit could not transcend the limits of the peer group organization as mentioned by Williamson.

2. The sharecropping theory and agricultural responsibility systems

The agricultural responsibility systems include the *zhuan ye cheng bao* (specialized contract system with payment directly linked with production), *lian chan dao zi* (production with contract with small groups), *lian chan dao lao* (production

with contract with an individual worker), *bao chan dao hu* (production quotas with contract with a household), and *bao gan dao hu* (collection quotas with contract with a household) systems. The former three types of systems are responsibility systems which are considered by the government to achieve distribution according to work under the commune system.

Bao chan dao hu and *bao gan dao hu* are household responsibility systems in which a collective organization (the township government) makes arrangements for a contract of land lease with peasants. Under the former system, a farm household can obtain the premium return in the case of overfulfilment or have to pay a penalty in the case of underfulfilment.⁷ The *bao gan dao hu* system is under the commune system, in which a farm household is fully responsible for management and can own the agricultural surplus after paying agricultural tax, accumulation fund, social welfare fund, and production quotas. In this case, the peasants are not under the unified distribution system of grain rationing in the commune. In 1985, the peasants were allowed to produce crops freely under the price reform in which the government abolished the procurement system of agricultural products and adopted the purchase contract system. The government considers that the collection of 60 to 70 million tons of foodgrains based on the contract system all over the country is sufficient⁸ and that the rest of foodgrains could be sold in the free market. Therefore, the planned target of collected foodgrains accounts for 15 to 17.5% of a total production of 400 million tons, for example.⁹ The price reform is a form of indirect rather than direct control. It implies that the government should promote counter-speculation to eliminate speculation as mentioned by Lerner.¹⁰

Table 1 shows the diffusion process of all types of responsibility systems. As of 1984, the number of production teams that adopted responsibility systems amounted to 5.69 million units of which 99% adopted the *bao gan dao hu* system. The number of production teams which did not adopt any responsibility system amounted to only two thousand units. In terms of the number of farm households 183.98 million farm households adopted a household responsibility system. Accordingly, the fact that *bao gan dao hu* is the dominant responsibility system shows that this system gives the highest incentive to the peasants.

Based on the new sharecropping theory,¹¹ it appears that the *bao gan dao hu* system is a pure rental system and that the other responsibility systems are sharecropping systems. Under the *bao gan dao hu* system, peasants are risk neutral while the collective (the state) is risk averse. Then, the *bao gan dao hu* system offers the highest incentive to the peasants among the responsibility systems. Therefore, the peasants are strongly motivated to earn the agricultural surplus after paying the "rent," i.e., agricultural tax, accumulation fund, social welfare fund, and collection quotas. The profit accrued by technological innovation benefits the peasants. The duration of contract of land lease, which was originally three years, was extended to more than fifteen years in order to avoid rough farming based on the "Notice Regarding Rural Works in 1984" issued by the Central Committee of the CCP in 1984.

Table 1. PROPORTION OF PRODUCTION TEAMS ADOPTING EACH RESPONSIBILITY SYSTEM, JAN. 1980–FEB. 1983

	Jan. 1980	Dec. 1980	Jun. 1981	Oct. 1981	Feb. 1983
<i>Ding e bao gong</i> ^a	55.7	39.0	27.2	16.5	n.a.
<i>Zhuan ye cheng bao</i>	n.a.	4.7	7.8	5.9	n.a.
<i>Lian chan dao zu</i>	24.9	23.6	13.8	10.8	n.a.
<i>Lian chan dao lao</i>	3.1	8.6	14.4	15.8	n.a.
<i>Bao chan dao hu</i> (partly)	0.026	0.5	n.a.	3.7	n.a.
<i>Bao chan dao hu</i>	1.0	9.4	16.9	7.1	n.a.
<i>Bao gan dao hu</i>	0.0	5.0	11.3	38.0	78.7 ^c
<i>Lian chan ze ren zhi</i> ^b	29.0	51.8	64.2	81.3	92.0
Total	84.7	90.8	91.2	97.8	

Sources: Su Xing, "Responsibility System and the Development of Collective Economy in Rural Areas," *Jinji Yanjiu*, No. 11 (1982), p. 6 and *Renmin Ribao* (Feb. 9, 1983).

^a *Ding e bao gong* means norm management of the collective by assigning a small plot to each peasant. The system is also called *xiao duan bao gong*.

^b *Lian chan ze ren zhi* includes all the responsibility systems for output except *ding e bao gong*.

^c The figure includes the production teams under *bao chan dao hu* but the proportion of production teams to adopt *bao gan dao hu* is larger.

^d Data in February of 1983 are based on *Renmin Ribao* (Feb. 9, 1983).

In terms of high incentives of the responsibility systems for the peasants except *bao gan dao*, *bao chan dao hu* ranks first followed by *lian chan dao lao*, *lian chan dao zi*, and *zhuan ye chen bao*. The peasants under the *bao chan dao hu* system lease land through contracts with the collective and make contract for output quotas. Then, under this responsibility system, they are less risk averse than those under the other three responsibility systems while their wages linked with production are higher than the wages under the other systems. On the other hand, peasants' work points under the latter three types of responsibility systems are also linked with production and the assessment of work points of the peasants may be more precise under the *lian chan dao lao* system than under *lian chan dao zi*, and even more under the *lian chan dao zi* system than under *zhuan ye cheng bao*. Since the peasant works individually under the *lian chan dao lao* system, it is easy to assess his work points and the peasant can accept the assessment easily. In other words, the *lian chan dao lao* system is a responsibility system which is able to assess the peasant's efforts more readily. Moreover, the assessment of work points of the peasant is more difficult under the *lian chan dao zi* system than under *lian chan dao lao*, because the assessment of work points under the former system gives rise to the same problem as the "Dazhai" model did. In general, the *zhuan ye cheng bao* system is adopted by a small specialized group and also poses the same problem of how to assess each member's work points as the "Dazhai" model did. In addition, as the number of members of the specialized group under *zhuan ye cheng bao* is larger than that of the smaller group under *lian chan dao zi*, the assessment of work points of each member is more difficult under the former sys-

tem than the latter one. Furthermore, information costs for each member to become acquainted with new technology are likely to be higher.

As a result, in terms of incentive effects *bao chan dao hu* ranks first followed by *lian chan dao lao*, *lian chan dao zi* and *zhuan ye cheng bao*. Obviously, under these responsibility systems of the sharecropping type, the peasants enjoy fixed wages as well as wages linked with output.

The pure wage system is the same as the wage system in manufacturing. Before the rural reform, state farms adopted this system. In this case, the state is risk neutral and bears all the risks, while workers are risk averse and bear no risk.

The assessment of work points leads to the problem of transaction costs. Cheung¹² suggested that the coexistence of sharecropping and fixed-rent systems should be explained by risk sharing and transaction costs. He classified the transaction costs into two kinds of costs, i.e., negotiation costs and monitoring costs. He indicated that the transaction costs were higher under a share contract than under a fixed-rent contract or a wage contract, while gains from risk sharing in sharecropping exceeded losses in the transaction costs which justifies the coexistence of the share and fixed-rent contracts. Stiglitz,¹³ who criticized Cheung's argument, stressed that the supervision cost curve should have the property of non-convexity. The supervision cost of the wage system is the highest, that of fixed rental system the lowest, and that of sharecropping is intermediate between the two. In addition, he argued that labor input in sharecropping cannot achieve the Pareto optimum unless the supervision cost is zero.

It seems that the transaction cost curve may also have the property of non-convexity, because the negotiation cost is higher under the sharecropping system than under the pure rental system or under the wage system, while the supervision cost is higher than the negotiation cost.

Based on Stiglitz's general equilibrium theory of sharecropping, as a peasant's share of output α increases from zero (the wage system) to one (the pure rental system), the transaction costs decrease. The case in which α is between zero and one is suited to sharecropping. In other words, giving the incentive to a peasant results in the saving of transaction costs.

To sum up, the transaction costs decrease as the responsibility system evolves from *zhun ye cheng bao* to *lian chan dao zi*, from *lian chan dao zi* to *lian chan dao lao*, from *lian chan dao lao* to *bao chan dao hu*, and from *bao chan dao hu* to *bao gan dao hu*.

During the rural reform in China, the preferences of the state and the peasants changed towards the saving of transaction costs and the *bao gan dao hu* system was eventually selected.

3. The innovation of agricultural organizations

a. *Problems of Family Farms*

A commentator of *Nonmin Ribao*¹⁴ stressed that the concept of economies of

scale should not be incompatible with the operation of the household. The traditional concept of economies of scale stands for the enlargement of the scale of operation through mechanization with increase in labor productivity, the commercialization ratio and the rate of profit. In China's context, however, it means the optimum combination of production factors given factor endowments. In terms of agricultural economics, this concept is similar to that of optimum operation scale of farm.

For example, based on a survey of 40 family farms in Ruyang township, Kunshan county, Suzhou city, family farms with an operation scale of 102.4 mu (about 6.82 ha) tended to prevail. The Party Committee of the township extends favorable treatment to family farms as follows: (i) sale of farm machinery owned by production teams to peasants at lower prices with specialist farm machinery teams providing services to them. (ii) system of station extension workers in order to disseminate agricultural technology. (iii) abolition of "*liang jin yi fei*" system (accumulation fund, social welfare fund and management fee of land) and granting of fixed subsidies to family farms according to production quotas of foodgrains. (iv) banks and marketing organizations giving good treatment to family farms in terms of credit, purchase of agricultural produce, and supplies of fertilizers and pesticides.

Through these measures, peasants created many family farms. The township government collected agricultural subsidies amounting to 400 thousand yuan and gave 20 yuan per mu to each family farm. As outlined previously, the government sold farm machinery to the peasants at lower prices and gave them services in charging them less for utilizing farm machinery. Moreover, the existence of land rent (differential rent), and the alleviation of the peak load problem of the demand for labor by the employment of wage laborers brought family farms into being. According to this survey, the optimum operation scale was estimated at 10 to 15 mu per worker or at 30 to 40 mu (2 to 2.7 ha) per household given the present level of production.

In order to develop family farms, the government of Suzhou city encouraged villagers' boards to establish a development fund for farm mechanization and to organize specialized teams in farm machinery. So far four villages have established institutions for farm mechanization funds.

According to a survey involving 98 farm households in Muyang county, Jiangsu province, the optimum operation scale was estimated at 15.073 mu per worker in terms of elementary econometrics.¹⁶ It follows that the net revenue per worker is 1,435 yuan. At present, since the total farm land area of the county amounts to 2.04 million mu and agricultural labor force to 444.5 thousand persons the land area per worker is 4.6 mu. The optimum operation scale is twice as large as the real scale, and the optimum size of the labor force is 136.3 thousand persons, so that surplus labor is estimated at 308.2 thousand persons.

The second estimation in the same survey showed that the marginal productivity of aggregated capital goods in terms of horsepower is 167.2 yuan. In this respect,

presently the average amount of horsepower used per worker is 5.8, so that the net revenue per worker would be 810 yuan if each farm household achieved mechanization of 10 horsepower, which is presently the highest.

During the 13th Party Representative Congress in October 1987, Du Lunsheng, director of the Agricultural Policy Research Office of the central organ of the Party, announced new land policies.¹⁷ First, the government will collect fees for land use (a kind of land rent) and prevent overconcentration of possession rights to land. Second, the Party and the government will maintain the collective ownership system of land and will not allow private ownership of land. An owner-operator is allowed to get a right to land use based on the principle of the separation of management and ownership adopted by the Party and the government. A peasant can transfer the right to land use with or without compensation, and can also demand the compensation for the amount of investment he has put into the land. Through bargaining between both parties the conditions of the transfer of the right to land use are fixed and the results of the negotiation must be reported to the villagers' board which owns the land.

b. *Rural New Economic Unions*

During the rural reform, peasants voluntarily organized rural new economic unions (hereafter RNEUs). According to Table 2, the number of RNEUs amounted to 470.6 thousand units and the number of employees to 4.34 million persons in 1988. In terms of the number of RNEUs by sector, 229.7 thousand units belonged to industry, 65.1 thousand units to fisheries, 52.8 thousand units to transportation, 47.3 thousand units to commerce, catering, and service trade, 42.6 thousand units to construction, 10.0 thousand units to agriculture (crop cultivation), 5.0 thousand units to animal husbandry, 4.1 thousand units to forestry, and so on. In terms of employment of the RNEUs by sector, the RNEUs of industry employed 2.66 million persons, those of construction 0.55 million persons, those of fisheries 0.36 million persons, those of transportation 0.32 million persons, those of commerce, catering, and service trade 0.22 million persons, those of agriculture 0.07 million persons, those of forestry 0.03 million persons, those of animal husbandry 0.02 million persons.

The gross income of the RNEUs in 1988 was 27.2 billion yuan, accounting for 2.5% of the gross income of the national rural economy.

Several examples of large-scale cooperative economic organizations will be presented.¹⁸ The first is the Liuzhuang Agriculture-Industry-Commerce Integrated Enterprise of Xinxiang county in Henan province which consists of 215 farm households with a population of 1,300 and a land area of 1,904 mu. This enterprise has adopted the "unified management, specialized production, division of labor, and a reward-penalty system linked with production" without the introduction of the household responsibility system since the Third Plenum of the Central Committee of the CCP was held. This enterprise presently operates seven specialized divisions dealing with the following activities: agriculture, forestry, animal husbandry, industry and sideline production, commerce, farm machinery, construction, etc. with 36 management subdivisions.

Table 2. BASIC STATISTICS ON RURAL NEW ECONOMIC UNION, 1988
(Rmb 100 million)

	Number of Unions (10,000)	Persons Engaged (10,000)	Original Value of Fixed Asset	Gross Income	Sum of Expenditures	Net Income	State Tax	Reserves	Earnings of Union Members
Crop cultivation	1.00	7.06	1.06	3.07	1.53	1.54	0.09	0.24	1.21
Forestry	0.41	3.20	0.43	0.72	0.29	0.43	0.03	0.08	0.32
Animal husbandry	0.50	2.34	0.93	2.30	1.62	0.68	0.02	0.11	0.55
Fishery	6.51	36.31	17.77	29.39	14.91	14.48	0.60	1.11	12.77
Industry	22.97	266.34	48.61	172.11	123.74	48.37	7.15	6.53	34.69
Construction	4.26	54.77	5.76	21.55	13.42	8.13	0.77	0.80	6.56
Transportation	5.28	31.82	10.90	19.65	11.47	8.18	0.86	0.87	6.45
Commerce, catering and service trade	4.73	21.88	4.37	18.05	12.12	5.93	0.76	0.69	4.48
Others	1.40	10.23	1.90	5.31	3.12	2.19	0.21	0.24	1.74
Total	47.06	433.95	91.73	272.15	182.22	89.93	10.49	10.67	68.77

Source: State Statistical Bureau, *Statistical Yearbook of China 1989*, Beijing, 1989.

Each management unit concludes contracts with the enterprise, factories, production teams, workshops, working groups or individuals (in the case of animal husbandry). Since the division dealing with agriculture initiated a cooperation with the division dealing with construction, peasants can engage in construction in the slack season and construction workers in agriculture in the busy season. The reward-penalty system is called “*wu ding yi shang* (five fixed targets, one prize).” The five fixed targets are investment, personnel, wages, production, and profit. Regarding the “prize,” each management unit can get a reward in the case of overfulfilment of the profit target but is subjected to a penalty in the case of underfulfilment.

The second example is the Beiti Agriculture-Industry-Commerce Integrated Enterprise. In 1981, this brigade formed a unified organization and adopted the household responsibility system and the industrial cooperative system including supply and marketing services. It formed a corporation in cooperation with eight villages and collected 200 thousand yuan to construct a refrigerated warehouse with a capacity of 100 tons, two processing factories, and an electric machinery factory.

Recently the agriculture-industry-commerce integrated enterprise has become a large unified enterprise which owned a refrigerated warehouse and four factories, i.e., a meat factory, a frozen vegetable factory, and industrial oil and fat factory, and a fishery farm. It consists of 24 cooperative economic organizations at the village level, 1,112 farm households, and a state-run firm.

In this enterprise, peasants engage in cultivation, raising and collection of wild birds, animals, and edible wild plants, purchase and processing of agricultural produce, purchase of horses, mules, cattle, and sheep, transportation and marketing, providing factories with materials, and so on. The cooperative economic organizations give peasants the following services: water and electricity supply, tractors for plowing and transportation. They adjust the allotment of planted areas based on information from the enterprise, as well as the processing capacities of factories. They also adjust industrial structure and promote public utility enterprises. The factories adopt a self-supporting accounting system. The wage system of cadres consists of basic wages plus bonus, and that of workers of piece-work rate.

The third example is the township association for the diffusion of scientific information. Baiyang township in Weinan city, Shaanxi province is composed of nine villages and 4,123 households with a population of 17,032. This province began poultry raising. It established a division of poultry raising in an agricultural school, and invited professors from Xibei Agricultural College and extension workers from the veterinary experimental station to transfer to the peasants scientific information on poultry raising. For the past several years, the number of trainees has amounted to 1,060 of which 572 were specialist households for poultry raising.

In terms of internal economics, the Liuzhuang Agriculture-industry-Commerce Integrated Enterprise shows the characteristics of a firm with a multidivision structure referred to by Williamson as a multidivisional (M-form) firm.¹⁹ The system of “unified management, specialized production, division of labor and a reward-penalty system linked with production” is regarded as a kind of management of the M-form firm.

The Beiti Agriculture-Industry-Commerce Integrated Enterprise is also a kind of corporation which shows characteristics of a M-form firm. On the other hand, the poultry raising association of Baiyang township is also a M-form organization which owns a poultry raising company.

These examples indicate that the unitary (U-form) organizations under the people's commune system evolved into the M-form organizations in order to avert the loss of control of organizations.

c. *Regional Cooperative Economic Organizations*

The "Notice on the 1984 Rural Works"²⁰ issued by the Party as the No. 1 document in 1984 defines regional cooperative economic organizations (hereafter RCEOs) as follows:

Regional cooperative organizations should place emphasis on services for peasants. First, a cooperative organization must have total charge over land and contracts. Second, it must manage irrigation facilities and farm machinery well, implement plant protection measures and secure the prevention of epidemics, teach and spread science and technology, maintain irrigation systems and improve land, and provide services before and after production. It is natural that these organizations should depend on their ability but, what is more important is that they promote the development of specialist farm households and give peasants good services in cooperation with marketing cooperatives, credit cooperatives, agriculture-industry-commerce integrated enterprises, companies with diversified-management services, marketing sections of firms run by communes and brigades, warehouses, experimental stations for agriculture and forestry, veterinary stations, farm machinery stations, etc.

Based on this definition, it appears that the Party defines the RCEOs as organizations providing public goods such as water, land, farm machinery, and so on. For example, the Menggaocun Agricultural Cooperative in Taigu county, Shanxi province acts as the villagers' board, having 817 households with a population of 3,267 and farm land covering 6,597 mu.²¹ In 1983, the people established an agricultural cooperative (hereafter the AC) after the introduction of the household responsibility system in the winter of 1982. The AC established companies for water- and power-supply services, farm machinery services, agricultural technological services, and an accounting company. The water- and power-supply company is in charge of the unified management of water- and power-supply facilities run by nine production teams, is responsible for the basic construction of land and irrigation infrastructure and for the planning, construction, use, and maintenance of water- and power-supply facilities and the collection charges for irrigation, water- and power-supply for industry and sideline production and for human life. Under a contract between the AC and the company, the AC must obtain investment funds from accumulation funds and profits delivered by the rural industry and sideline production and invest into all the new power plants. On the other hand, the company must have a contract for the maintenance and repair of the existing power plants, depreciation expenses, electricity and water charges, and wages. The company does not give profits to the AC while the AC does not compensate the company for losses. In addition, the other companies give fee-charging

Table 3. ESTIMATION OF TOTAL FACTOR PRODUCTIVITY INDEX (1950-88)

	Total Factor Productivity Index	Gross Value of Agriculture Output Index	Aggregate Input Index	Input Categories			
				Land	Labor	Capital	Current Inputs
1950	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1978	96.5	210.2	217.8	106.3	163.8	656.7	290.8
1979	98.8	226.0	229.3	105.1	165.7	734.6	311.6
1980	95.9	229.2	238.9	103.6	168.5	800.8	324.3
1981	99.0	244.0	246.5	102.8	172.3	852.7	329.5
1982	98.1	271.5	257.7	102.5	178.5	904.2	348.9
1983	109.3	292.6	267.7	101.9	180.2	976.9	362.4
1984	119.0	328.5	276.1	102.1	178.6	1,052.6	373.7
1985	118.8	339.7	285.8	101.7	180.1	1,124.7	386.0
1986	117.3	351.2	299.4	102.1	180.8	1,226.8	405.4
1987	119.5	371.6	311.0	102.6	183.2	1,321.1	411.0
1988	119.1	386.1	324.3	102.6	186.6	1,409.5	429.1

Notes: 1. The estimation method depends on *A.M. Tang, An Analytical and Empirical Investigation of Agriculture in Mainland China, 1952-1980*, Taipei, Chung-Hua Institution for Economic Research, 1984.

2. All data are taken from *Statistical Yearbook of China* (various issues). The index of the gross value of agricultural output, land input (total planted area), and labor input (agricultural labor force) are taken from *Statistical Yearbook of China 1985*. Capital input means total horsepower of agricultural machinery plus large domestic animals in terms of horsepower where a large domestic animal is equivalent with 0.52 horsepower. Current inputs stand for chemical and organic fertilizer applied. The estimation method of organic fertilizer used depends upon Tang's method. The calculation method of aggregate input is as follows: land input index \times 0.25 a labor input index \times 0.50 a capital input index \times 0.10 a current input index \times 0.15, where the weights for land, labor, capital and current inputs is 0.25, 0.50, 0.10 and 0.15 respectively.

services to peasants, adopt a self-supporting accounting system and implement the distribution system of "more pay for more work."

d. *The Relationship between Cooperative Economic Organizations and Farm Households*

Su Xing, a Chinese agricultural economist, points out the following limits of the management of households.²² (1) The operation scale is small. (2) Farm households are not receptive to market information. (3) They cannot withstand natural and artificial disasters. He, however, thinks that these limits might be overcome by cooperation and unification. For instance, RCEOs can solve many problems which peasants cannot solve by increasing items of unified management. If many kinds of RNEUs can develop on the basis of the management of households, it will be possible to enlarge the operation scale, enhance competitiveness, and develop a commercial commodity economy.

Presently peasants are afraid of recollectivization and of the abolishment of the management of farm households. They do not agree that economic cooperative

Table 4. PRODUCTION OF FOODGRAINS (1978–88)

	Production (10,000 tons)	Planted Area (10,000 ha)	Land Productivity (kg/ha)
1978	30,477	12,059	2,527
1979	33,212	11,926	2,785
1980	31,822	11,647	2,732
1981	32,502	11,496	2,828
1982	35,343	11,340	3,117
1983	38,728	11,405	3,396
1984	40,731	11,288	3,608
1985	37,911	11,885	3,483
1986	39,151	11,093	3,483
1987	40,297	11,127	3,638
1988	39,408	11,012	3,579

Sources: State Statistical Bureau, *Statistical Yearbook of China 1989*, Beijing, 1989.

units should develop on the basis of the household management system.

Du Lunsheng, director of the Agricultural Policy Research Office of the Secretariat of the central organ of the Party states that:²³

The objective of the first stage of rural reform was to help each peasant become motivated to development. From now on, peasants should be motivated by the reform to unify and carry out the collective management well under the two-level management system.

It appears that both Du and Su consider that the management of households should be placed under the authority of the regional cooperative organizations.

4. Results of the rural reform

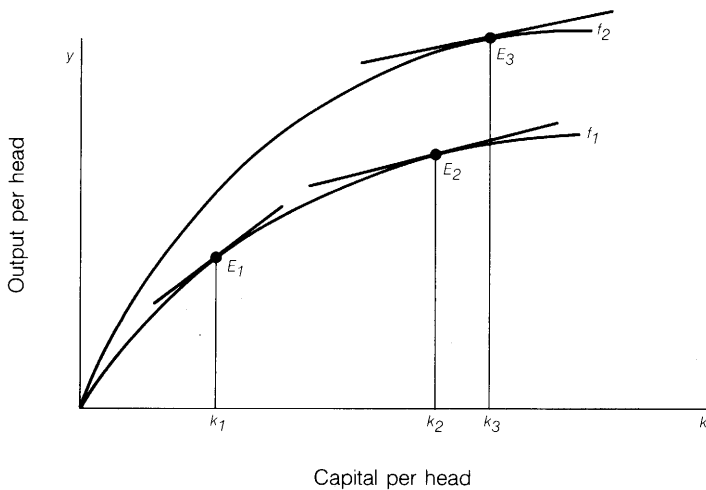
The results of the rural reform will be analysed in terms of production. The index of the gross value of agricultural output increased by 83.7% from 210.2 in 1978 to 386.1 in 1988 (Table 3). Aggregate factor input index increased by 48.9% from 217.8 in 1978 to 324.3 in 1988. In terms of the breakdown of total factor input index by factor input, the land input index decreased by 3.4% from 106.3 in 1978 to 102.6 in 1988.²⁴ The decrease in agricultural land area and in planted areas is now a serious problem in China.

Labor input index increased by 13.9% from 163.8 in 1978 to 186.6 in 1988. Capital input index doubled from 656.7 in 1978 to 1,409.5 in 1988. Current input index increased by 47.6% from 290.80 in 1978 to 429.1 in 1988.

As a result, the total factor productivity index (hereafter TFPI) increased by 23.4% from 96.5 in 1978 to 119.1 in 1988. This increase in TFPI is the major achievement of the rural reform since 1978. On the contrary, it should be noted that the TFPI decreased from 100.0 in 1952 to 96.5 in 1978.

The rural reform included the new price policy in 1979, the introduction of the responsibility systems, and the decollectivization of the people's communes. The effects of the rural reform on production are illustrated in Figure 1.²⁵ Denoting

Figure 1. EFFECTS OF RURAL REFORMS ON PRODUCTION



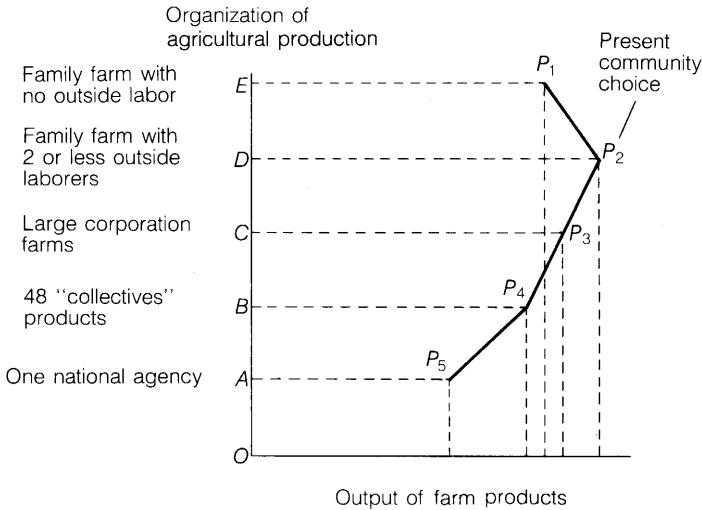
agricultural real output by Y , Capital by K , and the labor force by L , we have $Y = F(K, L)$, where we impose a particular property on the production function constant returns to scale. Then, we have a simple relationship between output per worker $y = Y/L$, and capital per worker, $k = K/L$, so that we can write $y = f(k)$. The new price policy, i.e., the increase of the relative price between an agricultural product and a modern input moved the equilibrium point from E_1 to E_2 so that the input of the service of capital good per head increased from k_1 to k_2 . In addition, institutional innovations such as the introduction of responsibility systems and the decollectivization of the people's communes shifted the production function from f_1 to f_2 , moving the equilibrium point from E_2 to E_3 without a concomitant change in the relative price. As a result, this shift of the equilibrium point from E_1 to E_3 is the very result of the rural reforms in China.

The rural reforms, however, have given rise to the following problems. First, foodgrain production recorded the historical peak of 0.4 billion tons in 1984 (Table 4). But since then, foodgrain production has not exceeded this value. At the same time, the planted area to foodgrains decreased from 12.059 million ha in 1978 to 11.012 million ha in 1988.

Second, agricultural land area has decreased. Agricultural land area covered 95.889 million ha in 1987, while 817.467 thousand ha of land was lost in the same year.

Third, agricultural investment has decreased. The ratio of agricultural basic construction investments to basic construction investments of the state decreased from 11.9%, which was the average figure during the period of 29 years before 1980, to 6% during the Sixth Five Year Plan, and finally to 3.3% in 1986. The ratio of agricultural expenditure to the total expenditure in the state finance decreased

Figure 2. FARM OUTPUT AND ORGANIZATION OF AGRICULTURE POSSIBILITIES



Source: Schultz, T.W., *The Economic Organization of Agriculture*, McGraw-Hill, 1953, p257, Fig. 16.3

from 7% in 1979 to 5.5% in 1987. Furthermore, rural collective and individual investments also decreased.

Fourth, although the supply of modern inputs increased, it cannot meet the demand of peasants.

5. Concluding remarks

China has stressed the fact that the “*liang hu yi ti*” are the producers in the agricultural sector. The term “*liang hu*” refers to *zhuan ye hu* (specialized farm household) and *zhong dian hu*²⁶ (semi-specialized farm household) while “*yi ti*” means the economic union.

Schultz illustrates the relationship between the decentralization of agricultural producers’ organizations and production in Figure 2.²⁷

The analysis of China’s agricultural organizations in the light of Figure 2 indicates that the people’s commune may be represented by P₄, while the *zhuan ye hu* and *zhong dian hu* under the *bao gan dao hu* system by P₁.

The first document of 1983 entitled “Some Problems on the Present Policies of Rural Economies,”²⁸ issued by the Central Committee of the CCP recognized that peasants could lease their contracted land to specialized peasants in order to intensify the operation. Moreover, the central government recognized that a peasant could employ two helpers and five apprentices.²⁹ According to Figure 2, a family farm with hired laborers in China may be represented by P₂ and the rural new economic union by P₃.

The decentralization policy based on the introduction of the responsibility system and the decollectivization of the people's commune immediately resulted in the establishment of family farms with small plots. The transformation from the pure family farm to the family farm with hired labor implies that China should realize economies of scale by farm mechanization, at the expense of decentralization to some extent.

It is true that China may have three options for agricultural organizations in the future, i.e., the "*liang hu*," the "*yi ti*" or the "*liang hu yi ti*," but in reality it is likely that the latter two will be selected. In addition, the government has again referred to collectivization, and some scholars regard family farms as transitional forms of agricultural organizations. Here we can perceive that a new agricultural problem may arise from the old problem, namely, the theory of comparative advantage of large farms.

Schultz's hypothesis emphasizes the comparative advantage of family farms. In fact, the question may be debatable whether family farms, including ones with hired labor, are always the most efficient organizations.

Presently China stresses that the family farms are not incompatible with cooperative economies. The family farms are organizations which give the highest incentives to the peasants since they have the autonomy of production and distribution. Then, the farmers are most afraid of recollectivization in which everyone eats the "iron rice bowl." The Party and the government consider that farm households should be placed under the authority of regional cooperative economies. The regional cooperative economies which provide public goods, such as, water, farm machinery services, plant protection, and promote variety breeding are in charge of transportation, technology, information, etc.

The Party and the government aim at creating family farms through the enlargement of the operation scale under the two-level management system. In March 1987, the five central authorities, namely, the Agricultural Policy Research Office of the Central Secretariat, the Ministry of Agriculture, Animal Husbandry, and Fishery, Ministry of Forestry, Ministry of Water Conservancy and Electric Power, the Research Center for Rural Development of the State Council presented eight policies to the Party and the government.³⁰ Among them, the contents of the policy related to the promotion of the enlargement of the operation scale are as follows:

- (1) Regions with developed economies and appropriate regions should encourage on an experimental basis the creation of modernized capital-intensified family farms specialized in the production of commercial foodgrains to realize economies of scale and to increase land productivity.
- (2) General regions should realize economies of scale in service sector unification before and after production. Then, they could absorb 100 million laborers into rural small-scale industries and the tertiary industry for institutional innovation in agriculture.

Moreover, then General Secretary Zhao Ziyang emphasized the "primary stage of socialism," and appreciated the role of the private sector during the 13th National Representative Congress of the CCP held in October 1987.³¹

In his speech at the National Rural Works Conference in November 1988, Premier Li Peng stressed the following five points:³²

- (1) prompt purchase of foodgrains.
- (2) promotion of modernization of agriculture.
- (3) emphasis on the production, management and use of fertilizers.
- (4) consolidation of the agricultural reform, and
- (5) effective management of the production and supply of foodstuffs for urban areas.

In December 1988, the central organ of the Party and the State Council made public “Decisions on the Increase in Agricultural Production for the Next Year.”³³ The “Decisions” point out the importance of the following measures to increase investment in agriculture, raise the purchasing prices of foodgrains, strengthen agricultural basic construction and disseminate rural educational activities:

- (1) The government raises the fixed procurement price of foodgrains by contract properly.
- (2) The government provides peasants with chemical fertilizer and diesel oil in proportion to their collection quotas of foodgrains and treats provinces and autonomous regions which provide a large quantity of foodgrains to other provinces favorably in terms of investment, banking, finance and provision of capital goods in agriculture.
- (3) The government increases agricultural infrastructive investment, and the local government at each level provides special funds for agricultural development.
- (4) The government consolidates existing irrigation works, and drainage, and irrigation systems, improves soils, plants and trees.
- (5) The government deepens the belief of the peasants in rural reform and production through rural education.
- (6) The government takes measures to increase supplies of modern inputs and organic manure. (The production target of fertilizers is 85 million tons.)
- (7) The government increases the production of meat, eggs and vegetables.
- (8) The government makes the rural industry improve the level of management and the quality of products and develop successfully. It also agrees that the qualified collective firms issue shares.
- (9) The government makes the household responsibility system more complete. Some qualified regions should operate large-scale family farms.
- (10) The local government and the local Party committee at each level must be convinced that the base of the national economy is dependent on agriculture.

Concerning the increase of prices of foodgrains, it will be very difficult for the government to reach the target of collection quotas unless the purchase price of the government is raised to the level of market price. The government must increase the basic construction investment in order to avert the “market failure,” which happened in capitalist countries.

It is noteworthy that in some areas the government has implemented the policy of buying and selling of the right to land use.

A scholar implied that the agricultural organizations will develop from a household management unit to a small-scale specialized firm, and from a small-scale

specialized firm to a specialized corporation group. In other words, it follows that household management units specialized in foodgrains, cotton, forestry, pig raising, industry, commerce, construction, etc., will evolve into specialized organizations in specialized regions and into specialized firms.³³ On the other hand, he also suggested that technological specialization may bring about division of labor, namely, the creation of specialized units in breeding, harrowing, plant protection, supply of fertilizer, irrigation and drought control, harvesting, drying, processing, and so on.

Therefore, the transformation of household management or family farms into firms, must lead to the formation of hierarchical organizations which implies the introduction of monitoring and discriminated in wages. But to achieve this objective, economic agricultural organizations can not evolve from peer groups based on the experience of the Japanese agriculture where the large number of cooperative organizations for production failed to evolve into firms.

NOTES

1. Zhonggong Zhongyang and Guowuyuan (1984).
2. Zhonggong Zhongyang (1970a).
3. do. (1979b). This document also stressed on distribution according to work, but finally this document was abolished. For detail, see Yamamoto (1983).
4. do. (1979c).
5. *Renmin Ribao* (October 3, 1979).
6. See Williamson (1975) Chap. 3.
7. See Yamamoto (1983) (1985).
8. Zhonggong Zhongyang and Guowuyuan (1985)
9. Zhao (1985).
10. Lerner (1971).
11. Stiglitz (1974).
12. Cheung (1969;).
13. Stiglitz (1974).
14. *Nonmin Ribao* (August 9, 1986).
15. Zou, Shi, and Zhang (1986).
16. Zhang (1986).
17. *Nanfang Ribao* (October 27, 1987).
18. Su Xing (1986).
19. See Williamson (1975), Chap. 8.
20. Zhonggong Zhongyang (1984).
21. Su Xing (1986).
22. do.
23. *Zhonggong Yanjiu* (1986).
24. See Yamamoto (1987) and Tang (1984).
25. For the detailed argument, see Yamamoto (1985).
26. China does not currently use the term “*zhong dian hu*.” Because in November of 1985 the State Statistical Bureau defined the national criteria of “*zhuang ye hu*” as follows. (1) A household in which major laborers or many laborers engage in specialized production or in special services and working hours for the task shares more than 60% of all working hours. (2) A household of

which income from specialization shares more than 60% of all the income of the household. (3) A household of which the commercialization rate of specialized products reaches is more than 80% (60% in the case of specialist farm household in grain production). (4) A household of which sales of products (including income from services) are more than the double of the average income per farm household at the local level.

27. Schultz (1964).
28. Zhonggong Zhongyang (1983).
29. Guowuyuan (1984).
30. *Renmin Ribao* (March 3, 1987).
31. Zhao (1987).
32. *Renmin Ribao* (November 8, 1988).
33. Zhonggong Zhongyang and Guowuyuan (1988).
34. Zhang Yixin (1987).

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