

PEASANT ECONOMIC BEHAVIOUR: THE CASE OF TRADITIONAL AGRICULTURAL CO-OPERATION IN CHINA

JOHN WONG

I

ARE THE PEASANTS OF underdeveloped agricultures efficient in their patterns of resources utilization? Or are they optimizing or economizing in their behaviour? On this, as in many other issues in economics, there are conflicting views.

To begin with, we need to clarify these normative terms "efficient" and "optimizing." At the core of economics is the concept of efficiency. Broadly speaking, output per unit of input is economic efficiency. When a peasant is efficient, he must be optimizing in his behaviour. To say that a traditional peasant is optimizing or economizing is to say that he is the Economic Man, which is the *sine qua non* of economic rationality underlying every economic theory.

As a matter of fact, the whole body of microeconomics is concerned with the problem of efficient allocation of economic resources. When the economy allocates resources in such a way that no feasible reallocation either of inputs or outputs would increase the welfare of at least one individual without simultaneously decreasing the welfare of some other individuals, the economy is said to have allocated its resources efficiently. This is a fundamental welfare economic criterion. In Neo-classical economics, efficiency requires the fulfilment of marginal conditions. However, it is important to realize that attainment of the maximum allocative efficiency for the economy is equivalent to achievement of an optimal state, which therefore calls for value judgement.¹ This in effect assumes ideal conditions under a perfectly competitive economy. Real life economy, of course, contains "external effects" which can either hamper efficiency or prevent any movement towards efficiency on the basis of marginal calculus.

II

In contrast to the Physiocrats in the late eighteenth century, economists in the nineteenth century, especially the English Classical Economists, showed little interest in the non-capitalist type of production. To the extent that most economists were urban-bred intellectuals, they viewed the peasants as indolent people,

¹ Implications of normative economics are generally discussed in texts on welfare economics. See, e.g., [27].

economically backward and inert, as opposed to the progressive and economically dynamic capitalist class. Ironically, Marx also showed a similar scorn for traditional peasants. Impressed by the efficiency of large-scale industrial production in the capitalist sector, Marx viewed peasant agriculture with "the townsman's contempt for all things rural and the economist's disapproval of small scale production" ([31, p. 6], see also [19, pp. 1-40]). With the rise of marginalism and general equilibrium analysis in the last quarter of the nineteenth century, there was even less place for discussion of peasant economies in the standard economic theory. If anything, the image of the peasant even got worse in the mind of the Neo-classical economists armed with the profit-maximizing hypothesis and the tool of marginal analysis. After World War I, as economists began to show some interest in the underdeveloped areas (then mostly backward colonies of the Western countries) as separate theoretical entities, many tended to over-emphasize the cultural and sociological determinants of the condition of underdevelopment and took an unduly pessimistic view. An extreme stand in this direction was J.H. Boeke's social dualism.² In short, the proponents of this school argued that the traditional social and institutional set-ups in the underdeveloped areas restrain the kind of economic forces normally in operation in the advanced countries (see, e.g., [38, pp. 294-303] and [10, pp. 360-78]). Hence there recurred a number of controversial topics in the literature of economic development such as "disguised unemployment," the "backward-sloping supply curves of effort and risk-taking," the "negative supply response," and so on. It follows that the peasants of underdeveloped agricultures were taken as not only inefficient in their utilization of resources but also, by implication, a nearly incapable of being efficient. Accordingly, peasant economies were seen to be different from the model of capitalist market-economy in degree as well as in kind. The question of applicability and relevance of the standard economic theory based on the concept of the Economic Man to the underdeveloped countries was therefore raised.³

Next, there were those (especially the economic anthropologists) who stressed that the peasants are a distinct social group possessing sufficiently different traits to warrant special consideration.⁴ According to them, the peasantry should be dealt with in the context of a peasant system of production and the peasant economy is a special type of economy different from the capitalist system of production. Labour, for instance, is just treated as another commodity in the capitalist system which can be purchased or dispensed with; but the peasant's labour force consists mainly of his kith and kin who cannot be hired and fired as labour in the city's labour market. Likewise, the objectives of the peasant's enterprise are primarily survival or continuity in the genealogical sense and only secondarily economic in the sense of profit maximization. If the peasants are maximizing, they would maximize labour input rather than total profits [17, pp.

² See [48] and B. Higgins' critical review [22, Chapter 12].

³ For a succinct discussion on this topic, see [32].

⁴ For an anthropological approach to the study of peasantry, see [37]. See also [16, pp. 293-315].

1-26] [18, pp. 145-66]. Further, a peasant farm is quite different from the industrial firm in taking risk and dealing with uncertainty: a farm cannot liquidate itself if it has made a poor economic decision.

In the early 1920s, a Russian economist, Chayanov, also drew attention to the special features of the peasant system of production. In the main, Chayanov postulated that the intensity of farming or the use of family labour is a function of the ratio of consumers to workers in the family and that economic differentiation among the peasantry, in terms of farm size, is more a measure of relative family size than differential economic success. Accordingly, the above characteristics are inconsistent with the profit-maximization hypothesis contained in Neo-classical economics. Since the peasant family farm does not contract wage payments with its own members (the family as a whole is a residual claimant to the farm's proceeds), wages are indeterminate. So must be profits and rent. Hence the family farm cannot maximize what it cannot measure.⁵

At the other end of the spectrum of arguments stands the "efficiency hypothesis." Thus T. W. Schultz argued that the allocative efficiency in most peasant agricultures is generally high in the context of the prevailing technical possibilities and of the factor and product-cost relationship. "There are comparatively few significant inefficiencies in the allocation of the factors of production in traditional agriculture" [40, p. 37]. The Schultz proposition in effect holds that the traditional peasants do optimize or maximize in the sense of equating marginal returns to resources for alternative use. John Mellor, among other agricultural economists, strongly backed up Schultz's efficiency thesis and dismissed the many studies indicating peasant inefficiency as reflecting deficiency in the measures used in such studies rather than in farming itself [29, Chapter 8]. Mellor also cogently argued that the long-unchanging physical, economic, and cultural environment in traditional agricultures would normally cause, even by common sense, the peasants to gravitate towards an optimal solution to resource allocation through a process of trial and error or even through natural selection. The Schultz-Mellor thesis, which has been gathering force in recent years, has received support from two groups of scholars. Many prominent anthropologists with field experience have come to the opinion that the traditional peasants are just as rational or irrational in their behaviour, especially in the microeconomic sphere, as any other group in the world.⁶ On the other hand, many economists engaged in the econometric study of peasant economic behaviour have also concluded that the peasants do in fact respond significantly and efficiently to price changes or other economic incentives, implying that the traditional peasants are rational and economizing in their behaviour.⁷

⁵ See [46]. Also, the discussion by James R. Millar [30, pp. 219-29].

⁶ Manning Nash stated: "The rationale of economic choice in peasant society follows the general rule of maximization as economic activity does anywhere, at any time." [33, pp. 186-91]. Also see [15, pp. 23-37].

⁷ See Krishna [24, pp. 497-540] and Behrman [3]. Both writers have documented extensively studies on supply response. In particular, Behrman has tabulated all the major econometric findings in the estimation of price elasticity for the underdeveloped countries.

While most serious social scientists today have discredited the extreme view of Boeke on this subject, the Schultz-Mellor thesis is not without its drawbacks. Needless to say, many of the propositions in the theory of optimizing peasant behaviour are close to those of the Neo-classical model of the profit-maximizing firm under perfect competition. A more serious weakness of the thesis springs from the neglect of the problem of risk and uncertainty, as pointed out by Michael Lipton [26, pp. 527-51]. Owing to the rainfall variability in peasant agricultures, there is no unique marginal physical product associated with any factor, but only a probability distribution of the marginal physical products. Under conditions of uncertainty, the peasants, instead of maximizing, seek "survival algorithms."⁸

Perhaps the peasant efficiency controversy will continue, because there is so much variability among peasants of various forms of peasant agriculture with regard to their underlying values, objectives, and motivations that it will simply not be possible to arrive at a generalization that the traditional peasant is either efficient or inefficient from the modern standpoint.

It may be noted that the marginal values in the analytical scheme of Neo-classical economics are only mathematical concepts of the first derivatives. In reality, the peasants do not, of course, try to calculate down to single units and substitute them at the margin with a fantastic degree of infinitesimal accuracy. Economists use the mathematical conditions for maximization to represent the theoretical limit of approximation of the real-world behaviour patterns. If the peasant does not equate MR to MC in the manner postulated by economic theorists (indeed, he never does in the absence of information and knowledge), it does not necessarily refute the theory that the peasant is not maximizing profits, and therefore not optimizing. It is the way he responds to certain changes that actually counts. After all, empirical evidence shows that the cost of misallocation arising from the violation of the "maximization rules" (e.g., the existence of monopoly) are frequently small for advanced countries (see [25, pp. 392-415]). Even for developing countries, the cost of inefficiency is "not only quantitatively unimportant," but is also "nearly irrelevant to [the] development problem" [21, p. 169]. In view of the fact that the real world takes the allocative efficiency as something "which doesn't matter very much after all," one should avoid an unduly rigid interpretation of the conditions for efficiency [42, p. 44].

III

In the case of traditional China, it seems on balance a safe evaluation that the average Chinese peasants were not only hard-working but also efficient and capable of making rational economic decisions. The Chinese peasants had for centuries tried to better their economic lot by watching margins very carefully within the

⁸ Lipton attacks Schultz's argument as a "tedious tautology." The Schultz-Mellor argument does have a smack of tautology—given inefficient environments, the peasants have done their best to be efficient. But the whole point of the Schultz-Mellor argument is to show that agricultural production cannot be expanded by the reallocation of traditional factors within the same static framework.

traditional technological confines. For the industrious and often hard-pressed peasants, maximizing was sometimes a kind of "survival algorithms."⁹ The Chinese peasants shared with peasants in other lands the general trait of "capacity to suffer." Some economists take the view that the peasants in low-income countries, especially those in South Asia, attach a high marginal utility to leisure relative to material goods so that once their subsistence is met, their marginal utility of income substantially declines.¹⁰ This behaviour model has limited relevance for China. We have no evidence to support any such view that the traditional Chinese peasants displayed limited material aspirations. On the other hand, authoritative evidence points to the contrary. The eminent economic historian R. H. Tawney considered Chinese agricultural practice efficient:

Compared with that most part of Europe, any period before the nineteenth century, it is a prodigy of efficiency and as a triumph of individual skill unaided by organized knowledge, its reputation is deserved. [45, p. 46]

The geographer G. B. Cressey was also greatly impressed by the high efficiency of the Chinese peasants in their resource use:

Almost everywhere man has long ago utilized the resource of nature up to the limit of the tools at his command. Centuries of famine and invasion have pushed people back into practically every corner which will support life. Generations of empirical adjustment have shown the way to secure both the maximum harvest and the most satisfactory social relationships. [9, p. 2]

From the above observations, one cannot fail to feel the same common chord that characterizes the Schultz-Mellor thesis. In addition, the existence of co-operative activities in traditional Chinese agriculture also lends support to the maximizing behaviour of the Chinese peasants.

IV. TRADITIONAL CO-OPERATIVE TEAMS AND PATTERNS OF RESOURCE UTILIZATION

The economic behaviour of the peasants is best reflected in the ways they utilize the available resources at their command. In this section we shall examine the economic nature of the key inputs on the traditional Chinese farms and show how economic crisis is regularly created by the disequilibrium between the demand and supply of those inputs during the peak farming seasons. We shall then discuss the common methods by which the Chinese peasants responded to the various challenges by organizing themselves into mutual aid teams (MATs). A MAT is simply a horizontal inter-farm co-operative body informally organized for the joint use of certain essential economic services during the busy seasons.

⁹ Foreign observers were often impressed by the "industrious and patient character of the [Chinese] people . . . their will to live and their ability to overcome adversity" [4, p. 171].

¹⁰ This is the essence of Mellor's "Limited Aspirations Model," in which two basic assumptions are made: the marginal utility of goods drops substantially once subsistence is reached and the productivity of labour is such that incomes range around the subsistence level. See [28, pp. 517-34].

A. *Use of Labour*

In underdeveloped agriculture, labour is the primary variable input for increasing production. But it is commonly assumed in much of the literature on development economics that labour is the most abundant asset in a developing economy, forming a surplus that is mostly concentrated in the agricultural sector. Consequently, a state of "disguised unemployment" exists in the country-side which implies that the "redundant" labour can be removed from agricultural employment with no change in total output.¹¹ The concept has since been under controversy in which the seasonality of agricultural production is another relevant issue. In his study of Korean agriculture, Yong Sam Cho shows that instead of disguised unemployment in the sense of chronic idle labour, there is only seasonal underemployment in Korean agriculture, with shortage of family labour being seriously felt in the peak seasons.¹² Chinese agriculture is another case in point.¹³

Based on the earlier study by Buck of 2,866 farms in prewar China, Chiang Hsieh attempted to estimate the extent of agricultural underemployment in the areas in North China and East Central China. The results of Hsieh's analysis showed that as far as the male working population was concerned, of the eleven localities studied by Buck, only four suffered from chronic agricultural underemployment, i.e., labour surplus. In six localities there was a deficit of male labour at the seasonal peak, which had to be reinforced by a large number of female workers [7, pp. 714-17]. Specifically, the Chinese peasants generally experienced a shortage of labour in harvesting and cultivating periods, as shown in Table I. In the rise region, transplanting and irrigation constituted an extra demand for labour and therefore created an additional shortage. In particular, in the double- and treble-crop regions in South China, the timetable for agricultural activities was extremely tight and rigid, especially in the brief "turnover" periods—the harvesting of the first rice in the spring and the planting of the second in the summer. The intervals, severely constrained by weather, often lasted only for a week or two for many areas in China.¹⁴ Hence the seasonal character

¹¹ The term "disguised unemployment" was originally coined by Joan Robinson to describe workers in developed countries during the Great Depression who accepted inferior occupations with productivity lower than that from their previous occupations. Rosenstein-Rodan made use of this concept to study the industrialization problem in Eastern and South-Eastern Europe. It became popular when Arthur Lewis, Nurkse, and Leibenstein applied it to explain the phenomenon in underdeveloped countries. See [23].

¹² [8]. Egypt also has a large number of child labour employed for intensive farming and there is no case of zero marginal returns to labour. See [51, p. 103]. It should be noted that Warriner was in favour of the concept of disguised unemployment in her early works [50], because her estimate of surplus of labour did not take into account the labour requirement for capital maintenance in agriculture.

¹³ It should be noted that labour shortage during the peak periods by themselves does not provide a sufficiently clear-cut test as to whether the marginal productivity of some part of the labour force is zero or not, although it serves to show that the notion of disguised unemployment is oversimplified, while the proposition of labour redundancy is untenable.

¹⁴ See [47]. Cf., a similar situation occurs in India: "Dependence on the monsoons obliges them [peasants] to make certain variations in their agricultural schedule to fit in with the uncertainty of the rains. Some of their operations must precede the first rainfall; others must follow it almost immediately. For some days during the busy season this causes great pressure on available resources in men and cattle" [11, p. 84].

TABLE I
PREWAR SHORTAGE OF AGRICULTURAL LABOUR IN MAJOR FARMING ACTIVITIES
(Based on a Sample Survey of 260 Localities in 20 Provinces, 1929-33)

	Percentage of Localities Reporting Shortage of Labour for the Following Major Farm Operations					
	None	Harvesting	Cultivating	Planting	Ploughing	Irrigating
National average	19	65	12	27	2	13
Wheat	15	78	17	16	3	2
Rice region	22	57	8	34	1	21

Source: [5, p. 301].

of agricultural production in China often enforced a rigid time schedule for farming operations, giving rise to fluctuating demands for labour in agricultural employment as well as the existence of an extensive labour gap in the peak seasons.¹⁵ And frequently the peak demands ran in excess of the total labour resources in the peasant's family.

To cope with the enormous peak demands for labour, the peasants had the limited choice of either resorting to more labour-saving devices or getting extra labour through redistributing and improving the utilization of the available labour resources. The former involves greater capital investment and introduction of new kinds of inputs, with all the technological and economic complications as implied in the factor substitution process. Of course, the agricultural structure would not remain underdeveloped had there been large-scale adoption of labour-saving equipment and widespread technical substitution. The latter, however, will provide some extra labour without changing the basic structure of agriculture or, more specifically, without entailing any drastic change in the resource cost and supply conditions of resources. Clearly, the solution open to the Chinese peasants was for them to follow the second option and to acquire more labour either by hiring labour or by some forms of labour exchange when they could no longer draw upon the source of family labour. Only the rich and the well-to-do middle peasants could afford to hire labour on a more regular basis, i.e., to "buy" labour with money. For the poorer and the majority of the peasants, they had to "buy" labour with labour, i.e., they exchanged labour services. Peasants normally preferred informal co-operative arrangements to wage labour because the latter implied some form of contractual relationship while the former could be more easily operated on a reciprocal basis. Many rural areas in China had retained until recently the non-monetized feature so characteristic of other underdeveloped economies in which wage labour was traditionally not considered a norm. Many peasants tended to bypass the monetary transactions due to sheer old habits, or just in an attempt to avoid the financial and administrative complications involved—wage labour required not only accounting control but also regular hours and

¹⁵ Kenneth Walker also argued that a large labour gap exists in the peak seasons, and he attempted to estimate the demand and supply of labour in six provinces in South China. See [49, pp. 405-13].

consistency over a period.¹⁶ Hence the popularity of the mutual aid teams (MATs) among the Chinese peasants.

The labour-exchange or the work-exchange is a "Uni-factor" type of agricultural mutual aid co-operation which had been widely practised in China for centuries under various local names, the most popular of which being *jen-kung pien-kung* ("human labour exchange").¹⁷ This kind of mutual aid teams was operated by staggering the dates of planting to avoid the simultaneous arrival of harvest for the members. The membership was usually chosen by the peasants themselves on a variety of considerations such as complementary economic interests and more or less equivalent social standing, so that a fairly equal amount of work or labour could be exchanged without undue social frictions and without any partner feeling being exploited. More commonly, the labour exchange unit was created informally on the basis of kinship and friendship. When relatives or friends agreed to come to help each other for mutual benefit, the risks of conflicts arising from demanding rigid reciprocal treatment, which could be a common plague to all agricultural co-operative activities, were considerably reduced.¹⁸ For many traditional *pien-kung*, the absence of formal organization and institutionalization was far from a disadvantage. As a temporary and spontaneous creation of the cultivators to meet with the economic crisis during the tight agricultural seasons, the *pien-kung* after all had to be of great organizational flexibility and simplicity in order to operate successfully.

In North China, it was particularly common to see the formation of the labour gangs called *cha-kung* ("collective hiring out of labour or poor peasants hiring out their labour to work the land of others in groups"), and *ho-chung-ti* ("joint tilling"). The popularity of all these forms of MAT owed much to the advantage of team work. Mutual aid practices were able to yield a certain degree of increased efficiency through a limited process of division of labour in addition to the increased enthusiasm of people working in groups on their own volition.¹⁹

In a deeper economic sense, the "labour-exchange" type of MAT was more than just an ingenious device of the Chinese peasants to adjust the existing labour distribution system to meet the peak demand for labour. This kind of MAT also provided evidence of the peasants' effort to utilize the slack labour and to command additional non-labour resources for a higher level of production. This aspect of peasant co-operation was of far greater economic significance in the Chinese context.

In many areas in China, the amount of land a peasant could work on was

¹⁶ For example, a field study of a village in Yunnan province undertaken by Fei and Chang shows: "A count made during the harvest in 1939 revealed that one-half of the workers in the fields were working on exchange basis rather than for wages" [13, p. 36].

¹⁷ Literature on the pre-Communist MATs has been collected and compiled into a compendium of materials by Peking. See [43]. Section one, pp. 3-67, provides an excellent account of various forms of MATs in different parts of China.

¹⁸ See [43, pp. 21-27], where MAT practices in traditional form are vividly described.

¹⁹ Shih Ching-t'ang's book is replete with local examples of similar nature, showing how MATs adjust their labour resources and maximize the contribution from their members. See [43, pp. 820-23, 952-57].

limited by what he and his family could manage during the busiest peak. Paradoxically, his low labour productivity plus the climatic constraint defined the amount of land he could undertake to cultivate, even more than the overall constraint from the unfavourable man-land ratio in that area. Given the situation of limited technical substitution, his "operational farm size," which in this case is a function of the labour resources at his command, had to be small, sometimes even at a level lower than what was required for his survival. MATs were one way to help him to raise his "operational farm size." This is best illustrated by Fei and Chang in their study of Lutsun village in Yunnan. They found that the maximum size of land a peasant couple could attend to during the peak season of transplanting rice was ten kung or about 0.7 of an acre. But this small parcel of land could hardly be sufficient to support a family on the basis of the general productivity of soil in that region. The only option for the peasant was to cultivate a larger piece of farm, and this entailed the use of additional labour at peak periods. The common solution was for the peasant to enter into some form of labour exchange agreements with his neighbours, as he could not afford to hire help in the form of wage labour. As a result, he could handle a larger farm by stretching his scarce labour resources—simply increasing his total working days or working hours [13, pp. 35–36]. This had been a common "survival strategy" for the many poor peasants in China whose productivity was generally low (as compared with the middle and rich peasants), because the poor peasants invariably had poor factor endowment. For the relatively richer section of the peasantry, MATs could of course be equally effective in rendering the same advantage for them by enabling them to enlarge their "operational size," although in practice they relied less on simple labour exchange because they could afford to hire help.

In short, the MATs enabled the peasants to achieve a higher level of utilization of resources through mobilizing the "agricultural slack." To a poor peasant in the MAT, that part of mutual aid service actually represented his additional economic activity otherwise idle. To view it from another angle, the MATs extended the employment opportunity to all their members through the overall shortening of their period of rural underemployment.

It should be borne in mind that no amount of mutual aid service could overcome such natural constraints as arising from rainfall during the peak seasons. In general, weather uncertainty could of course foil the successful operation of MATs. But the uncertainty was usually reduced through the proper estimation of risk. The heavy reliance of the Chinese peasants on the centuries-old traditional agricultural calendar and some well-tried local agricultural adages was but one of the many means which the peasants had long used, quite effectively, to reduce the threat of disasters arising from miscalculation of such hazards as weather uncertainty. The flexible organizational structure of the MATs with all their improvisation nature could also have contributed to the alleviation of risk and uncertainty. Finally, the problems of risk and uncertainty were not all that unfavourable for the development of MATs. Any co-operative scheme had the effect of spreading risks, thereby sustaining its members to emerge from a crisis better. Thus the climatic uncertainty and other elements of risks did not, on

balance, constitute any undue obstacles to the operation of the MATs.

By contrast, successful working of the MATs did depend a great deal on the operation of some other economic forces. Peasants who joined the MATs in order to take up more land or a higher level of agricultural activities were usually acting on two basic rationales: (1) MATs can better utilize all the available resources in the peak periods than individual peasants by operating on a tighter schedule of activities and with members contributing more intensive effort. It is recognized that human groups working under pressure can create some "crisis atmosphere" or mood of exigency which helps enforce discipline and therefore increase efficiency. (2) MATs can raise the efficiency of members through the division of labour and save some labour for other activities.²⁰ In economic analysis, increases in labour efficiency usually follow a change in the relative marginal productivity of labour (i.e., the expansion path of the farm in question tends to move away from the true scale line).

However, it should be stressed that with no basic change in the nature and structure of the inputs, any economy would be bound to be limited as operational scale is increased. It is only with the introduction of new forms of inputs that major economies are to occur.²¹ Hence there are limits to the latitude of exploiting the potential efficiency of the MAT activities.

B. *Use of Draught Animals*

In a densely populated country, peasants will have to compete with animals for land use. In China, the high population pressure on land, especially in the coastal agricultural regions, necessitates the maximum devotion of land to growing food rather than leaving the land to pastures or to growing fodder for animals. Hence beasts of burden were relatively scarce on farms, despite the fact that they were central to all activities on the Chinese farms. According to Buck, the draught animals for the wheat regions were oxen, donkeys, mules, and horses; and for the rice regions, water buffaloes and oxen. However, there was a general shortage of draught animals in many areas in that there were far fewer draught animals than families. Buck showed that each farm in the wheat region on average was entitled to 0.51 ox, 0.47 donkey, 0.17 mule, and 0.11 horse; and each farm in the rice region had 0.51 water buffalo and 0.47 ox.²² The situation was exacerbated by the uneven distribution of draught animals such that the difference between having one draught animal and none was enormous. The overall average for China showed that 65 per cent of small farms and 38 per cent of medium farms had no draught animals at all [5, p. 253]. As a matter of necessity, these farms without a draught animal had to resort to hiring from the households having

²⁰ Fei and Chang observed that, in the village under their study, an optimum crew of ten peasants was formed for harvesting rice—four on the threshing floor, four reaping, and two transporting the grain from the reapers to the threshers. In transplanting the young rice shoots, a team of six or seven would yield the same optimum efficiency. [13, p. 64].

²¹ See [29, Chapters 16 and 20]. This is why many small farms in the Near East and Asia have a higher gross output per acre than large farms or large co-operative units. See [2].

²² According to Buck, 65 per cent of the "small" farms, compared to 7 per cent of the "very large" farms, are without labour animals. [5, p. 253].

TABLE II
HORTAGE OF DRAUGHT ANIMALS IN CHINA: PER 100 FARMS IN 22 PROVINCES*

Year	Farms Owning Draught Animals	Farms Hiring Draught Animals	No. of Animal Work-days Hired	Shortage of Animal Work-days on Farms	Percentage of Animal-Labour Shortage on Farms
1939	64	36	745	103	14
1940	63	37	872	129	15
1941	63	37	912	139	15
1942	62	38	953	145	15
1943	60	40	1,088	163	15
1944	60	40	1,079	192	18
1945	59	41	1,050	223	21
1946	61	39	1,056	199	19

Source: The Department of Agricultural Economics of the National Agricultural Research Bureau. Quoted from T. H. Shen, *Agricultural Resources of China*, Ithaca, New York, 1951, p. 373, Appendix Table 1.

* During the War years only fifteen provinces were included. The table incidentally indicates the effect of the war on animal shortage.

surplus animal power, as shown in Table II, usually not by playing rental in cash, which would involve unnecessary accounting complications, but by returning with their own labour services. Here the demand for the co-operative use of draught animals led to the development of the labour-animal exchange or the "cross-factor" type of MAT.

The pattern of animal distribution was most significant for the formation of MATs. Buck's survey showed that the crop acreage of the median-sized farms for the wheat region was 3.14 acres, and for the rice region, 2.05 [5, p. 268]. Further, each draught animal on average could take care of 4.55 crop acres in the wheat region, and in the rice region, 2.94 crop acres [5, p. 255, Table 11]. This means that peasants with small holdings would find it difficult to support draught animals because of the potential underemployment of their animal power as well as of the utmost priority for making land available for food production. Even if the initial cost of a horse or water buffalo was not prohibitive, the size of allotments made animals an uneconomic investment. Yet draught animals were indispensable for almost all kinds of farming operations. On the other hand, given the small farm size in most areas, the acquisition of even a single animal could, to most owners, create excess animal power badly needed by their neighbours, and the animal owners would well find it profitable to let out their spare animal services for the kind of labour services they felt most needed. Thus the primary shortage of draught animals, aggravated by their maldistribution and the prevailing pattern of small land holdings, provided a fertile ground for spontaneous peasant co-operation pivoted around the joint use of animals. Just to quote an anthropological study of a village in Shantung to show the animal-land relation:

If a family owns fifteen *mow* a small cow joins the donkey to form a team; a family with twenty *mow* can have a donkey and a large ox; a family with more than forty *mow* can have a donkey, a large ox, and a mule; a family owning less

than ten *mow* cannot afford any animal and must either work without one or co-operate with a more fortunate neighbour by exchanging labour for the use of his animals. [54, p. 25]

In China, the most common form of cross-factor co-operation based on the use of the scarce factor, draught animals, was the *niu-chu pien-kung* or *jen-kung pien-niu-kung* ("labour-animal exchange"). In organizational structure, the labour-animal exchange was not unlike the ordinary *pien-kung* ("human labour exchange") except in the co-operative substance. Usually it was the poor peasants who were not adequately endowed with animal power and had to hire it from the rich peasants not by paying rent in cash or in kind, as in the case of renting land, but by offering their own labour. The poor peasants would then arrange to work for the animal-owners for a certain period at peak seasons by helping in the farms, or even in slack seasons as ordinary household helpers. The rich peasants having relatively more surplus land and surplus animal power would also feel the need to hire extra labour in order to make the fuller use of their animal resources. While the animal rentals, payable in human labour, varied in different areas in accordance with the supply of animals, the terms of such labour-animal exchange in most areas in China were invariably against the human labour as a grim consequence of unfavourable man-animal ratio.²³ An outstanding feature of the "labour-animal exchange," as opposed to pure "labour exchange," was that the former often cut across the rural class lines in a combination involving the rich and the poor.

In some parts of China, notably in the Northeast and the Northwest, ploughing requires two to three or even four to five horses to turn over the soil. As the peasants rarely possessed the required number of beasts, they were forced to enter into some form of mutual aid co-operation.²⁴ The situation was particularly true of areas north of the Yangtze, and the form of MAT thus organized is commonly called *huo-ko niu* ("teaming up of animals"). Elsewhere in China the need for the joint use of draught animals has led to the formation of various MATs such as the *huo-wei-niu* ("co-operative rearing of animals").²⁵

C. Use of Major Agricultural Implements

Chinese farms before the war were badly under-capitalized. Surveys in Kiangsu, a relatively rich province, can be cited in support of the state of shortage: only 61-70 per cent of the owner households and 40-50 per cent of the tenant households had "good and sufficient" agricultural implements [14, p. 233]. From Buck's national sample survey in which twenty-one pieces of farm equipment are listed, it can be worked out that in the wheat region small farms on the average only

²³ In Northwest China, it is common to find three human labour units to one animal labour unit, and it is not rare in some poorer areas to have a seven to one ratio.

²⁴ In the Northern parts of Northeast China (Manchuria) at least four heads of animals are required to pull the heavy plough. Even in North China, most farm implements have to be operated by at least two animals. See [36].

²⁵ See [43, pp. 5-11]. Co-operative ownership of animals or oxen is also practised in the rice areas in the Mekong Delta. See [12, pp. 137, 140].

have 0.6 piece and large farms have 1.3 pieces, while in the rice region small farms have 0.5 piece and large farms 1.5 pieces (see Tables III and IV). What

TABLE III
AVERAGE NUMBER OF IMPORTANT AGRICULTURAL IMPLEMENTS PER FARM
(A Survey of 499 Farms, 150 Localities, 143 *Hsien*, 22 Provinces, China, 1929-33)

	Small Farms		Medium Farms		Large Farms	
	Wheat Region	Rice Region	Wheat Region	Rice Region	Wheat Region	Rice Region
1. Ploughs	0.7	0.6	1.0	1.4	1.6	2.3
2. Harrows	0.5	0.6	0.8	1.1	1.2	1.7
3. Hoes	2.0	2.7	3.3	4.0	4.9	8.3
4. Spading hoes	0.9	0.4	1.2	0.4	2.0	0.8
5. Drills	0.3	0.1	0.7	0	1.2	0
6. Stone rollers for packing soil	*	*	0.3	0*	0.5	*
7. Iron rakes	0.2	1.0	0.4	2.0	0.9	3.1
8. Iron spades	0.9	0.5	1.3	0.6	2.2	0.9
9. Wooden chair pumps (man-operated)	0	0.2	0	0.5	*	0.8
10. Wooden chair pumps (animal-operated)	0	0.1	0.1	0.2	0.1	0.4
11. Stone rollers for harvesting	0.2	*	0.5	0.1	0.9	0.3
12. Fan mills	0.1	2.0	0.1	0.3	0.2	0.4
13. Swinging sickles	0	*	*	0.1	3.9	0.1
14. Sickles	1.7	2.3	2.6	3.7	0.8	5.9
15. Flails	0.4	0.8	0.4	1.2	0.9	2.2
16. Wooden rakes	0.3	0.5	0.6	0.5	1.9	1.1
17. Wooden spades	0.7	0.2	1.0	0.2	0.9	0.4
18. Carts	0.3	*	0.5	0.1	0.9	0.1
19. Boats	0	*	0	0.1	0	0.2
20. Wheelbarrows	0.3	0.1	0.6	0.1	0.7	0.2
21. Feed cutters	0.1	*	0.2	0.1	0.3	0.1
Total	9.6	12.1	15.6	16.7	26.0	29.3
Average	0.6	0.5	0.8	0.8	1.3	1.3

Source: [5, pp. 394-99, Table II].

Note: * Statistically insignificant.

most peasants lacked were the large and expensive items like wooden chain pumps and fan mills. Again, what they did own was not evenly distributed. Almost all the surveys made before the war came out with the similar results: that rich peasants owned more and better farm tools than the poor peasants; or, to view it from another angle, landowners had more tools than the tenants (see [6, pp. 857-69]).

The peasants responded to the challenge of equipment scarcity essentially in the same manner as they did to shortage of draught animals. They shared the use or the ownership of the major implements on a team basis. In addition, the poor peasants returned their own labour for the service of the tools rendered to

TABLE IV
 PROPORTION OF FARMS OWNING ESSENTIAL AGRICULTURAL IMPLEMENTS
 (Based on a Survey of 1,426 Farms in 11 *Hsien* of Chekiang, Kiangsu,
 Anhwei, Kiangsi, and Hupeh Provinces in 1935)

	Percentage of Farms Owning:
For ploughing	
1. Ploughs	50.9%
2. Spike rakes	65.3
3. Spades	79.1
4. Rakes	55.5
5. Big hoes	73.5
For irrigation	
1. Ox-driven water-wheels	18.3
2. Paddle water-wheels	52.0
3. Hand water-wheels	19.9
Other purposes	
1. Stone rollers	69.6
2. Flails	42.6
3. Winnowing machines	26.0
4. Buckets	67.3
5. Sickles	85.1

Source: P'an Hung-sheng and Chin Ke-T'un, "A Preliminary Study of Agricultural Implements in China," *Ching-chi tung-chi*, Vol. 3 (November 1936), p. 157.

them by the rich peasants. Thus the peasants were able to overcome the problems of shortage of capital equipment through mutual co-operation.

Suffice it to say that the MATs involving both animals and tools were the rationalized means devised by the Chinese peasants for a fuller and more efficient utilization of the "slack" resources. The resources were rendered "slack" either as result of their maldistribution or due to their "lumpy" nature of indivisibility. In so far as those hidden resources had little or no opportunity costs, MATs of this kind made a real economic gain by bringing those resources into productive use.

So far we have treated the traditional mutual aid practices among the Chinese peasants as purely an economic proposition in isolation from other non-economic considerations. We have only seen them as spontaneous economic devices created by the peasants in response to certain economic and agronomic challenges inherent in the structure of traditional Chinese agriculture. In reality, there were no lack of non-economic explanations for the growth of self-actuated mutual aid co-operation in traditional China. For example, we have not investigated how much social relationships were actually in the guise of the economic exchange under MATs. It is obvious that the traditional kinship network must have furnished a natural ground for inter-farm co-operation in the village, not only in the sphere of agricultural production but also in various aspects of rural life.²⁶ In normal times, the local clan organizations would manage the construction and

²⁶ Franz Schurmann provided some amounts of sociological analysis of the village co-operative activities in pre-Communist China; see [41, pp. 412-25].

maintenance of communal projects like waterworks by the joint-efforts of the peasants. Another example is the role of the historical factor in the growth of MATs. The incessant cycles of war, famine, and other calamities recurrent in modern Chinese history must have also provided strong impetus to draw peasants together in some form of association for mutual help to keep agricultural production going.

Co-operation everywhere has a necessity for its mother.²⁷ It is no exaggeration to state that the co-operative spirit we have outlined above is inherent in almost all backward peasant societies. Given a social structure favourable to co-operation, such as one based on kinship, the economic and agronomical predicament often prods the peasants to organize neighbourly help for survival. For example, in traditional Japan, *oyakata-nago* co-operation in the rural areas was very much akin to the Chinese *pien-kung*.²⁸ In the rice-growing regions of Burma, there were also mutual aid bodies structurally and functionally similar to the Chinese *cha-kung* (see [35, pp. 47-60]). Many similar forms of elementary agricultural co-operative activities also thrived in the Indian country-side, e.g., the *Virhi*, the *Mang*, and the *Sanjh*, in rural Punjab.²⁹

In summary, MATs were not only an important mechanism for mobilizing unused resources with low opportunity costs but also a kind of "survival instrument" for the poor peasants to cope with the crisis of resource shortage during the tight agricultural periods. By forming themselves into MATs, the peasants could enlarge the total size of economic activities whereby the indivisible and slack resources could be more efficiently utilized and some structural deficiencies of small farming eliminated. From our point of view, the popularity and the ubiquitous existence of MATs in China were *de facto* support to the contention that the peasants in traditional China were rationalistic and economizing in their economic behaviour within their static structure of agriculture.

V

The question of allocative efficiency of traditional peasants is not just another intellectual debate, but has great empirical significance. While economists and politicians have in recent years repeatedly warned against the impending crisis in the state of agricultural production in the developing world, the selection of proper policies to induce expansion of output in those countries does depend on a careful understanding of proper peasant economic behaviour. If the peasants were inefficient and primarily not rational in their response to economic incentives, then conventional policies implemented through the ordinary market channels would be bound to be ineffectual. On the other hand, if the peasants were found to

²⁷ For study on agricultural co-operation in general, see [39] and [1].

²⁸ See [44, Chapter 3]. *Oyakata* as "parent" is similar to the Chinese rich peasant and *nago* as "child" is similar to the Chinese poor peasant.

²⁹ The *Virhi* is for two peasants to pool their resources, the *Mang* is equivalent to the Chinese *pien-kung*, and the *Sanjh* is a kind of joint venture of the peasants for co-operative irrigation. See [20, p. 121].

be primarily efficient in their traditional structure of agriculture, then any institutional reform such as land reform involving the reallocation of traditional factors could not contribute significantly to economic development. In the circumstances, any substantial advance in productivity had to come from the introduction of new "dynamic" inputs, or technological improvement, as in the case of Japan before her take-off (see [34, pp. 43-68]).

Again, China can furnish an interesting example. The production structure of Chinese agriculture up to the formation of the people's communes in 1958 was basically traditional in character. Since the Chinese peasants were known to have displayed a high degree of economic efficiency within the traditional production context, the gigantic effort spent by the Chinese Government on organizing institutional reforms in the 1950s did not yield any substantial results in terms of increased productivity. It was only after 1962, with the set-back in production following the Great Leap Forward movement, that the Chinese Government began to realize the futility of relying solely on "changes in production relations" or re-allocation of traditional factors for increasing production, and steps were then taken to develop "production forces" or to exploit new production possibilities.³⁰

Furthermore, the MATs had played a very important role in the collectivization movement in the mid-1950s in China. The collectivization of agriculture, which met with so much difficulty in the Stalinist Soviet Union, was achieved in China in less than four years after the completion of the land reform in 1952. In 1955, there were only a few hundred collectives in China, mainly for demonstration and experimental purposes. By the end of 1956, however, 88 per cent of China's 122 million peasant households were collectivized. While credit should be given to the Communists' skilful organizational technique in rural affairs for the startling speed of transformation, the groundwork laid by the MATs in the early stage was undeniably crucial, because on the eve of the nationwide collectivization drive at the end of 1955, 65 per cent of the peasant households were already in MATs (see [52, pp. 569-89]). Hence the study of traditional agricultural co-operation in China not only sheds some light into the current "efficient peasant" debate but also provides a better understanding of the institutional revolution in Chinese agriculture initiated by the Chinese Communist Government.

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³⁰ For a detailed discussion on this topic see [53].

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