CHINESE AGRICULTURE IN THE SECOND FIVE-YEAR PLAN PERIOD

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Introduction

It is believed that the agricultural production of China fluctuated greatly in the second five-year plan period, as this covers the "great leap forward" of 1958, the "lean crop" of 1960, and the gradual recovery of 1961 and 1962.

As is commonly known, production statistics were not published after 1959, and 1958 was the last year for which detailed figures were made available to the public. For 1960 and the subsequent years, therefore, there are no means of assessing these figures apart from estimating them on the basis of fragmentary information. The reason why the production statistics have not been published for these years seems to lie mainly in the fact that production has been running at a very low level. At the time of the "great leap forward" of 1958 the Chinese Government announced its official figures, but many doubted them, including not only foreign scholars of Chinese affairs but (it is said) the Chinese leaders themselves.[1] This is particularly true for 1959, also, and in fact, many query the official Chinese figures for this year, a time which was regarded as the year of the continued great leap, and consider it rather as comparable with the lean crop of 1960. This writer is one who holds this opinion. In Tables 1 and 2 below, the official figures for food and raw cotton production are given, followed by the writer's estimate of what the actual crop figures were.

The inferences of what these production levels mean to China do not fall within the purpose of the present study, but we may discuss briefly the volume of agricultural products which China needs for her domestic consumption.

Experiences in other countries teach us two things. Firstly, the per-capita calory intake rises as income increases, but this rise does not exceed a certain limit (about 3,000 calories) beyond which no further rise is feasible. Secondly, the ratio of starchy food in the per-capita

1 Edgar Snow, *The Other Side of the River,* New York, 1961.

Table 1. FOOD AND RAW COTTON PRODUCTION IN CHINA
——Officially Announced Figures——

(In thousands of tons)

	Food	Raw Cotton
1957	185,000 1)	1,640 1)
1958	250,000 1)	2,100 1)
1959	270,050 2)	2,410 2)
1960	297,100 3) (planned figure) The plan was not carried out because of extensive natural disasters. 4)	
1961	A better crop than 1960 5)	Yields decreased from the previous year. 5)
1962	The crop was better than that of 1961. The yields recorded slightly higher than the average. 6)	The output was lean and the area planted was less than the previous year. 7)

Sources: 1. *Ten Great Years.*
2. Bulletin of the National Statistical Bureau, January 22, 1960.
3. Lee Fu-chun's Report at the National People's Congress held March 31, 1960.
4. The Report of the Ninth Central Committee Meeting of the Eighth Convention of the Chinese Communist Party.
5. *Jen-min Ji-pao,* January 1, 1962.
6. *ibid,* January 1, 1963.
7. *ibid,* July 13, 1962.

calory intake is very high when the calory intake is low, but it falls extremely rapidly once a certain level of calory intake is attained. Accordingly, the aggregate volume of starchy food intake begins to also decline thereafter.

Now if the population of China is taken to be 700 million, then what is her level of consumption of these starchy foods (the term "food" embraces rice, barley, wheat, potatoes, and minor grains)? Disregarding the previous estimates, all observers agree that her requirements are well over 200 million tons with seeds, feedstuffs and export needs being added to those products mentioned above. As for cotton, China has about 10 million spindles and can manufacture about one million spindles annually as of 1960.[1] In view of this level of production capacity, the needed volume of raw cotton is about three million tons. The above represents the levels that must be achieved as long as China aims at building a self-sustaining economic system. As may be seen in Table 2, the agricultural production of China has never

1 Etsuzō Onoue, "China's Cotton Industry," *Far Eastern Economic Review,* July 6, 1961.

Table 2. ACTUAL FOOD AND RAW COTTON PRODUCTION
——Author's Estimates——

(In thousands of tons)

	Food	Raw Cotton
1957	185,000	1,640
1958	200,000	2,000
1959	180,000	1,900
1960	150,000	1,500
1961	165,000	1,400
1962	182,000	1,300

Note: The 1957 figures were taken from official announcements. For 1958, the official figure was reduced by 20 per cent on the basis of the statements of Chou En-lai. See, Edgar Snow, *The Other Side of the River*, New York, 1961. For raw cotton, it is possible that the output was reappraised at cotton mills, and the writer has thought that here would be less possibility of errors in calculation. The 1959 figures have been worked out by taking into account the circumstances referred to in Section 2 and the figures given by Snow in his report. Here Snow estimates the food production at less than 180 million tons. The 1960 figures are based on Marshal Montgomery's report. For the food production of 1961 and 1962, an increase of 10 per cent was estimated over the previous years. For the raw cotton production for 1961 and 1962, 100 thousand tons have been subtracted each year from the output of the previous year.

reached these levels. The 1960 level of about 150 million tons was probably the point where the total Chinese population was being exposed to the dangers of starvation. Although China neared satisfactory levels in agricultural production in 1958, along with an increased rate in economic growth, satisfactory levels could not be maintained in the years that followed. One of the leading tasks of Chinese agriculture is therefore to increase total production. Increased production is the basic principle of Chinese agriculture.

China's agricultural production is governed by the relative scarcity of land and the relative surplus of farm labour. China's aim, therefore, is to increase the productivity of land. This is of particular importance. Also, as the rate of introduction of capital equipment is extremely low in Chinese agriculture, this must be improved and intensive farming and land conservation must be practised. It is an important factor which must be kept in mind when the role of the mechanization of agriculture during the second five-year plan period is appraised.

Chinese agriculture witnesses the establishment of countrywide co-operatives under the first five-year plan and that of people's communes under the second five-year plan, throughout the country. In the light of experiences in other countries, these were organizations which in-

cluded contradictory factors in that their unit scale of operation was colossal despite the low level of capital equipment. This contradiction has not yet been removed, and the Chinese have had to cope with the problem by modifying the organization itself.

What was the cause of the poor crop of 1960? At first, the Chinese authorities explained it as a "natural disaster" and then admitted that an "error in guidance" was one of the causes. Outside China, the poor crop raised a variety of arguments as to whether the causes were natural or artificial and whether it came from the dry weather or as a result of the establishment of people's communes. Although all have recognized that weather conditions were unfavourable since 1959 in contrast to the previous year 1958, when they were good the execution of the "great leap forward" policy and the rise of a new organization in the form of people's communes gave rise to the doubt that these developments might have been the major causes of the bad crop.

A conclusion drawn from this study indicates that in the argument as to whether natural disaster or people's communes were the cause, the question itself was not raised properly. Steps taken in 1958 were to develop new measures of increasing agricultural production in every way. The establishment of people's communes must be taken as one of these measures. Therefore, if one takes into account an artificial factor as a cause of the bad crop, one must do so with all these measures. What steps China adopted to overcome difficulties in the face of the bad crop of 1960 were the contrary to what she did in 1958. Briefly, it was to return to the old methods of farming, and the reorganization of people's communes was part of this. In this connection, China's second five-year plan period may be regarded as a time of "the development of new method of farming and the re-establishment of old method of farming." To explain this in terms of agricultural yields, China experienced a great leap forward by adopting new farming methods and, after the failure of these, production recovered through a return to the old methods of farming.

"The unseasonable weather of the three consecutive years" from 1959 to 1961 was a severe one. The fact that the area concerned was about one-half of the total area under cultivation certainly constituted a main reason for the bad crop. But unfavourable weather conditions have to be accepted as a part of the Chinese scene. It is also noted that the organization of agriculture is the decisive factor in achieving production and constitutes an important aspect of what is meant here

by the system of farming. In fact the people's communes have undergone many changes since they came into being, and a number of studies have so far been made in this connection, so that the writer will only touch on them when needed for his purposes.

The Chinese authorities overcame their difficulties in the face of the bad crop of 1960 by denying what had been carried on since 1958. In more specific words, it was the switchover from the policies of "politics first," "Red theory first, expert techniques next" and "outsiders lead experts" in 1958 to the policy of "ask the veteran farmers" or restoring the old reputations in agriculture. It was a change from the policy of reforming the old system of farming to that of reconstructing them. Accordingly, in order to understand what was done after 1960, we must first begin by finding out what was done in 1958.

I. DEVELOPMENT OF THE NEW FARMING SYSTEM AND THE "GREAT LEAP FORWARD."

The agricultural production of 1958 was characterized by yield increasing measures brought about by intensive labour methods devised to improve the productivity of land. These measures, which had been repeatedly tested during the first five-year plan period, were brought into full operation in 1958. They were to change the whole system of agriculture. "The farmers are no longer using the old methods but they are producing by demanding a constant leap forward, and a bold and doubling increase in yields. They are therefore putting much labour into the construction of irrigation schemes, increased soil fertility, soil improvement, topographical reforms, improved cultivation and increased two-crop areas."[1] What was actually carried out is concretely formulated in the well-known Eight-Character Constitution published by the Central Committee of the Chinese Communist Party at the end of that year. To sum up the points: the Eight-Character Constitution urged deep ploughing and soil improvement, increased fertilization, irrigation construction schemes plant, breeding, mass planting, blight and insect damage prevention, farm-land control, and farm-implements reform.

Deep ploughing was not only to plough the soil deep but to turn over the soil of China's fields to a standard depth of 1 or 1.5 feet once every year or three years. In fact, by 1958 the area which had undergone "deep ploughing" amounted to about 800 million *mu* (55 million hectares) or one-half of the total area under cultivation. As for fertilizers, the

1 *Jen Min Ji-pao,* March 19, 1958.

production of chemical fertilizers remained at a low level, and increased production or imports could not be expected; emphasis was therefore laid on the use of natural fertilizers. The input of organic fertilizers increased from about 20 piculs per *mu* (16 tons per hectare) in 1957 to about 200 piculs (or 160 tons per hectare) in 1958. (The corresponding figures for Japan are about 10 tons per hectare, although the Japanese fertilizers are far superior in content to their Chinese counterparts.) The area of irrigated land increased from 34,660 thousand hectares in 1957 to 66,660 thousand hectares by the end of 1958. (The total area of land under cultivation in China is about 110 million hectares.) "The area of land where improved strains of seeds are generally used" increased from 55.2 per cent in 1957 to 77.5 per cent in 1958 in respect of food crops, and from 93.9 per cent to 97.0 per cent for raw cotton. The planted area of the two very important crops—rice and sweet potato —were also increased. Close planting was carried out not only in the "experimental fields" and "rich fields" which were expected to provide guidance for the future, but also in the ordinary fields, several or even ten times as dense as it had been done in the past. In order to reduce blight and insect damage, the production of agricultural chemicals was increased and the human-wave tactics of labour were used in the campaign to exterminate harmful insects. As the result of the drive to better farm equipment, hundreds of millions of "improved farm implements" and "new-type implements" were constructed, and in many factories the production of tractors and other farming machinery commenced.

All these played a part in the preparation of the "experimental fields." It is said that these fields yielded several ten times as much as ordinary fields, as a result of the extremely deep ploughing and heavy planting, increased use of fertilizers and ideal irrigation. It was about this time that a mythological story was told of how the ears of rice were so full of grain that an egg could be thrown among them without any danger of breaking it.

Here may be considered more fully the important matters of water, fertilizers, and farm equipment.

(1) Water Facilities

The rate of construction of water conservation and irrigation facilities gradually increased during the first five-year plan period and it was during that time that much valuable experience was gained. Then came an unprecedented rapid increase due to the introduction of mass manpower during the latter part of 1957 to the spring of 1958. Table

3 shows the increase in the area of irrigated land, of which the 1958 figure is outstanding.

The campaign for agricultural water in 1958 was expressed by the slogan of "three priority principles." They were that priority should be given to construction by people's communes, to conservation of water, and to small-scale construction. Although large-scale waterworks were of course built by the State under the second five-year plan, the strik-

Table 3. AREA OF IRRIGATED LAND

1957:	34,660 thousand hectares. 1)
	(an increase of 3,000 thousand hectares in the October-December period of 1957.)2)
1958:	66,660 thousand hectares. 1)
1959:	71,330 thousand hectares. 3)
	(an increase of 4,380 thousand hectares in the period October 1958 to September 1959.) 4)
1960:	The area of effectively irrigated land increased 20,000 thousand hectares or more over 1957. 5)

Sources:
1. *Ten Great Years.*
2. *Jen Min Ji-pao,* January 4, 1958.
3. Tan Chen-lin's report at the Second Session of the Second People's Congress on April 6, 1960.
4. *Press Release on the Development of the National Economy in 1959,* January 23, 1960.
5. Public Announcement on the 9th Plenary Session of the Central Committee of the Chinese Communist Party during the 8th Session of the Party Convention, January 1961.

Table 4. PRODUCTION OF CHEMICAL FERTILIZERS

(in thousands of tons)

1957	631 1)
1958	811 1)
1959	1,333 2)
1960	2,000 3)
1961	1,447 4)
1962	2,170 5)
2nd Five-Year Plan	3,000-3,200
Plan for 1962 in the revised draft of Agricultural Development Programme.	5,000-7,000

Sources:
1. *Ten Great Years.*
2. *Jen Min Ji-pao,* January 23, 1960.
3. *Бюллетень иностранной коммерческой информации,* Приложение, No. 10, Mockwa, 1961.
4. New China News Agency, January 2, 1963, and (5).
5. New China News Agency, September 25, 1962.
   The figure is an estimate at the end of September 1962.

ing expansion of irrigated land area in 1958 was mostly brought about by the construction of small irrigation waterways by the people's communes, often using human-wave tactics.

(2) Fertilizers

As will be seen in Table 4, with the production of synthetic chemical fertilizers on an extremely low level, China tried to make good this deficiency by starting a "compost-heap campaign" and manufacturing "indigenous chemical fertilizers."

The compost-heap campaign of the early years of the second five-year plan period may well be compared in scale with the campaign for agricultural water, and it drastically changed the position of organic fertilizers which had been increasingly taken into use as a self-sufficing manure by farm households. For instance, in January 1958 it was reported, "Vessels on the rivers are standing in line, and the vast fields are filled with the endless rows of people carrying manure. In many districts, crowds of people may be seen making compost-heaps under the lights at night."[1] Twenty to 30 per cent of the total labour force in rural China took part in this campaign of early 1958. Literally, "from the mountain, out of the river and ponds, from the sea, and from the ground, soil even from out of the houses, came the materials to make this fertilizer." The composted soil containing the earth of old mud walls and ducks' dung, soot from chimneys, garbage from refuse heaps, mud from the river-bed, sea-weed from the beach, and all other possible "sources of fertilizers" were put into use. There was neither adequate planning nor science in the campaign. In fertilization, no heed was given to priorities and, most important, the reproduction of the natural sources of fertility was not taken into consideration. All this meant a type of spoliation farming which deprived the land of fertility, and which gave diminishing returns to the increased investment of labour.

In respect to indigenous chemical fertilizers, it is said that in 1958

Table 5. INPUT OF DOMESTIC MANURE

Fertilized Area (%)		Kg per hectare of cultivated land	Total Input (in billions of tons)
1952	60	12,000	1.1
1957	80	16,000	1.5
1958	90	160,000	15.0
Winter 1957-April 1958	*	155,000	

Source: *Ten Great Years.* Figure marked* is taken from Liu Shao-chi's report to the Second Session of the 8th People's Congress in May 1958.

1 *Jen Min Ji-pao,* January 16, 1958.

"about three million factories were built and about 100 million tons of indigenous chemical fertilizers of various kinds were produced."[1] What then was this "indigenous chemical fertilizer"? The following quotation will show that much would not warrant the name of fertilizer. "More than 50 kinds of indigenous chemical fertilizer were produced in various parts of the country, such as an indigenous urea, indigenous fertilizing powder, crude phosphoric acid, potassic compound fertilizer, etc. These are mostly made by adding a small quantity of chemical fertilizer, such as superphosphate of lime, to the basic materials of human urine, plant ashes, and fertile earth. Since the amount of human urine and plant ashes was naturally limited, supplies of chemicals such as superphosphate of lime and ammonium sulphate were also short and production was adversely affected by the lack of raw materials in some factories."[2] Generally, most of these "factories" were equipped with a simple type of furnace and an iron pan built in the period of three days: The equipment could provide no chemical change except that of combustion, and their products were mostly organic. Even when an inorganic raw material was used, it was collected wherever it came to hand, and used indiscriminately without regard to its quality and without understanding of its efficiency and suitability.

(3) Mechanization of Agriculture

As various measures to increase production were taken in 1958, the "labour shortage" developed and this brought about an increasing demand for the mechanization of agriculture. Under the circumstances, the Government advocated methods of the "walking on two legs." The production of tractors, irrigation and pumping machines started, on the one hand, and a mass campaign for "new farm equipment" and their local production took place, on the other. In 1958, the programme of reforming farm equipment and the production of new farm implements reached an important stage. It is said that in the single year 1958, 350 million improved implements were put into use, while the number of improved farm implements and semi-mechanized tools put into use by the end of 1959 stood at 520 million.[3]

All this illustrates that what is called the new farming system is not essentially different from that which had gone before. That is, this was the same way of working as of old, that is, under the condition of the relative surplus of labour, the relative scarcity of land, and the

1 *Jen Min Ji-pao,* February 27, 1959.
2 *ibid,* September 9, 1958.
3 Tan Chen-lin's report to the Second Session of the Second People's Congress.

low level of capital equipment in agricultural production, they devised an increase of productivity of the land by an extensive input of labour. What was new was that these measures were pushed to an extreme degree, and implemented on such a scale as to bring about a transformation of the natural conditions in which agricultural production was carried on. Any point of the Eight-Character Constitution shows that what was carried out in 1958 went so far as to bring about a drastic change in the growing of agricultural products. This was also true of the new organization of people's communes. If emphasis is laid on the fact of common ownership of land, the most important means of production in agriculture, as well as on the joint operation of agricultural production, then there is no difference between producers' co-operatives and people's communes: both represent "socialist production relations based on collective ownership." But the difference in scale grows into a qualitative one beyond the mere difference of degree.

Such a great undertaking was only possible through the immense enthusiasm of the masses for increased production and construction and the new organization of people's communes which permitted this enthusiasm to be translated into performance. In this process, all conservative ideas and practices were thrown away. Miracles were believed in, while scientific thought was given the name of "superstition." People were absorbed in working, and all-night heavy labour was a common occurrence. True, it cannot be overlooked that the weather was very favourable in 1958, but the record crop of that year may well be attributable more to the measures to increase production as seen above. These circumstances are apparent in the editorial of *Jen Min Ji-pao* of January 1, 1959 in which Minister of Agriculture Liao Lu-yen attributed the good crop of 1958 to (1) the principle of politics first, (2) the fervour of the masses, and (3) the Eight-Character Constitution.

The rich harvest of 1958 created a mood of extreme optimism in China. It was worthy of special mention that, at the end of 1958, the idea of "a rich harvest from a minimum area of planting" was authorized at least temporarily as a policy for 1959. The view was taken that the per-unit yield could be indefinitely increased. It also indicated that Chinese authorities regarded that inadequacies in agricultural production in China lay not in land but in labour. Optimism lasted until April 1958 when the Second People's Congress sat in its first session. Then the Chinese became aware that the rich harvest of 1958 had been gained at the expense of the fertility of the soil, and the powers of recuperation of both land and labour.

II. FAILURE AND RECONSTRUCTION

A major undertaking often gives rise to excesses and errors. The possibility of this is more likely when it is carried out in one single massive effort. China was a good example. The year 1959 was to be spent in completing and consolidating the achievements of 1958. The following is given as an account of what was to be done in the main.

From a labour standpoint, the working unit of the people's communes was to be reduced (at this time, the dominant scale of operation was reduced to the size of production brigades——similar to that of the advanced producers' co-operatives) and "distribution in proportion to labour" was to be revived, while the idea was set forth that importance should be attached to "living" by letting the labourers have more time for rest and amusement. In respect to water conservation, efforts were made to secure water resources by completing small waterworks under construction in 1958 and combining them with large and medium-sized ones. In respect to fertilizers, the gathering of natural manures, called "coarse manure" was dropped, and emphasis was placed on increasing fertility by growing green manure and raising hogs. The policies of deep ploughing and heavy planting were revised in favour of "rational" adjustments in line with practical conditions. In fact, they were suspended. The new farm-implement campaign took a somewhat different turn and lasted until the beginning of 1960 because of the "labour shortage" which developed in 1958.

In any case it became apparent that to increase agricultural production was no easy task. The authorities were busy retracting their former ideas of "concentrated planting and rich harvest" and explained that this would be a target of the far future. Instead they laid emphasis on "diversified planting and rich harvest" or the need to expand the planted area. The statement that China has 110 million hectares of uncultivated but arable land was made at this juncture with the intention of explaining this need.

In 1960 it became obvious that the measures taken in 1959 to correct the situation were adopted too late. The most serious problem at this stage was one of morale, for the farmers were losing their willingness to work. This produced a crisis in both agricultural production and construction. The first countermeasure that China took in this situation was to assign members of the Communist Party to agriculture. Starting in March 1960, several million members were in position by September. At the end of the month, "two million to three million executives and cadres of the party were eating, living, working,

and thinking together with the members of people's communes at the very front of production throughout the country day after day, and by their model behaviour,.....brought about a series of changes to farm villages.....This also drastically changed the efficiency and quality of the various types of operations on the land."[1] This passage indicates that there was ample scope for improvement in the supervision of the work itself, as well as improvements in agricultural techniques. At that time, the Chinese authorities appealed to the masses of the people to go about their job of planting, weeding, and harvesting as quickly as possible. In May to October 1960 the country was full of pleas to get the work started quickly. This shows that planting had not been done on time, that the crops had not been adequately taken care of, and that even the crops had not been harvested satisfactorily. Drought at the time of planting did not improve the situation. However, appeals to work hard at harvest time was an indication of the critical state that agriculture had reached as a whole.

"Come together from all places and all work to help agriculture" was the rallying call of the latter half of 1960 and the whole of 1961. Labour flowed back from all other sectors of the economy into agriculture. The number of workers involved was said to be 20 million in 1960 alone and the trend lasted until 1962. However, the direction of labour into farm villages was not solely for the purpose of benefiting agricultural production. It cannot be overlooked that the Chinese were trying to solve two problems—food shortages in urban areas arising from a breakdown of commercial distribution channels and the growing army of unemployed formed by the lagging scale of construction and production in the mining and manufacturing industries.

From the end of 1960 to 1961, the whole question of agriculture was examined on a large scale. The policy resultant from this was a return to the old methods of production. It was believed that the situation might be saved restoring the old methods of farming once more and applying them more carefully than ever before.

In the latter half of 1960, the principle of *san pao yi chiang* or a system of contracted work by production teams was adopted into the operation of people's communes, so that individuals' labour expenditure and income became clearly linked together, while the systems of individuals' land holding and free market were restored to help farmers to stand again on their own feet and to encourage their will to work. As an alkalization of the soil had been caused by defective drainage of

1 *Jen Min Ji-pao,* September 27, 1960.

the water facilities built in 1958, corrective measures were instituted. The compost-heap campaign was discontinued in favour of a more dependable method of fertilizing. And instead of deep ploughing and heavy planting, the old methods of cultivation were adopted again. In the place of introducing and using new types of farm implements, the production and use of old, particularly small, ones were encouraged on a priority basis. And as far as seeds were concerned, those strains easier to grow were the ones chosen for use. In all cases, the words of experts and veteran farmers were to be given more attention. In short, methods were to be applied intelligently rather than automatically.

Mention should also be made of developments in water conservation projects, fertilization, and farm-implement supply in and after 1959.

(1) Water Facilities

Please refer to Table 3. The area of irrigated land increased almost twofold in 1958. Figures for 1961 and after have not been made available. Other information, however, suggests that new construction was almost at a standstill. For instance, the water facilities constructed in 1958 were realized by the farmers' frantic efforts—by non-paid labour—, but after 1960 it became apparent that nothing but remuneration could make farmers work.

At the same time, the "effectively irrigated area" in 1960 was below the 1959 level, and even that of 1958. This reveals that an important segment of the irrigated land had failed to be "effective."

From December 1959 to January 1960, an over-all survey of irrigated land throughout the country was carried out. The major problems brought to light on this occasion were as follows: (1) since the volume of water failed to keep in balance with the area of irrigated land, waterways were, even if they existed, frequently lacking in water; (2) many works were left in an incomplete state, and this made the completed part useless, too; (3) since land had not been levelled, water did not flow smoothly; (4) water was wasted a short distance from the fields because of the shortage of pumps; (5) importance was attached only to storing water, with little attention being given to drainage; and (6) the maintenance and repair of the sectors already built were neglected, and the facilities were quickly deteriorating.

Irrigation schemes, from the source of water at a dam or a large river down to the smallest terminal drain, must constitute a systematized whole, and if any one of these sectors is deficient, the whole system will be useless. The irrigation systems of China, which were built so quickly and on such a large scale, naturally failed to solve

those problems completely. It is a matter of common knowledge that as the area of irrigated land increases, the amount of water evaporated increases proportionally and those crops which give high yields but have little drought resistance grow in relatively importance. In China this was seen most clearly in the expansion of the rice-planting areas. It is easy to imagine how the situation further deteriorated following the drought of 1959. The problem must have been especially serious in North China where there is a low rainfall. But artificial factors cannot be overlooked where valuable water was wasted because irrigation facilities were incomplete and often misused. From 1961 to 1962, problems arose from defective drainage and the alkalization of soil resulting therefrom. The matter seems to be centred on the expansion of rice-growing in North China where the soil was originally alkaline, and drastic decreasing yields arising from the alkalization of the soil was reported.[1]

Since 1961, the emphasis has been placed on the construction of the unfinished water facilities, completing the related drainage schemes and securing water resources. The production of pumps has also been given importance.

(2) Fertilizers

The following three facts arise when considering the question of fertilizers in the period after 1959: (1) as seen in Table 4, the production of chemical fertilizers fell below the planned level and the development of the industry was slow; (2) the production of indigenous types of chemical fertilizers was completely stopped with a few exceptions; (3) the main source of supply remained to be composts collected by farm households but the collecting of natural manure was discontinued, while the fertility of the fields was increased by the growing of green manure and the breeding of hogs. In the two years of 1961 and 1962 alone, the input of manure remained presumably on the same level as in the first five-year plan period, but tremendous efforts were made to increase the supply of chemical fertilizers in these years, using home-made equipment.

(3) Farm Implements

In the latter half of 1960, Communist Party cadres and farm implement experts went into farm villages to conduct a detailed survey of farm implements, their requirements and use. This was an opportunity to deal with a number of problems that had arisen. As a result

1 *Jen Min Ji-pao,* May 25, 1962 carries a report on the results of a model survey in Honan and Shantung provinces.

of this survey, the improvement of farm implements and the production of new ones were brought to an end, and improvements in standards of maintenance and repair were demanded as absolute necessities. In addition, it became apparent in 1961 that the new types of farm implements which had already been taken into use would be discarded. Accordingly, in the same year and the year that followed, tremendous efforts were made to produce and popularize the old types of implements. In 1961, emphasis was shifted to such "small farming tools" as hand-ploughs and sickles, and in 1962 importance was attached to the production and broader use of such medium-sized tools as carts and ploughs. For instance, the number of small farming tools produced in 1960-61 was stated to be 800 million, while that of carts was 150 thousand. Although efforts have been made to produce tractors and irrigation machines, the development of these products is slow, as will be seen in Tables 6 and 7.

Table 6. TRACTORS

Standard types (15 h.p.)

	Output	Holdings at the Year-End
1957	—	24,629
1958	957	45,330
1959	4,852	59,000
1960	20,000	79,000
1961	20,000	99,000
1962	—	100,000

Source: Official reports.

Table 7. PUMPING AND IRRIGATION MOTORS

(In 10,000 h.p.)

	Output	Holdings at the Year-End
1957		56
1958	280	338
1959		
1960	258	596
1961	72	650
1962	—	700

Source: Official reports.

Consequent to the efforts made in the two years of 1961 and 1962, the production recovered to an "upper-medium" level. The tenth session of the Central Committee of the Chinese Communist Party in the 8th Convention period declared that the recovery efforts produced

satisfactory results. This signifies that the time has come for Chinese agriculture to advance along a new course of development. Now, China can be said to stand at a crucial turning-point. Now that the "great leap forward" policy of 1958 has proved unable to solve the problems, and recovery has been achieved by using the old farming methods, China will have to present new measures to increase production for further development. It is typical that the tenth session of the Central Committee is so prudent that it has not advised any specific course of development. It has been stated in vague terms that "we will complete the revolution of agricultural techniques in 20 or 25 years." What is meant here is that they will take great interest in increasing the production of chemical manure and farming machines. The statement also refers to improving farming implements (of a different nature of those taken up in 1958), and the Chinese themselves are well aware that before they can achieve anything in this sector, they have a long way to go.

As a tentative measure, the session has left to experts the task of working out a definite programme. In February 1962, the Central Committee of the Chinese Communist Party and the Cabinet called a "National Conference on Activities in Agricultural Science and Techniques" at Peking. This conference was on a large scale with a participation of 1,200 including experts on paddy-field rice, wheat, raw cotton, plant diseases, insects, soil, biology, forestry, fisheries, and all other agricultural fields. Literally, the best Chinese brains on agriculture got together in a hall "to join in the discussion of important problems of every aspect of agricultural science and techniques and to formulate a long-term plan for the Agriculture of our country." Neither the results nor conclusions of the studies and discussions have been made available. One thing which we can safely predict is that, in the light of past experiences in other countries including Japan, it is highly unlikely that "anything miraculous" will be put into practice again with such force and vigour.

III. SOME COMMENTS

We have seen that under the conditions of relative scarcity of land and the relative surplus of labour, Chinese agriculture is required to increase the total output or to improve the productivity of land. Now, there is a case where under similar circumstances a similar requirement was successfully met, that is, in Japanese agriculture. In Japan after the Meiji Restoration, the productivity of land was increased by three

factors, namely by chemical fertilizers, by water facilities and irrigation, and breeding improved strains of plants. (Here mention should be made of the role played by agricultural machinery after World War II.) These are essential factors which we know will contribute to improving the productivity of land over a period of years. Looking at what was done under the second five-year plan in China from this viewpoint, what similar factors do we find on the scene? The greatest factor is the water conservation programme, which has reached colossal proportions and may constitute almost the sole achievement of the "great leap forward." As already stated, these facilities have met so many problems that they are not being used to their full advantage, and it is impossible now to accurately assess their scale. The fact remains, however, that they are tremendous in scale, and it is not unlikely that many of the existing problems connected with their use can be solved in the near future. Then these water facilities will play an invaluable role in the agriculture of China.

Turning to fertilizers, superhuman efforts have been made to increase the production of chemical fertilizers. The present level of chemical fertilizer input per hectare is about 20kg (in terms of ammonium sulphate), as compared with about one ton in Japan. The task of filling this gap will be related at the same time to industrial development over a score of years.

Plant improvement usually means cross-breeding between similar types of plants, but what is of great importance here is to increase the planted area of paddy-field rice. This was true of Japan as well as of the China of 1958 and 1959. China failed and has had to start all over again. It will have to go through a period counted by tens of years before it can attain its objective. In this course China will have to solve the problem of alkalization of land besides what Japan had—low temperature.

China attached great importance to deep ploughing and heavy planting, apparently on the assumption that more fertilizers would be available. These methods have not been applied since 1959.

In China the mechanization of agriculture had a peculiar role to play. The extremely heavy investment of labour in production and construction reached a climax in 1958 and, as it was reported, resulted in a "labour shortage," which in turn stimulated the "reform of agricultural techniques." Also, in 1960, the decrease in the "will to work" was reported as the cause of "labour shortage." The efforts to mechanize agriculture therefore were carried on until the middle of 1960. At that

time, an increase in labour productivity apparently meant an automatic increase in the total output of agriculture. Theoretically, the two essentially irrelevant factors of the mechanization of agriculture and the improvement of the productivity of land were used like synonyms without weighing the terminology. In other words, it was not taken into account or defined in a way that mechanization replaces labour, but not land. In reality, however, new types of farm implements and newly-designed tools were put into use universally throughout the country, without confirming whether or not they were suited to different methods of farming in the various parts of China. It is only natural that they were discarded in the latter half of 1960, when the old farming methods were rehabilitated. A typical example of these is the rice-planting machine which was brought into general use in the middle of 1960, and shortly afterwards discarded.

In China the idea prevailed that the organization and mechanization of agriculture could not proceed at one and the same time, or at best the former process would promote (or retard) the latter. It was an idea which arose from the urgent need to collectivize farms in order to concentrate necessary agricultural products in the hands of the Government and from the fact that China had been pressed for time to put off mechanization. These circumstances are well expressed in the famous phrase of Mao Tse-tung: "Collectivization first, and then mechanization." This may seem strange in the light of what happened in other countries in the past, for these experiences show that mechanization provided the motive power for reform of the organization of agriculture. Without supposing a "communist image of man," completely free from self-interest, it would be impossible technically to support a colossal scale of farming by means of old-fashioned small farming implements. It is natural that the large organization of people's communes had to be split up again into smaller units.

China claims now that it will "complete the reform of agricultural techniques in 20 to 25 years." As far as mechanization is concerned, its purpose must be to use the techniques as a levy to expand again the size of organization of farming. At least such will be the course of events.