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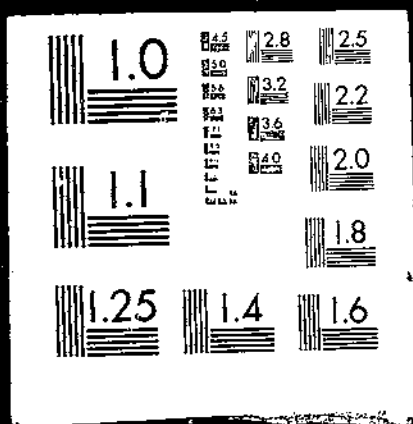
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USDA/FAER-94

AGRICULTURE IN THE UNITED STATES AND THE PEOPLE'S REPUBLIC OF CHINA, 1967-71.
(Foreign Agricultural Economic Report). / Frederick W. Cook (and others). Washington,
DC: Economic Research Service. Feb. 1974.

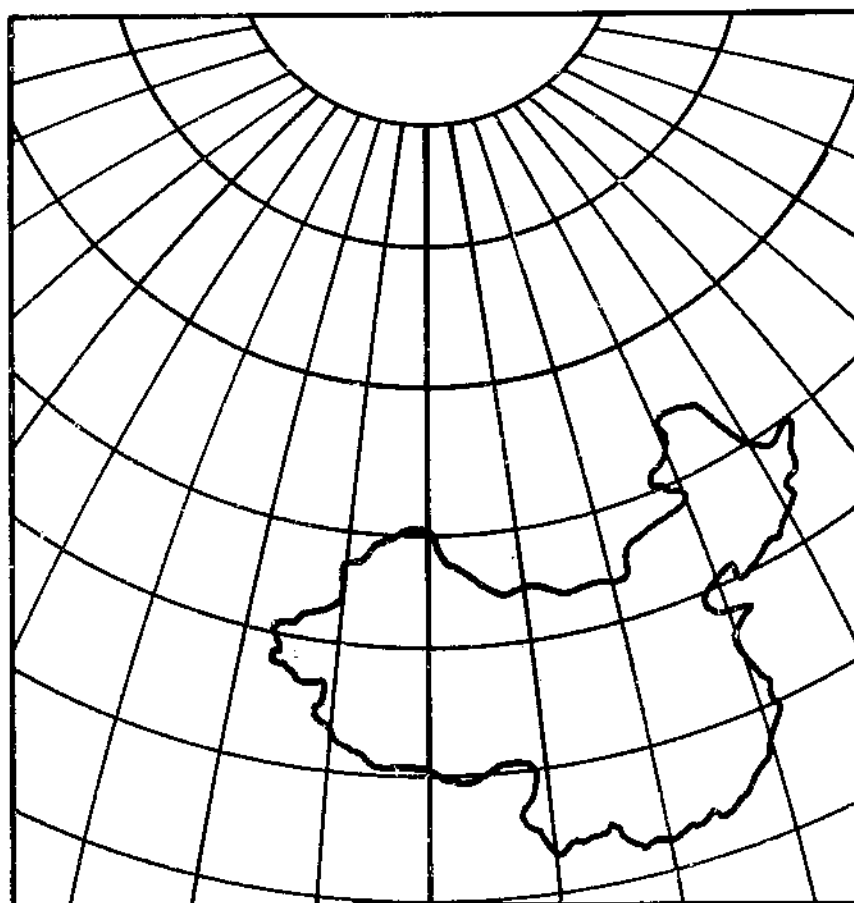
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FAFR 94

Agriculture in THE UNITED STATES and THE PEOPLE'S REPUBLIC OF CHINA, 1967-71



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600 1st St., N.W.
Washington, D.C. 20540

Foreign Agricultural Economic Report No. 94
ECONOMIC RESEARCH SERVICE • U.S. DEPARTMENT OF AGRICULTURE

ABSTRACT

For 1967-71, an average of 264 million acres of farmland were cultivated annually in the People's Republic of China; in the continental United States, 386 million. However, because of multiple-cropping, the sown area in China was about 371 million acres--a third more than U.S. sown area. In general, China's grain area is almost twice the U.S. grain area, but Chinese yields are only half of ours, primarily because of our greater use of technology. Grain crops for human consumption account for about 70 percent of China's grain output, compared with 23 percent of U.S. grain production. Cottonseed, sunflowerseed, and tobacco production is about the same in the two countries. China has half as many cattle but nearly three times the number of hogs and sheep--despite considerably lower levels of feed grain production. Agricultural commodities are more important in China's total trade, accounting for about 52 percent of exports and 35 percent of imports, compared with shares of about 18 and 15 percent, respectively, in the United States.

Key Words: People's Republic of China; United States; agriculture; climate; farmland; fertilizer; food grains; land use; natural resources; population density; precipitation; structure; trade.

Photographs in this report are from various issues of China Pictorial (edited and published by China Pictorial, Peking, China).

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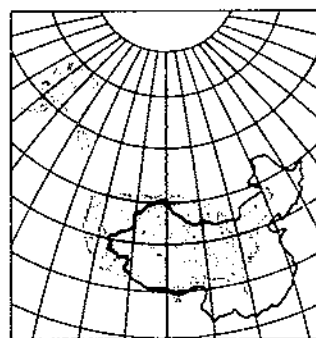
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SUMMARY



Agriculture in the People's Republic of China differs markedly from U.S. agriculture, primarily for two reasons. First, China has a centrally planned and developing economy, while the United States has a market-oriented economy based on a high level of industrial and agricultural technology. Second, China has a population about four times that of the United States. These conditions result in different levels of farm production efficiency, different farm ownership structures, and different patterns of agricultural production and trade.

Per capita, there are only four-tenths of an acre of cultivated land in China, compared with 2 acres in the United States. Nearly all the land that can be farmed in China is under intensive cultivation, while in the United States, a portion of farmland lies fallow or is in cover crops.

Grain output in the two countries is about the same. But in China, the emphasis must necessarily be on food grains rather than feed grains. Statistics for 1967-71 indicate that grains for human consumption--chiefly wheat, rice, and potatoes--account for about 67 percent of China's grain output, but for only 23 percent of U.S. grain production. Area planted also reflects the contrast: in China, 55 percent of total grain area is in food grains; in the United States, 65 percent is in feed grains. Diets in the two countries differ accordingly. Starches account for almost 80 percent of average daily caloric intake in China, but for only 23 percent in the United States. Livestock products account for 71 percent of protein intake in the United States, but for only 14 percent in China.

U.S. crop yields are generally twice as high as Chinese yields, primarily because of the highly technological and capital-intensive nature of U.S. agriculture compared with labor-intensive Chinese agriculture. One tractor per 58 sown acres is available in the United States, but in China, the ratio is one tractor per 2,246 acres. Use of nitrogen fertilizer to raise crop yields is four times greater in the United States.

China has half as many cattle as does the United States, but nearly three times the number of hogs and sheep--despite considerably lower levels of feed grain production. In contrast to the United States, where cattle are raised for meat and livestock products, cattle in China are used primarily for draft purposes.

Almost all of China's farms are owned or closely controlled by the state, while U.S. farms are for the most part family-owned and operated. Chinese farmers, organized into communes, sell their output to the state at fixed prices. Most Chinese farm production units are relatively small, ranging from 30 to 60 acres. U.S. farm units, on the other hand, average 265 acres in the eastern part of the country and over 1,000 acres in the West.

During 1952-71, agricultural output grew at an average annual rate of 2 percent in China and 1.86 percent in the United States. The U.S. growth was achieved under subsidy policies that discouraged production of some crops, while in China, there was a determined policy to increase agricultural production.

Farm commodities are more important in China's international trade, accounting for 35 percent of the country's imports and 52 percent of its exports. For the United States, these shares are about 15 and 18 percent, respectively. China exports more cattle, hogs, and eggs, but the United States exports more grain, fresh fruit, vegetables, and soybeans.

Trade between the two countries resumed in 1971 after a lapse of more than 20 years. In 1972, agricultural commodities accounted for virtually all U.S. exports to China and for half of our imports from that country.

SOME COMPARISONS--

	<u>United States</u>	<u>People's Republic of China</u>
Farm units.....	2.9 million	4-8 million
Area cultivated.....	386 acres	264 acres
Per capita.....	2 acres	.4 acre
Agricultural output:		
Wheat.....	41 million tons**	24 million tons
Rice.....	4 million tons	92 million tons
Feed grains.....	162 million tons	70 million tons
Soybeans.....	30 million tons	7 million tons
Sugar.....	5 million tons	2 million tons
Cotton.....	2.2 million tons	1.7 million tons
Tobacco.....	0.8 million tons	0.8 million tons
Livestock:		
Cattle.....	113 million head	56 million head
Hogs.....	61 million head	163 million head
Sheep.....	20 million head	66 million head
Agricultural exports.....	\$6.7 billion	\$1.1 billion
Share of total exports.....	18 percent	52 percent
Agricultural imports.....	\$5.1 billion	\$0.7 billion
Share of total imports.....	15 percent	35 percent
Growth in agricultural output (1952-71).....	1.86 percent	2 percent
Population (1971).....	207 million	855 million
Growth rate (1971).....	1.1 percent	2 percent
Per capita GNP (1971).....	\$5,057	\$150
Daily diet:		
Calories.....	3,140	2,050
Starches.....	23 percent	78 percent
Protein from starches.....	19 percent	62 percent

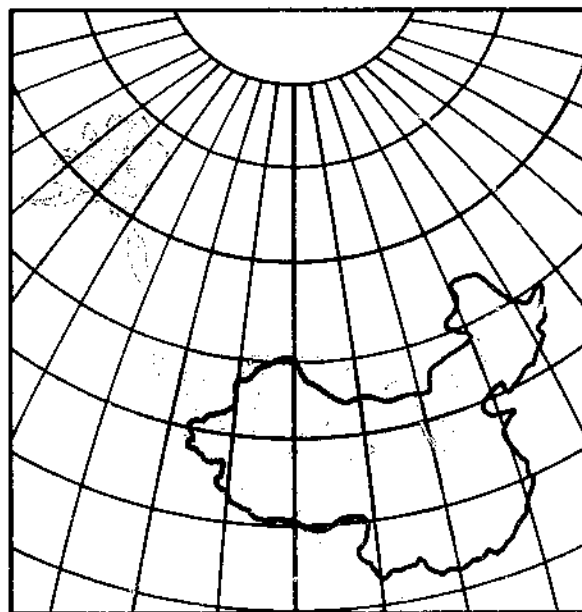
* Data shown in this tabulation are 1967-71 averages unless otherwise noted.
Data are estimated and are discussed in detail within the report.

** All tonnages are metric.

FIGURE 1
PEOPLE'S REPUBLIC OF CHINA
ADMINISTRATIVE DIVISIONS



Agriculture in THE UNITED STATES and THE PEOPLE'S REPUBLIC OF CHINA, 1967-71



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INTRODUCTION

This study compares the agricultural sectors of the United States and the People's Republic of China, utilizing recent statistical information and estimates on farm structures, natural resources, manmade agricultural inputs, crop production, livestock numbers, foreign trade, and overall rates of agricultural growth. The country comparisons are limited by differences in economic definitions, time periods, and inadequacy and incomparability of data, as well as by the more general differences between a market-oriented, industrially developed country such as the United States and a developing, centrally planned economy such as China.

1/ Other agricultural economists in the Foreign Demand and Competition Division who aided in the preparation of this report were Marion R. Larsen, James Scullen, and Sheldon Tsu.

The reader should bear in mind that China does not currently publish comprehensive production or trade statistics. Data in this report are from a variety of sources, including translations of radio broadcasts, periodicals, and books.

Secondary sources, generally based on studies by U.S. scholars of the Chinese economy, have also been extensively utilized.

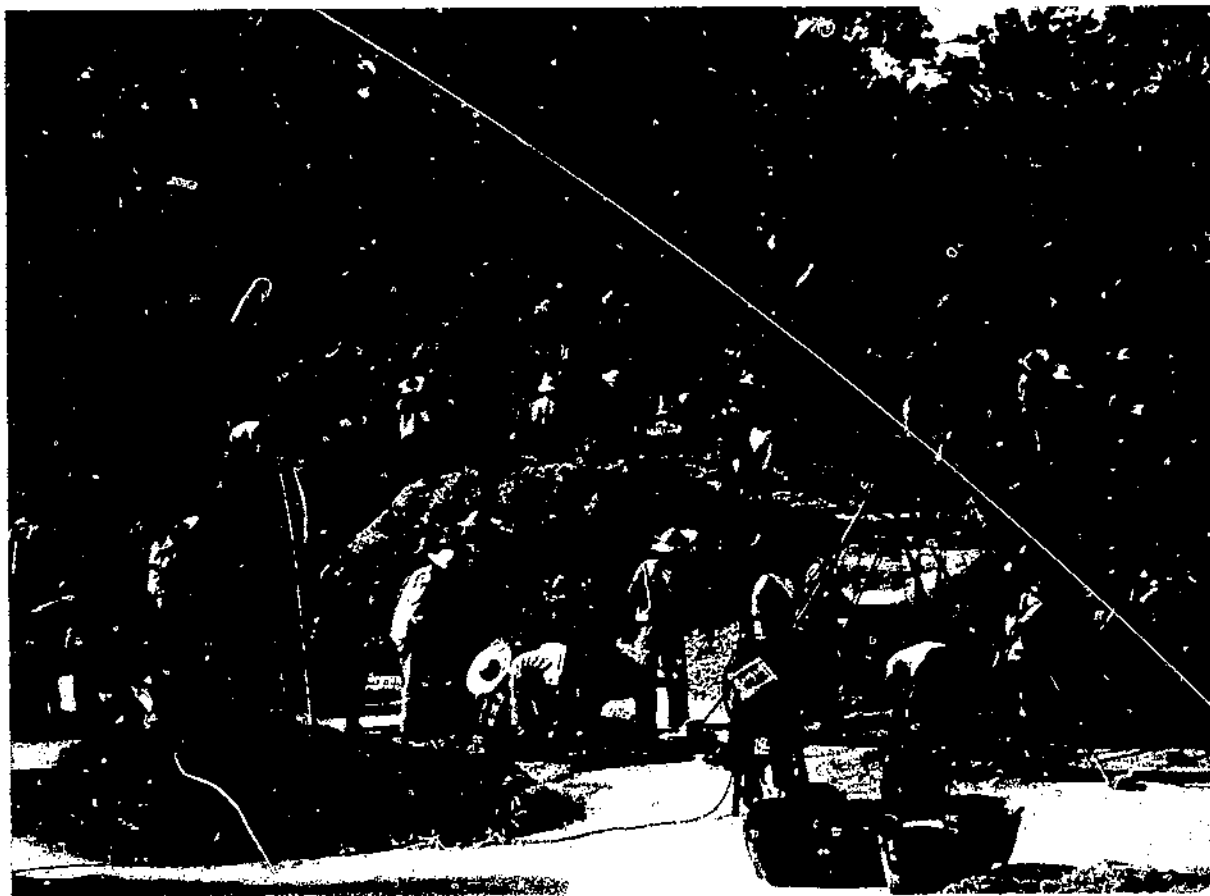
In the People's Republic of China almost all farmland is owned or closely controlled by the state. Crop production is conducted largely in response to centrally determined plans and quotas. Farmers, organized into collectives--or communes--jointly sell their marketable output to the state at fixed prices. Per capita gross national product (GNP) is low--it was \$150 in 1971--but income differentials are minimal (23, p. 5). 2/

In the United States, farms are generally family owned and operated. Although various Government programs have guided to some extent the production pattern of some crops, production is undertaken largely in response to market prices. U.S. per capita GNP was \$5,057 in 1971, but wide income differentials exist between households (32).

2/ Underscored numbers in parentheses refer to references listed at the end of this report.

FARM STRUCTURE

Prior to 1953, virtually all farming in the People's Republic of China was done by individual landowners and tenant farmers. Today, only a small number of farmers living in isolated regions of the country carry on private agriculture, while all other farmers have been organized into Government-controlled collective farm units. The collective members, however, are allowed to farm small plots of land for their private use and are permitted to engage in household handicraft production. One-fourth of all agricultural products purchased by the state and the majority of certain items--such as hogs, domestic fowl, fresh eggs, rabbits, and wild medicinal herbs--come from these private activities (13). While the products from private activities constitute a small part of total agricultural output, the output is nevertheless very important to supplement the farmers' diet and income (36).



Chinese production team members thresh grain

Socialization of Chinese Agriculture

The present institutional structure of China's agriculture has resulted from a concerted drive by the Chinese Communist Party (CCP, or Party) to refashion the agricultural sector in a collective mold. The major steps in this transformation process are discussed below.

First Phase: Land Reform

Land reform began in areas under Chinese Communist control even before the establishment of the People's Republic of China in 1949. The land reform program destroyed the political power of landlords, identified by the CCP as the class enemy, by severing the links which bound tenants to landlords. Millions of hectares of land were redistributed to millions of poor farmers. The pattern of ownership and economic decisionmaking, however, remained as before land reform--with the individual farmers.

Second Phase: Mutual Aid Teams

With the completion of land reform in 1953, the CCP began a socialization program which did change ownership and decisionmaking patterns. In the second phase of the socialist transformation, the Party initially organized several farm households into "mutual aid teams" for a season to plant or harvest a specific crop. Labor, tools, and draft animals were exchanged between households in these seasonal teams. Later, the farmers in several seasonal mutual aid teams, usually 3 to 10 households, were organized into year-round permanent mutual aid teams, which had a leader and an accountant, if one could be found. Farmers retained ownership of the means of production in permanent mutual aid teams, but some economic decisions began to be made on a collective basis, and some units did accumulate capital equipment.

Third Phase: Agricultural Producer Cooperatives

In the third phase, the Party organized several permanent mutual aid teams, consisting of 20 to 30 households, into semisocialist agricultural producer cooperatives (APC's). Each cooperative was formed on a permanent basis and each had a chairman, committees, and accountants. Households gave land and capital to the APC's and were remunerated for the land shares and labor they contributed to production. In theory, members were supposed to have had some influence in making major farm decisions since they were included in the "Congress of Members" which approved major policy issues. In fact, the chairman exercised great influence and made day-to-day decisions.

Fourth Phase: Collective Farms

In the fourth phase, the Party organized several semisocialist APC's into collective farms consisting of a hundred or more households. From the "Congress of Members," farmers elected their own administrators, a chairman and assistants, a management committee, and a control committee. To promote production and administrative efficiency, the labor force was divided into production brigades, which were further divided into production teams. Farm management decisions were made by farm chairmen, who were heavily influenced by the Party. Unlike semisocialist APC's, which in effect paid rent to their members for land shares contributed, collective farms dropped payment of rents and remunerated members solely on the basis of labor. In the "labor day" work payment system, farmers were given larger or smaller shares of the collective net income, depending on the amount of labor they contributed during the year.

The system was organized as follows. As farmers worked, they were credited with labor days according to the amount and quality of work accomplished. ^{3/} At the end of the agricultural year, the gross income of the collective was totaled, deductions were made for production costs, taxes, and capital accumulation, and the resulting net income was divided by the total number of labor days credited to all of the farmers and staff of the collective to determine the monetary value of a single labor day. The net income was then distributed to individual farm families according to the number of labor days they had earned as recorded in the collective accounts.

In addition to distributing income, the collective farms had responsibility for accruing capital and welfare funds for their own use. Moreover, collective farm administrators implemented an agricultural tax system which annually delivered about 10 percent of the total agricultural output to the Chinese Government (5, p. 342). They also implemented the "State Procurement System" in which collective farms were required to sell to the state most of their output in excess of seed, fodder, and consumption requirements. A small portion of output left the collectives through black markets and state-controlled markets.

^{3/} The labor day is defined officially by the State Statistical Bureau as follows: "Labor days are units for computing the amount of labor spent on completion of the labor norm set for each kind of work and for computing labor remuneration. One labor day is equivalent to ten work points. The number of labor days which should be credited for completing the norm of each kind of work should be determined by the technical standard required for each kind of work, the arduousness of the labor process, and the importance of this work to the entire process of production. One labor day should be credited for completing the norm of a medium grade of work. A labor day, therefore, represents the time spent for completing the norm and for attaining the quality of labor which meets a given standard. It does not mean that by doing a day's work, a labor day will be credited." Source: (20).

Of the three agricultural organizations in China--private, collective, and state farms--the collective farm has become the most important. Most Chinese agricultural output is produced and distributed by these farms, which control the dominant part of the labor force and cultivated land.

A modification of the collectivization phase occurred when Rural People's Communes were established in the fall of 1958. Communes with 1,000 to 5,000 households were formed by merging scores of collective farms. Many organizational patterns existed in communes, but in general there were three administrative levels. The production team, which corresponded to the production brigade in the collective farm, was the lowest level. The production brigade, which corresponded in size to the former collective farm was the middle level. The highest administrative level was the commune. Production and distribution decisions were made at this level.

The means of production in communes continued to be collectively owned. Like collective farms, communes were concerned primarily with agricultural production. But unlike collective farms, communes also undertook industrial and commercial projects and had governmental, political, educational, and military responsibilities as well. The distribution system used in collective farms was abandoned, and goods and services were distributed to commune members on the basis of need, as well as labor.

A series of reforms from 1959 through 1961 somewhat changed communes as established in 1958. The three-level administrative structure was retained; and the communes continued political, administrative, educational and military functions and commercial and industrial projects. But by 1962, production and distribution decisions were made at the production team level rather than at the commune level. The income distribution system of remuneration according to labor and need was abandoned, and the old "labor day" work payment system was re-established.

Today, communes number approximately 50,000, but the production unit--the organization which makes economic decisions, distributes income, and calculates profit or loss--is the production team (13). The number of production teams in 1971 is estimated to have ranged from 4 million to 8 million. ^{4/} On the average, they consisted of about 20 to 30 member households, and each team cultivated about 12 to 25 hectares (30 to 60 acres). ^{5/}

^{4/} The number of production teams was estimated as follows: First, 80 percent of China's population of 855 million on July 1, 1971, was assumed to be rural--or 684 million people. Second, 95 percent of the rural population was assumed to be on communes--or 650 million--with the remainder assumed to be on state farms or in private agriculture. Third, it was assumed that there were 4.2 persons per household and hence, that there were 155 million households in communes. Fourth, production teams were assumed to be of a standard size of 20 to 30 households. By dividing the 155 million households by 20 and then by 30, it was found that there were 5.2 million to 7.8 million production teams in 1971. (Footnote continued on next page.)

Fifth Phase: State Farms

In the fifth and final phase of socialist transformation of Chinese agriculture--nearly all of which is in the planning stage--collective farms are being organized into state farms. The state farm structure is considered to be superior to the other agricultural institutions for several reasons. The means of production is owned by all the people, hence there can be no "foundation for exploitation." The Party, through Government ministries, controls production and distribution decisions. Because state farmworkers are wage earners, they are true agricultural proletarians in contrast to collective farm members, who are part-owners. Finally, farming techniques are more advanced in state farms.

The number of state farms increased from 18 in 1949 to approximately 2,000 in 1965. Despite this rapid growth, the area cultivated by state farms in 1964 was less than 4 percent of total cultivated land, their grain output was only 1 percent of total output, and their population was less than 2 percent of the rural population (5, p. 95). In the past few years, there have been no signs from the authorities which indicate that they intend to increase the rate of transition from communes to state farms. Although the final phase has barely started, the Chinese leadership generally considers that the socialist transformation has been completed.

Table 1 indicates the rapid pace at which socialization of Chinese agriculture took place. In the space of 4 years--from 1953 to the end of 1956--nearly all agricultural households were in collective farms.

Based on the above methodology but a more conservative population estimate of 750 million, the number of production teams would range from 4.5 million to 6.8 million. However, the upper range--based on a high population assumption and small team size--probably would not be more than 8 million; and the lower range--based on a low population assumption and large team size--probably would not be less than 4 million. Hence the number of 1971 production teams is estimated to have been between 4 million and 8 million.

The assumed production team size of 20 to 30 households is from a recommendation contained in the Revised Draft Regulations Governing Rural People's Communes published by the Central Committee of the Chinese Communist Party in September 1962. Since that time, news articles suggest that the size of teams generally falls within this range, but they also reveal that, on the average, teams are closer to 30 households in size.

5/ Communes are assumed to have cultivated 92 percent of China's 107 million hectares of cultivated land in 1971--or 98 million hectares--and state farms are assumed to have cultivated 4 percent, and private farmers, 4 percent. Dividing the 98 million hectares by 4 million and 8 million production teams yields a range of 12 to 25 hectares, or 30 to 60 acres per team.

Table 1--Development of socialist agriculture in the People's Republic of China, 1950-72 ^{1/}

Year	Seasonal Mutual Aid Teams 2/	Permanent Mutual Aid Teams 2/	Semi- socialist APC's	Collectives	Rural People's Communes	State Farms 3/	Percentage of peas- ant households in socialist agricul- tural units 4/
	Number				Percent		
1950.....	2,097,000	627,000	18	1	--	NA	10.7
1951.....	3,600,000	1,075,000	129	1	--	NA	19.2
1952.....	6,270,000	1,756,000	3,634	10	--	404	40.0
1953.....	5,634,000	1,816,000	15,053	15	--	NA	39.5
1954.....	6,130,000	3,801,000	114,165	201	--	NA	60.3
1955.....	3,975,000	3,172,000	633,213	529	--	NA	64.9
1956.....	--	--	682,000	312,000	--	NA	96.3
1957.....	--	--	5/72,022	5/680,081	--	710	5/97.0
1958.....	--	--	--	--	6/26,578	1,442	6/99.1
8 1959.....	--	--	--	--	7/24,000	NA	NA
1960.....	--	--	--	--	NA	8/2,490	NA
1961.....	--	--	--	--	9/26,000	2,500	NA
1962.....	--	--	--	--	NA	NA	NA
1963.....	--	--	--	--	NA	NA	NA
1964.....	--	--	--	--	10/74,000	NA	NA
1965.....	--	--	--	--	NA	2,000	NA
1972.....	--	--	--	--	11/50,000	NA	NA

1/ All sources except those specifically marked are from China's State Statistical Bureau, Agricultural Statistics Section (21, p. 9-11). 2/ Single totals were given for mutual aid teams in 1950, 1951, and 1952. These totals were allocated to seasonal and permanent teams in the same proportion as in 1953. 3/ Source: (22, p. 134). 4/ Source: (22, p. 35). 5/ Source: (16, p. 23-25). 6/ Source: (22, pp. 36, 43). 7/ Source: (4, pp. 34-36). 8/ Source: (12, p. 41). 9/ Source: (15, p. 3). 10/ Source: (14, pp. 14-19). 11/ Source: (17).

NA means not available.

-- means not applicable.

Farm Units

In contrast to the estimated 4 million to 8 million production teams in China in 1971, the United States had only 2.9 million farms in 1971. Also, 98 percent of total U.S. farm sales in 1971 came from 1.8 million farms with cash receipts of \$2,500 or more. As mentioned above, most Chinese farm production units are relatively small, ranging from 30 to 60 acres. In contrast, most commercial farms in the United States are large, averaging 1,069 acres in the western regions and 265 acres in the eastern half of the country.

Farm ownership patterns in the two countries also differ sharply. Most U.S. farms are owned by private entrepreneurs, while in China farms are state or collectively owned. Tenancy was eliminated in China when agriculture was collectivized. While 13 percent of the farm land in the United States is operated by tenants, most of the land, 35 percent, is operated directly by full owners, and 52 percent by persons who own part and rent part of the land they work (28).

LAND AREA

The total land mass of China is slightly larger than that of the continental United States (table 2). However, China's cultivated area--about 107 million hectares--constitutes 11 percent of the mainland mass, while in the United States, 20 percent of the total land mass is cultivated area. Per capita, there were only four-tenths of an acre of cultivated land in China in 1964, compared with 2 acres in the United States. 6/

Table 2--Land area in the United States and the People's Republic of China

Item	United States 1/		China 2/	
	Hectares	Acres	Hectares	Acres
	<u>Millions</u>			
Total land mass.....	768	1,900	973	2,404
Cultivated land.....	156	386	107	264
Sown area.....	116	287	150	371

1/ Data applies to the 48 contiguous States for 1964. "Cultivated land" includes cropland used for crops, soil improvement crops, or land that is idle. It excludes cropland used only for pasture, because such pasture is not included in the Chinese definition of cultivated land. Sown area is cultivated land less fallow land. Fallow land is calculated as follows: Crop land used for crops, less cropland harvested, equals cropland not harvested; e.g., the soil bank. To the soil bank is added cropland used for soil improvement crops or land that is idle. Source: (27, pp. 436, 439).

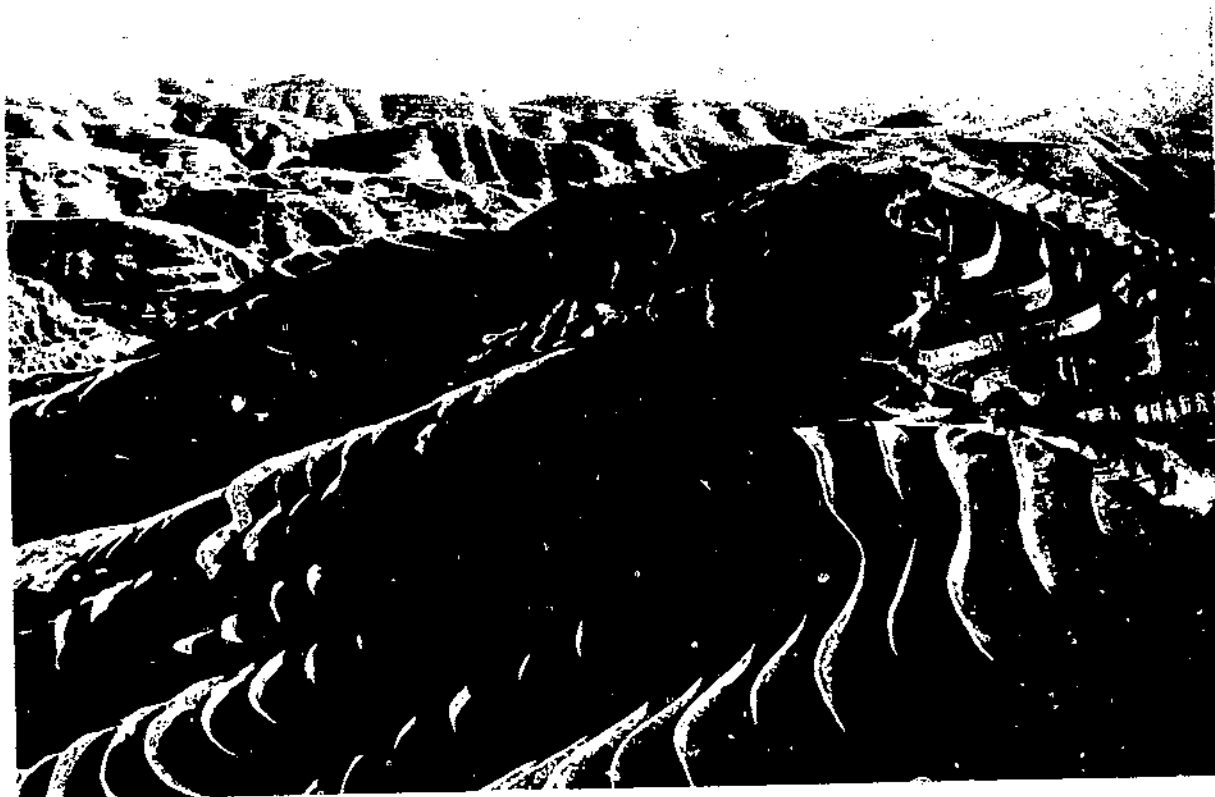
2/ Data not attributed to any specific year. Presumably, proportions have not significantly changed in this decade. Source: (23, p. 113).

Because multiple-cropping--the practice of growing two to three crops per year on the same area--is practiced in many parts of China, the actual area sown is about 150 million hectares--40 percent more than the cultivated hectareage. But in the United States, about one-fourth of the cultivated land has been fallow in recent years, and the actual sown area has totaled only 116 million hectares. Hence, the sown area in China exceeds that of the United States by about one-third.

6/ For China, per capita cultivated land is based on a 1964 population of 735 million people (31). The U.S. population in 1964 was 188.2 million, excluding Alaska, Hawaii, and armed forces overseas (27, p. 452).

Very little additional land can be cultivated in China. The 89 percent of the land mass that is not cultivated is largely forest, grassland, desert, mountains, urban areas, and wasteland (35). For example, the Tibetan highlands cover an area of 750,000 square miles, most of which is 10,000 feet above sea level. Only small amounts of marginal land can be made cultivatable, and only after costly investments.

Only 10 percent of the continental United States consists of desert, waste, and urban areas. The rest of the land area that is not cultivated--70 percent of the total land mass--is in pasture, forests, woodlands, and ranges (27, p. 507). The difference in land endowments between the two countries is staggering, especially when one bears in mind that China must feed a population nearly four times that of the United States.

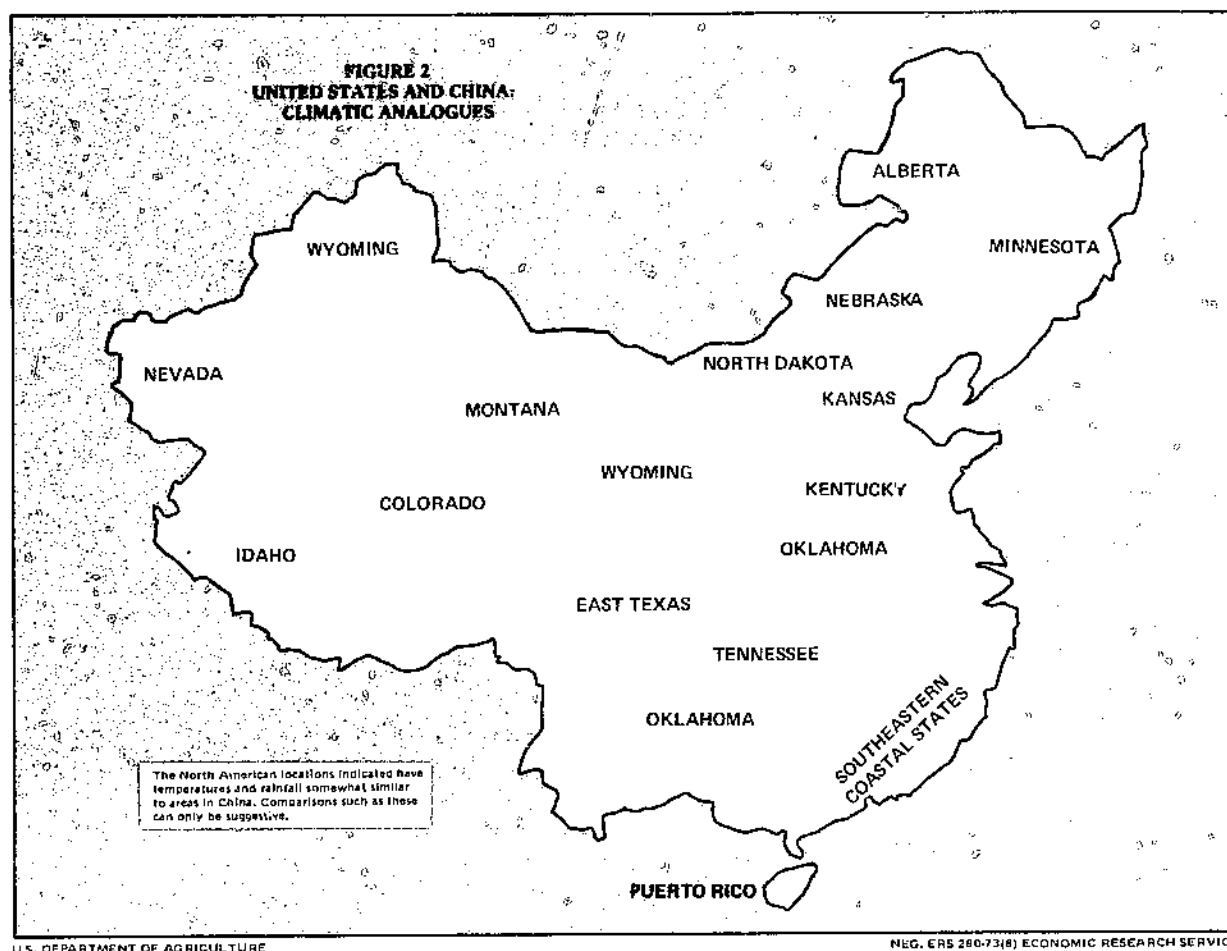


Costly terracing expands cultivated area in China's mountainous regions

CLIMATE

Climatic analogues are areas sufficiently alike with respect to major weather characteristics so that crops transplanted from one area to its climatic counterpart should have a fair chance of surviving successfully. Figure 2 shows the areas in North America that are climatic analogues--that is, having generally similar temperature and rainfall patterns--of areas in China.

Because latitudes of China and the United States are similar, much of the climate in the two countries is alike. For example, the climate in Peking is in many respects comparable to that of Philadelphia, as both are at 40° north latitude. Also, Canton and Miami, Florida, show similarities in latitude, elevation, mean January and July temperatures, and precipitation (2, p. 52).



The territory of China falls into two broad divisions--northern China and southern China--which are divided by the Tsing-ling Mountains along the 34th north parallel. Topography, climate, soil, natural vegetation, and planted crops differ markedly between the north and the south. Each area has an important river basin: the Hwang-Ho or Yellow River to the north and the Yangtze to the south (fig. 3).

Located between the Pacific Ocean and the great arid Asian land mass, China is subject to rains and warm sea breezes in the summer, and relatively dry conditions and cold winds in the winter. These monsoon conditions, which are not characteristic of the U.S. climate, are major factors determining the precipitation distribution pattern of the country, temperature ranges, and floods and drought.

FIGURE 3
PEOPLE'S REPUBLIC OF CHINA
REGIONAL DIVISIONS AND MAJOR RIVERS

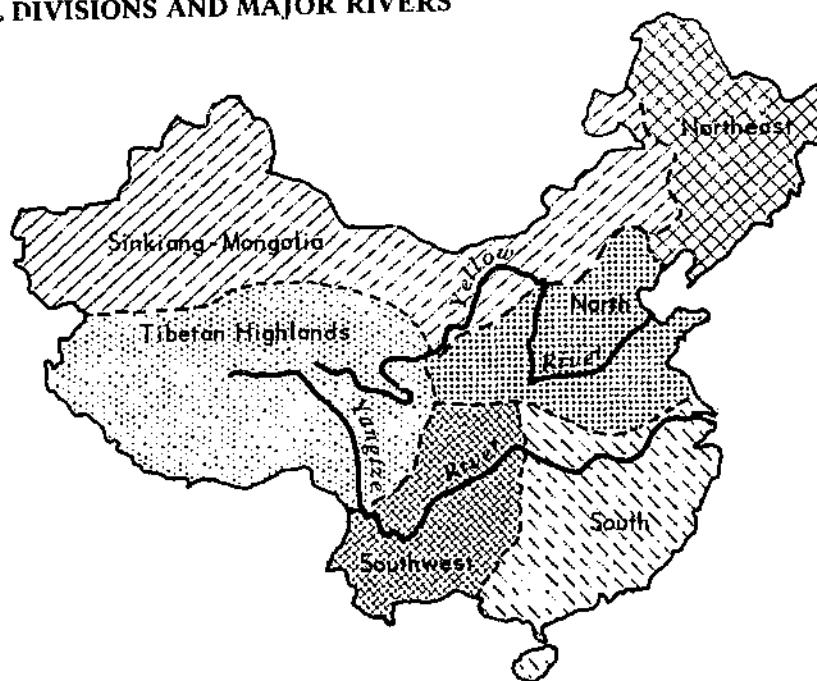
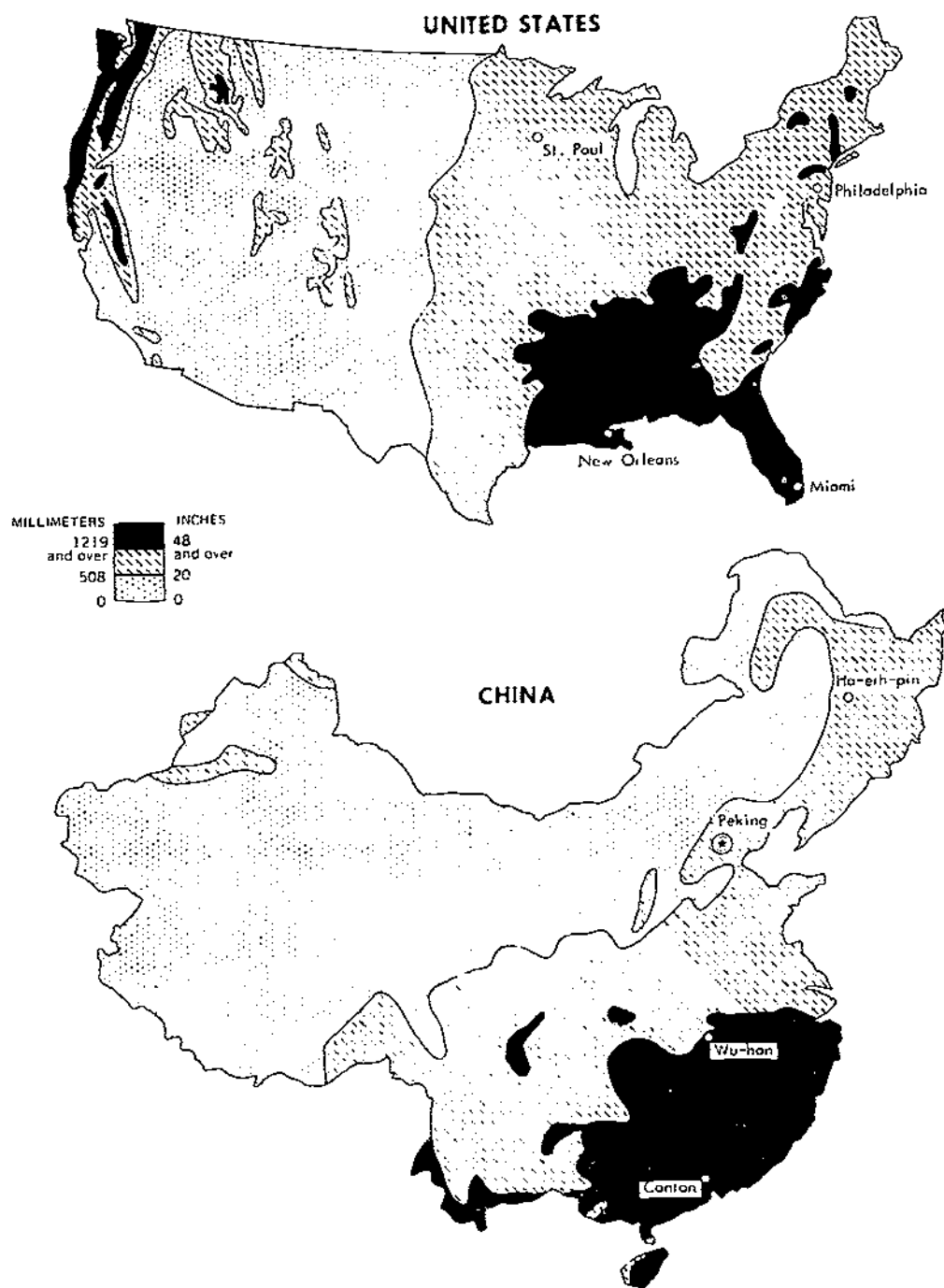


Figure 4 illustrates the distribution of annual precipitation in the United States and China. There are two major precipitation zones in China: in eastern, southern, and most of north and northeast China, annual rainfall is at least 20 inches. Often, two-thirds of total annual precipitation in these agriculturally rich areas falls between May and September, when moisture requirements for crops are highest. Without the summer monsoonal rains, Chinese crop production would be reduced considerably. Typhoons strike the southeast coast of China as hurricanes strike the southeast coast of the United States. But in China, the storms are of much greater frequency and intensity. In western China, rainfall is only 5 to 20 inches, comparable to that of the west and southwest United States, excluding the Pacific coastal States.

The highlands of the western part of northern China are occasionally subject to devastating earthquakes. Soils in these highlands are loess--a wind-blown, fertile, yellow silt of low-humus content and high-water-holding capacity. In 1947, about one-fifth of China's loess highland was under cultivation. The area surrounding Peking, which is in the eastern portion of northern China, is an extensive lowland of flat, fertile plains with river-laid alluvial and wind-deposited loess. Floods and dust storms are common on this "Great Plain of North China," which extends southward from Peking about 500 miles and is the largest agricultural area in China. The Manchurian Plain extends from the North China Plain. Prior to 1949, it was one of the most important agricultural regions in the country, comprising nearly 120,000 square miles of intensively farmed land (1). Winter and spring wheat, sorghum, millet, and corn are the main cereal grains grown in northern China.

Compared with precipitation levels in northern China, rainfall in southern China is greater and more of it falls during the autumn-winter-spring period. It is ample and reliable, and accounts for the higher agricultural productivity of southern China. Rice is the predominant grain produced in southern China, and one or more crops may be raised each year. Corn and sweet potatoes are also among the main cereal grains grown in southern China.

FIGURE 4
ANNUAL PRECIPITATION IN THE UNITED STATES
AND THE PEOPLE'S REPUBLIC OF CHINA



U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 279-73(8) ECONOMIC RESEARCH SERVICE

POPULATION

The last and only modern population census in the People's Republic of China, taken in 1953, placed the population that year at 583 million. In the absence of a census since 1953, analysts of China's population have constructed various estimates. For the period 1967-71, they range from 725 million to 855 million (19, 30). The U.S. population, including military personnel overseas, in July 1971 was 207 million (27, p. 521).

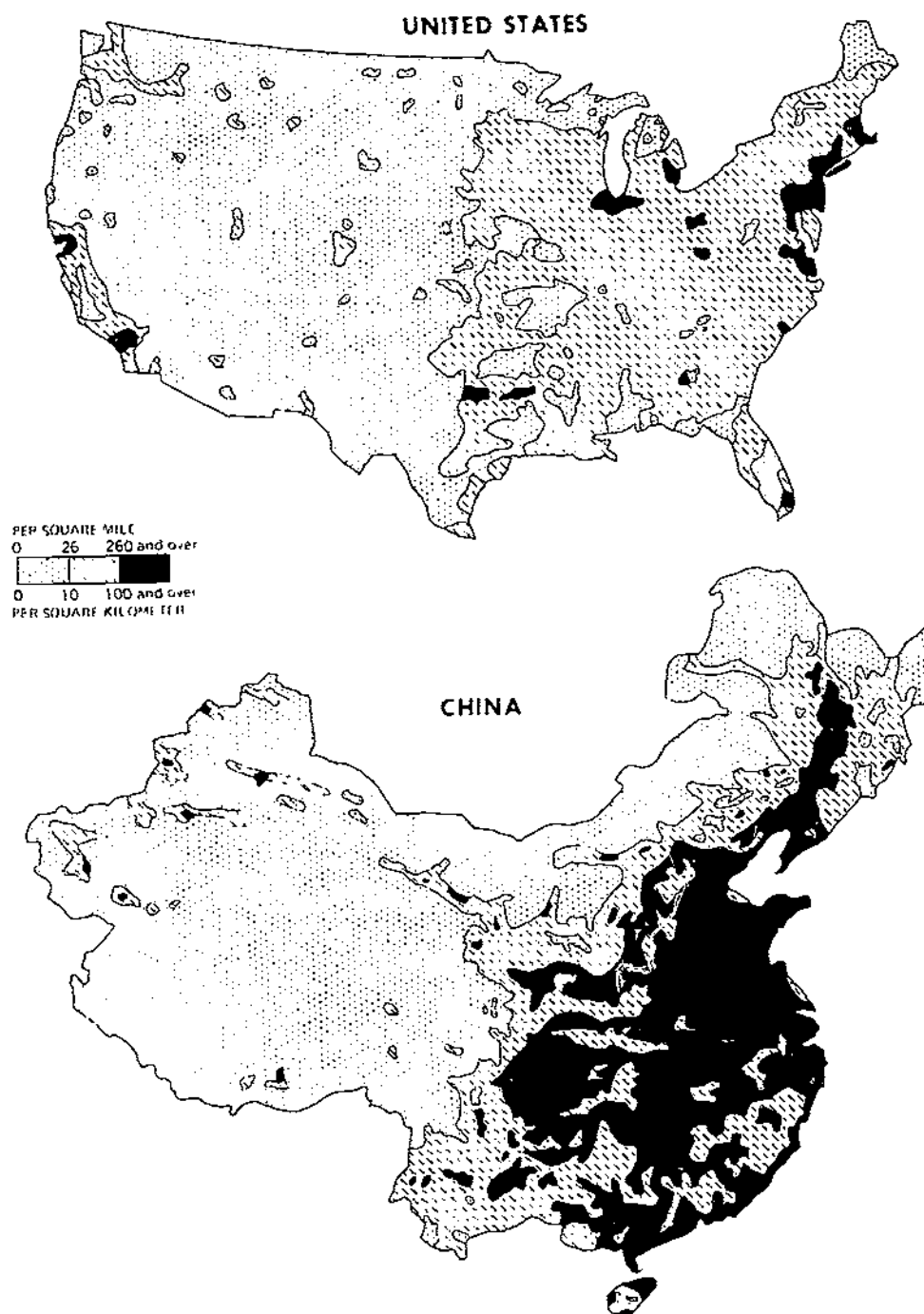
In the United States, the rate of natural increase of the resident population has grown at an average annual rate of 1.0 percent since 1966. Up to 1860, the natural rate of increase was over 2 percent, and with immigration, the U.S. population grew at more than 3 percent annually. But since the Civil War, there never has been a sustained period when growth from natural increase exceeded 2 percent. With the low rate of increase in 1973 of 0.7 percent, the U.S. population is increasing by 1.4 million people per year (31, 34).

In contrast, estimates of China's population growth rate center around 2 percent. The rate of natural increase in China for 1952 was estimated at about 2 percent. It has risen and fallen several times since and in 1971 was around 2.2 percent (23, p. 326). A net annual rate of increase of 15 million to 20 million people is generally assumed for China. It is obvious, then, that food production must, at a minimum, increase at a rate sufficient to feed these millions of new people every year.

The whole eastern half of China, cities and rural areas alike, have a density equivalent to the Boston-New York-Washington corridor (fig. 5). Areas of lower population density in the eastern part of China usually denote marginal or nonagricultural land.

It is generally accepted that 80 to 85 percent of China's population is rural. In contrast, in the United States--where the rural population declined from 85 percent of the total in 1850 to 36 percent in 1950--only about 27 percent of the population now is rural (34). Rural population in the United States refers to people in small towns of less than 2,500, in open country, and on farms.

FIGURE 5
POPULATION DENSITY IN THE UNITED STATES
AND THE PEOPLE'S REPUBLIC OF CHINA



U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 393-73(8) ECONOMIC RESEARCH SERVICE

AGRICULTURAL INPUTS

Comparisons of the use of tractors in the United States and China are difficult to make, primarily because of differences in the type of tractors used and their horsepower capacity. Even making allowances for errors in estimating, a picture of highly mechanized U.S. agriculture contrasted with highly labor-intensive Chinese agriculture emerges.

In 1970, the United States had about 5 million tractors on farms, including garden type tractors (27, p. 517, table 638). Estimates of tractors in China for that year range from 63,000 to 165,000 (15-horsepower units) (23, p. 139; 7, p. 487). 7/ This works out to roughly 23 hectares (57 acres) of sown area per tractor in the United States, compared with 909 hectares (2,246 acres) in China. 8/ In other words, Chinese farmers cultivate more sown area than do farmers in the United States, but they only have one-thirtieth as many tractors.

For centuries, Chinese farmers have collected animal and human waste, mud from canals and ponds, and vegetative materials such as grass and bean cake for use as fertilizer. These organic fertilizers continue to be the most important source of nutrients for crops. However, in the 1960's, the production of chemical nitrogen fertilizer increased rapidly, and in the past few years China has begun to manufacture complex fertilizers having nitrogen, phosphorous, and potassium.

Despite the progress made in fertilizer use in China, the crop production tables below indicate that Chinese crop yields generally run about half those achieved in the United States. A major reason for this difference is that in the United States, utilization of nitrogen fertilizer to raise crop yields is four times higher than in China. 9/ China's average annual estimated supply of chemical nitrogen fertilizer for 1966-70 was 1.93 million tons on a nutrient basis (23, p. 140). The estimate includes domestic production as well as imports, and total supply is assumed to equal total consumption.

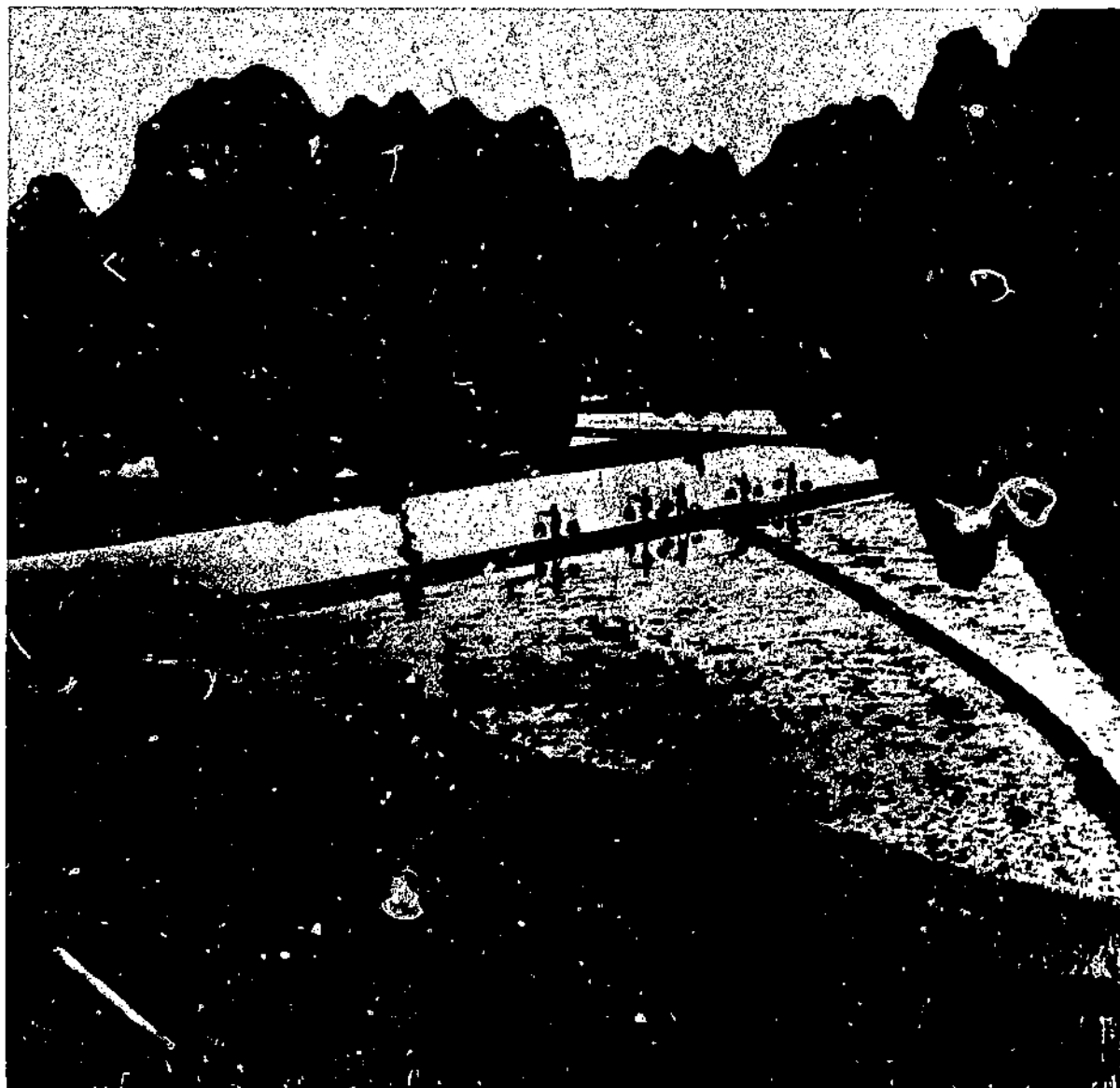
For a comparable time period, the United States consumed 6.4 million tons of chemical nitrogen. If these consumption levels are divided by the sown areas of the two countries, application rates for China would be 13 kilograms per hectare, compared with 55 kilograms for the United States.

Chinese farmers began irrigating fields several millenia ago. Enormous amounts of human labor in past centuries and in the past two decades were employed to construct an extensive system irrigating millions of hectares of land. China's irrigated area of 33.5 million hectares is double that of the United States, where 15.8 million hectares (39 million acres) are irrigated (23, p. 129; 27, p. 508). Indeed, China has more irrigated land than any other country in the world (6, p. 9). Moreover, about a third of all Chinese cultivated land is irrigated, compared with about 10 percent in the United States. 10/

7/ A figure of 154,000 15-horsepower units in 1965 has also been published (12).

8/ Sown area per tractor in China is based on 165,000 15-horsepower units.

9/ Phosphorus and potassium are the two other major plant nutrients in chemical fertilizer, but this discussion is limited to nitrogen.



Rice transplanting machine at work in irrigated fields

AGRICULTURAL OUTPUT

A comparison of agricultural output in the United States and China is difficult because China has not reported detailed agricultural production information since 1960. The figures published below for China are estimates made by U.S. Department of Agriculture analysts. ^{11/} Estimates are based on (1) published, official Chinese agricultural production data for 1953-67, (2) official press statements indicating percentage increases or decreases, and (3) qualitative information regarding policy changes, input availability, weather, and so forth.

Grain

The customary grain definition of wheat, rice, and feed grains such as barley, corn, oats, and sorghum is not used in this study. Instead, the Chinese definition of grain--which includes wheat, rice, miscellaneous grains, and tubers--is used. Rice is paddy (not milled), and tubers include both Irish and sweet potatoes, which are converted to a grain-weight equivalent basis at the ratio of four units of tubers to one unit of grain. Miscellaneous grain includes barley, beans, buckwheat, corn, field peas, kaoliang (grain sorghum), millet, oats, and other leguminous crops. The U.S. definition was not used because comparable statistics on the Chinese side could not be found. U.S. data were organized to fit the Chinese definition to make the grain statistics comparable.

Table 3 highlights several interesting differences between U.S. and Chinese grain production. First, the total area planted to grain in China is almost twice that of the United States. Second, in China, where 55 percent of the total grain area is planted to wheat, rice, and potatoes, the emphasis is on food grains. However, in the United States, 65 percent of the grain area is devoted to feed grain crops (classified as miscellaneous grain in the table).

As indicated in table 4, Chinese grain yields are about half those achieved in the United States. High yields are often associated with Chinese agriculture because it is considered to be "intensive," with farmers lavishing enormous amounts of labor on small, well-manicured fields. However, because Chinese labor is not combined with the comparable amount of capital inputs, yields are not as high as those in the United States. Higher yields in the United States are achieved through the use of chemical fertilizers, insecticides, high-yielding seed varieties, irrigation, mechanization, and specialization of crop production.

^{10/} Computed from data on cultivated area presented in table 2.

^{11/} Most estimates were made by Marion R. Larsen, Agricultural Economist, Economic Research Service (26).

Table 3--Area of major grains, United States and the People's Republic of China, average 1967-71 ^{1/}

Grain	United States	China ^{2/}	United States	China ^{2/}	China as a percentage of United States
	Million hectares		Million acres		Percent
Wheat.....	^{3/} 20.6	24.4	^{3/} 50.8	60.3	118
Rice.....	^{4/} .8	31.1	^{4/} 2.0	76.9	3,888
Miscellaneous ^{5/}	^{6/} 41.6	55.4	^{6/} 102.8	136.9	133
Tubers ^{7/}	^{8/} .6	12.9	^{8/} 1.5	31.9	2,150
Total.....	63.6	123.8	157.2	306.0	195

^{1/} Data based on acres harvested.

^{2/} Source: (26).

^{3/} Source: (27, p. 2, table 1).

^{4/} Source: (27, p. 25, tables 25 and 26).

^{5/} Miscellaneous grains in this and following tables include: millet, corn, kaoliang (grain sorghum), barley, buckwheat, oats, beans, peas, rye, pulses, lentils, broad beans, field peas, and other leguminous crops.

^{6/} Source: (27, p. 34, table 38; p. 64, table 71; p. 52, table 58; p. 526, table 650; p. 44, table 49; p. 338, table 415; p. 345, table 426; p. 19, table 18).

^{7/} Sweet and Irish potatoes.

^{8/} Source: (27, p. 219, table 268; p. 228, table 278).

Table 4--Yield of major grains, United States and the People's Republic of China, average 1967-71 ^{1/}

Grain	United States	China	United States	China	China as a percentage of United States
	Quintals per hectare		Bushels per acre		Percent
Wheat.....	20	10	30	14	49
Rice.....	50	30	100	59	59
Miscellaneous.....	39	13	66	NA	32
Tubers ^{2/}	59	20	^{3/} 87	^{3/} 30	35

NA means not available.

^{1/} Yields computed from table 3 and 4.

^{2/} Based on grain-equivalent weight of potatoes, at one-fourth actual farm weight.

^{3/} Yields based on actual farm weight would be 348 bushels per acre for the United States and 120 bushels per acre for the People's Republic of China.

When output of potatoes (at one-fourth their actual farm weight) is included in the grain output comparison, China has roughly the same grain output as the United States (table 5). Once again the food/feed contrast shows up. China predominates in the production of food grain and the United States does so for feed grain. Only about 15 percent of the grain produced in the United States is consumed directly by people, the remainder is fed to livestock or exported. In contrast, 80 to 90 percent of the grain produced in China is consumed directly by people.



Newly harvested rice in Kwangtung Province

Table 5--Production of major grains, United States and the People's Republic of China, average 1967-71

Grain	United States	China ^{1/}	United States	China	China as a percentage of United States
	Million metric tons		Million bushels		Percent
Wheat.....	2/41.2	23.6	1,513.7	867.1	57
Rice.....	3/4.1	92.0	200.9	4,507.2	2,244
Miscellaneous ^{4/}	5/162.1	69.7	6,822.2	NA	43
Tubers ^{6/}	3.7	26.2	7/135.1	9,627	708
Total.....	211.1	8/211.5	--	--	100

-- means not applicable.

NA means not available.

^{1/} Source: (26).

^{2/} Source: (27, p. 25, table 26).

^{3/} Source: (27, p. 25, table 25.21).

^{4/} Miscellaneous grains include: millet, corn, kaoliang (grain sorghum), barley, buckwheat, oats, beans, peas, rye, pulses, lentils, broad beans, field peas, and other leguminous crops.

^{5/} Source: (27, p. 34, table 38; p. 64, table 71; p. 52, table 58; p. 526, table 650; p. 44, table 49; p. 338, table 415; p. 345, table 426; p. 19, table 18).

^{6/} Sweet and Irish potatoes, in conformance with the Chinese definition, are converted to grain equivalent at one-fourth their actual farm weight.

^{7/} Production based on actual farm weight would be 540.2 million bushels.

^{8/} Although the official Chinese statistical organization has not published detailed information on area, yield, and production for China's major grain crops, Chinese officials have occasionally given foreign visitors figures on total grain production: for 1967, 230 million metric tons; for 1970, 240 million metric tons; and for 1971, 246 million metric tons. (The 1967 figure is from Anna Louise Strong, "Letter From China," No. 55, Jan. 1, 1968. The 1970 figure appeared in Foreign Broadcast Information Service, Daily Report, Communist China, Mar. 25, 1971, p. b-7. The 1971 figure is from an editorial in the People's Daily, Jan. 1, 1972).

This table uses estimates made by USDA analysts, however, because of the incomplete and semi-official nature of the Chinese figures. The USDA estimates are, of course, tentative and as more information becomes available, the estimates will be revised.

Oilseeds

China's area under oilseed crops is about 80 percent of that in the United States, but output is less than half (table 6). U.S. soybean and peanut yields are twice those of the People's Republic of China. Chinese sunflowerseed yields are somewhat higher than those in the United States, while U.S. cottonseed yields are slightly above Chinese levels (table 7). Soybean production in the United States is about four times that of China, but China exceeds the United States in production of castorbeans, peanuts, rapeseed, and sesameseed (table 8). Production of cottonseed and sunflowerseed is slightly higher in the United States.

Other Crops

Tobacco production is about the same in China and the United States. China's sugarbeet production is about a fifth of the U.S. level and its cotton and sugarcane production, about four-fifths (table 9).

Cotton yields in China are nearly three-quarters of those achieved in the United States. However, yields of sugarbeets, cane, and tobacco are only about half of U.S. yields.

Centrifugal raw sugar production in the two countries is as follows:

Centrifugal raw sugar production	United States	People's Republic of China
		<u>Million metric tons</u>
From sugarbeets.....	2.9	0.5
From sugarcane.....	2.5	1.3
Total.....	5.4	1.8

China produces about 17 percent as much sugar from beets, and about half as much sugar from cane, as does the United States. China's total sugar production is about one-third that of the United States (26; 27, p. 106, table 123). Slightly more than half of U.S. domestically produced centrifugal sugar is obtained from beets, while in China, cane supplies the larger share.

Because of limited imports, a population nearly four times that of the United States, and lower levels of production, per capita consumption levels of cotton, sugar, and tobacco are lower in China than in the United States.

Table 6--Area of major oilseeds, United States and the
People's Republic of China, average 1967-71 1/

Oilseed	United States	China <u>2/</u>	United States	China <u>2/</u>	China as a percentage of United States
	Million hectares		Million acres		Percent
Soybeans.....	<u>3/</u> 16.7	8.1	<u>3/</u> 41.3	19.9	49
Peanuts.....	<u>4/</u> 4.5	2.0	<u>4/</u> 1.4	5.0	400
Rapeseed.....	---	1.7	---	4.3	---
Sesameseed.....	---	.9	---	2.3	---
Sunflowerseed.....	<u>5/</u> 0.1	.05	0.2	0.1	50
Cottonseed.....	<u>6/</u> 4.2	<u>7/</u> 4.6	<u>6/</u> 10.4	<u>7/</u> 11.3	110
Linseed.....	<u>8/</u> 0.9	---	<u>8/</u> 2.2	---	---
Castorbean.....	NA	NA	NA	NA	---
Tung nuts.....	NA	NA	NA	NA	---
Total.....	22.4	17.4	55.5	42.9	78

NA means not available. --- means none.

1/ Area harvested.

2/ Source: (26).

3/ Source: (27, p. 162, table 189).

4/ Source: (27, p. 154, table 177).

5/ Source: (25).

6/ Source: (27, p. 142, table 160).

7/ Source: (25).

8/ Source: (6, p. 243, table 81).

Table 7--Yield of major oilseeds, United States and the
People's Republic of China, average 1967-71 ^{1/}

Oilseed	United States	China	United States	China	China as a percentage of United States
	<u>Kilograms per hectare</u>		<u>Bushels per acre</u>		<u>Percent</u>
Soybeans.....	1,792	821	26.2	12.3	46
Peanuts.....	2,460	1,205	92.0	50.5	49
Rapeseed.....	NA	459	NA	7.2	---
Sesameseed.....	NA	356	NA	6.6	---
Sunflowerseed.....	1,000	1,400	40.9	55.1	140
Cottonseed.....	874	713	24.3	20.0	82
Linseed.....	738	---	11.8	---	---
Castorbean.....	NA	NA	NA	NA	---
Tung nuts.....	NA	NA	NA	NA	---

NA means not available. --- means none.

^{1/} Yields computed from tables 6 and 8.

Table 8--Production of major oilseeds, United States and the
People's Republic of China, average 1967-71

Oilseed	United States	China <u>1/</u>	United States	China <u>1/</u>	China as a percentage of United States
	Million metric tons		Million bushels		Percent
Soybeans.....	2/29.93	6.65	2/1,099.72	244.20	22
Peanuts.....	3/1.23	2.41	3/128.84	252.58	196
Rapeseed.....	NA	.78	NA	31.15	---
Sesameseed.....	NA	.32	NA	15.15	---
Sunflowerseed.....	4/.10	4/.07	8.18	5.51	70
Cottonseed.....	5/3.67	3.28	5/253.17	226.34	89
Linseed <u>6/</u>	0.67	---	26.21	---	---
Castorbeans <u>7/</u>	0.02	.07	1.08	3.76	350
Tung nuts.....	8/0.03	9/.05	NA	NA	1,667
Total <u>10/</u>	35.62	13.58	--	--	38

-- means not applicable.

NA means not available. --- means none.

1/ Source: (26).

2/ Source: (27, p. 162, table 189).

3/ Source: (27, p. 154, table 177).

4/ Source: (25).

5/ Source: (27, p. 142, table 160).

6/ Source: (6, p. 243, table 81).

7/ Source: (6, p. 257, table 80).

8/ 1966-70 average. Production figures were discontinued after 1970.
Source: (27, p. 170, table 200).

9/ Source: (6, p. 260, tables 87,88).

10/ Excludes tung nuts.

Table 9--Area, yield, and production of selected agricultural commodities,
United States and the People's Republic of China, average 1967-71

Commodity	United States <u>1/</u>	China <u>2/</u>	United States <u>1/</u>	China <u>2/</u>	China as a percentage of United States
	Million hectares		Million acres		Percent
Area:					
Cotton.....	4.2	4.6	10.4	11.3	110
Sugarbeets.....	0.6	<u>3/0.3</u>	1.4	0.7	50
Sugarcane.....	0.2	<u>3/0.4</u>	0.6	0.9	200
Tobacco.....	0.4	0.7	0.9	1.8	180
	Kilograms per hectare		Pounds per acre		
Yield:					
Cotton.....	524	370	467	330	71
Sugarbeets.....	38,000	15,000	36,424	32,494	40
Sugarcane.....	111,500	43,250	81,938	38,583	39
Tobacco.....	2,306	1,099	2,033	980	48
	Million metric tons				
Production:					
Cotton.....	2.2	1.7			77
Sugarbeets.....	22.8	4.5			20
Sugarcane.....	22.3	17.3			78
Tobacco.....	0.8	0.8			100

1/ Source: (27).

2/ Source: (26).

3/ 1967-70 average.

Livestock

China has half as many cattle as the United States does (table 10). Cattle are used primarily for draft purposes in China, while in the United States, they are raised for meat and dairy products.

Although China produces considerably less grain for feed than does the United States, it has nearly three times the number of hogs and sheep. Sheep in China receive most of their feed from grazing. In contrast to the United States, where hogs are fed mostly feed grains (primarily corn and barley), hogs in China are fed garbage, forage grasses, legumes, milling byproducts such as rice hulls, and modest amounts of grain. In the late 1950's hogs in China were allocated a single ration of 100 to 200 pounds of grain for their entire period of maturity (15).

Table 10--Livestock numbers, United States and the People's Republic of China, average 1967-71

Category	United States <u>1/</u>	China <u>2/</u>	China as a percentage of United States
	Million head		Percent
Cattle.....	112.8	56.1	49.7
Milk cows.....	13.0	<u>3/</u> 0.9	6.9
Buffaloes (draft).....	---	14.5	---
Hogs.....	61.3	163.2	266.2
Sheep.....	20.4	65.8	322.6

---means none.

1/ Source: (21, p. 358; table 447; p. 364, table 453; p. 374, table 467; p. 386, table 485).

2/ Source: (26).

3/ Derived from milk production data in (6, table 123, p. 392).

AGRICULTURAL TRADE

The total value of U.S. trade--both agricultural and nonagricultural--greatly exceeds that of China (table 11).

Table 11--Value of total and agricultural trade, United States
and the People's Republic of China, average 1967-71

Country	Total trade	Agricul- tural trade	Total exports	Agricul- tural exports	Total imports	Agricul- tural imports
<u>Billion U.S. dollars</u>						
United States <u>1/</u> ...	70.8	11.8	36.6	6.7	34.2	5.1
People's Republic of China <u>2/</u>	4.1	1.8	2.1	1.1	2.0	0.7

1/ Year ending June 30. Source: (27, p. 698, table 817).

2/ Source: (23, p. 353).

Total trade as a share of GNP is comparatively low in both China and the United States. In 1971, total trade as a percentage of GNP was 9 percent for the United States and 4 percent for China (3, p. 1). These relatively low rates reflect the two countries' large continental economies, populations, and rich natural endowments. Similarly, the USSR has a rate of 5 percent (3, p. 1). In contrast, Italy's international trade as a percentage of its GNP is 30 percent (9).

Agricultural trade as a share of GNP is also low: 1.5 percent for the United States and 1.8 percent for China. While the ratios are about the same for the two countries, the total value of agricultural trade in the United States is six and a half times larger than that of China. Agriculture's share of total trade is greater in China--almost 50 percent--than in the United States--about 20 percent. As indicated below, farm products also account for a larger proportion of China's total imports and exports.

Item	United States	People's Republic of China
<u>Percent</u>		
Agricultural imports as a share of total imports...	15	35
Agricultural exports as a share of total exports...	18	52
Agricultural trade as a share of total trade.....	17	44

Table 12--Trade in selected agricultural commodities, United States and the People's Republic of China, average 1967-70 1/

Commodity	Imports		Exports	
	United States	China	United States	China
	<u>1,000 metric tons</u>			
Cattle <u>2/</u>	1,000	NA	55	109
Hogs <u>2/</u>	30	---	18	1,787
Meat, fresh, chilled, or frozen.....	526	---	204	110
Eggs, in-shell equivalent.....	7	---	13	57
Wheat.....	26	4,176	17,391	---
Rice.....	5	<u>3/28</u>	1,851	912
Corn.....	40	NA	15,058	32
Fruit, fresh <u>4/</u>	<u>5/1,736</u>	---	327	199
Potatoes, white.....	89	---	135	44
Beans and peas.....	8	---	288	112
Sugar, raw equivalent.....	4,473	491	1	214
Tea.....	65	---	---	32
Oilseed cake and meal.....	38	---	3,095	31
Tobacco, unmanufactured.....	111	---	256	17
Peanuts, shelled basis.....	---	3	51	48
Soybeans.....	---	---	8,872	508
Natural rubber.....	548	<u>3/201</u>	14	---
Silk, raw fiber.....	2	---	---	5
Wool, greasy, sheep and lamb.....	62	10	---	11
Cotton, raw.....	19	76	750	<u>3/3</u>
Animal fats, excl. lard <u>3/</u>	10	10	964	---
Vegetable oil <u>6/</u>	391	12	623	75

Note: At the time this report was being prepared, 1971 trade data for China was in large part not available. Hence, the annual average for 1967-70 is presented rather than the 1967-71 average generally used throughout this report.

NA means not available. --- means none.

1/ China's trade as reported by trading partners; excludes trade with non-reporting countries. Source: (7, 10). For information on PRC-U.S. agricultural trade in fiscal year 1973, see Foreign Agricultural Trade of the United States, Sept. 1973, U.S. Dept. of Agr., Econ. Res. Serv.

2/ 1,000 head.

3/ 1966-69 average.

4/ Includes citrus, bananas, apples, and pears.

5/ Largely bananas.

6/ Includes soybean oil, cottonseed oil, peanut oil, sunflowerseed oil, rape and mustard oil, palm oil, palm kernel oil, castor oil, and tung oil.

Great differences also are revealed when per capita trade comparisons are made. Total trade per capita is \$4.82 to \$5.65 in China, compared with \$90 in the United States. Per capita agricultural trade in China is \$2 to \$2.50, compared with \$57 in the United States. Agricultural exports in China range from \$1.29 to \$1.52 per person, compared with \$32 in the United States. Agricultural imports in China range from 82 to 97 cents per person, compared with \$24 in the United States.

Table 12 shows that in quantity terms, the United States exceeds China in exports of sheep and goats, meat, grain, potatoes, fruit, tobacco, oilseed cake and meal, soybeans, and cottonseed oil. China exports more cattle, eggs, sugar, tea, castor beans, rape and mustard seed oil, tung oil, silk fiber, and wool than the United States.

After a lapse of more than 20 years, trade between the United States and the People's Republic of China resumed in 1971. ^{12/} In 1972, agricultural commodities accounted for virtually all U.S. exports to China and for half of our imports from that country. ^{13/} Highlights of U.S.-Chinese agricultural trade in 1972 are given in table 13.

^{12/} For a description of previous Sino-American agricultural trading patterns see (11).

^{13/} In calendar year 1972, agricultural and nonagricultural U.S. exports to the People's Republic of China were valued at \$60.2 million; agricultural and nonagricultural U.S. imports from the People's Republic of China were valued at \$32.3 million (33).

Table 13--U.S. agricultural trade with the People's Republic of China, 1972

Item	Quantity	Value
		Million U.S. dollars
U.S. exports to the People's Republic of:		
China:		
Total.....	--	58.2
Wheat (mil. bu.).....	19.4	33.0
Corn (mil. bu.).....	14.3	23.0
Soybean oil (mil. lbs.).....	22.0	2.2
U.S. imports from the People's Republic		
of China:		
Total.....	--	16.4
Hog bristles (mil. lbs.).....	1.2	6.7
Raw silk (mil. lbs.).....	.3	2.4
Cassia spice (mil. lbs.).....	2.6	1.3
Fruits, nuts, and vegetables,		
prepared and preserved (mil. lbs.)..	2.7	1.0
Other.....		5.0

-- Means not applicable. Source: (24).

AGRICULTURAL GROWTH RATES

During 1952-71, Chinese agriculture grew at an average annual rate of roughly 2 percent (23, p. 8). U.S. agricultural growth was about the same--1.86 percent (27, p. 537). But the U.S. growth rate was achieved in the face of subsidy policies that discouraged production of many major commodities, while in China there was a determined policy--particularly since 1961--of increasing agricultural production.

DIET

Average daily caloric intake per person is estimated at 3,140 calories in the United States, versus 2,050 calories in China (table 14). ^{14/} The average U.S. consumer obtains about 23 percent of his total daily calories from cereals, potatoes, and other starchy goods. In contrast, starches account for 78 percent of the daily caloric intake of the average Chinese consumer. The American obtains only 19 percent of daily protein from starches, while the Chinese obtains 62 percent.

The average American obtains 35 percent of his calories from meat, eggs, fish, and milk; the Chinese obtains 8 percent. Livestock products thus account for 71 percent of protein intake in the United States, but for only 14 percent in China.

Rationing was initiated in China in 1953. Cereals, cooking oil, and cotton cloth are rationed, and the Government regulates the consumption of many other goods as well (37, p. 180). The rationing system takes into account energy requirements of different workers, and the largest ration is provided to people performing the most strenuous activities. In 1970, for example, one source reported that the rice ration varied from 30 to 45 pounds per month (37, p. 178). Descriptions of life in Peking in 1971 stated that rations were more than adequate and that foods not under rationing were abundant (37, p. 408). Each person, or head of household, is given a ration card. Restrictions on its use not only limit the holder's food and cloth supplies, but also help inhibit migration to urban areas.

^{14/} Food balances constructed by the Food and Agriculture Organization (FAO) of the United Nations on U.S. food consumption during 1963-65 and on consumption in China during 1964-66 provide the basis for the rough comparisons in this section (6, pp. 435-462). Another source estimates that 1970 average daily intake in China was 2,150 calories (33, p. 178).

Table 14--Per capita daily diets in the United States and the People's Republic of China

Item	United States <u>1/</u>	China <u>2/</u>	United States <u>1/</u>	China <u>2/</u>
	<u>Calories</u>		<u>Protein grams</u>	
Cereals.....	152	1,383	15.4	32.3
Potatoes and other staple starchfoods.....	97	224	2.2	3.1
Sugar and sweets.....	505	39	0.1	---
Pulses, nuts, and seeds.....	103	134	4.4	11.7
Vegetables.....	72	33	3.6	2.1
Fruits.....	99	6	1.1	0.1
Meats.....	598	134	34.1	5.3
Eggs.....	72	12	5.5	0.9
Fish.....	26	12	3.3	1.4
Milk.....	400	5	23.5	0.3
Fats and oils, by fat content...	520	65	0.1	---
Total.....	3,140	2,050	93.3	57.2

--- means none.

1/ Data are for 1963-65.

2/ Data are for 1964-66.

Source: (6, pp. 435-462).

REFERENCES

1. American Institute of Crop Ecology
1967. Ecological Crop Geography of China and the Agroclimatic Analogues in North America, Study No. 7, Washington, D.C., pp. 10, 13.
2. Central Intelligence Agency
1971. People's Republic of China Atlas. Nov.
3. _____
1972. People's Republic of China: International Trade Handbook. Dec.
4. Chia Ch'i-yun, Director of State Statistical Bureau
1959. "Superiority of People's Communes Analyzed," New China News Agency, Peking, Sept. 25; in Survey of China Mainland Press, No. 2,107, Oct. 1, 1959, pp. 34-36.
5. Donnithorne, Audrey
1967. China's Economic System. New York.
6. Food and Agriculture Organization of the United Nations
1972. Production Yearbook, 1971. Rome, Italy.
7. _____
1972. Trade Yearbook, 1971. Rome, Italy.
8. _____
1966-70. Monthly Bulletin of Agricultural Economics and Statistics. Various monthly issues. Rome, Italy.
9. International Monetary Fund
1972. International Financial Statistics, 1972 Supplement. Washington, D.C., p. 33.
10. International Sugar Organization
1972. Sugar Year Book 1971. Aug. London.
11. Kirby, Riley H.
1972. Agricultural Trade of the People's Republic of China, 1935-69. U.S. Dept. of Agr., Econ. Res. Serv., Foreign Agr. Econ. Rpt. 83, Aug.
12. Kuo, Leslie T.C.
1972. The Technical Transformation of Agriculture in Communist China. Washington, D.C., p. 198.
13. Li Hung
1973. "Supplies Can Be Insured Only When the Economy Is Developed," Jen min jih pao (People's Daily), Jan. 24, 1973.

14. Liu Kuo
1964. "74,000 People's Communes in China," Ta kung pao (Impartial Daily). Hong Kong, Sept. 17; translated in Survey of China Mainland Press, No. 3,307, Sept. 29, pp. 14-19.
15. Lo Keng-mo
1961. "The Nature of Rural People's Communes at Present," Kung jen jih pao (Worker's Daily), July 19, p. 3.
16. New China News Agency
1957. "China's APC's Achieved Great Results in Past Six Months," Peking, July 4; translated in Survey of China Mainland Press, No. 1, 573, July 19, 1957, pp. 23-25.
17. _____
1973. "Growth of Commune Clinic Shows Emphasis on Rural Health," Peking, June 25.
18. Ma Yin-ch'v
1957. "Grain Production and Peasants' Livelihood in China," Jen min jih pao (People's Daily), June 15.
19. Orleans, Leo H.
1969. "Propheteering: The Population of Communist China," Current Scene, Vol. VII, No. 24, Hong Kong, December 15, pp. 13-19.
20. State Statistical Bureau
1956. Handbook of Agricultural Statistical Work, Peking, p. 36.
21. _____
1957. Statistical Data on Agricultural Cooperativization and the Distribution of Income in Agricultural Producers' Cooperatives in 1955. Peking, pp. 9-11.
22. _____
1960. The Ten Great Years--Statistics on Economic and Cultural Achievements in the People's Republic of China. Peking, pp. 36, 43, 134.
23. U.S. Congress, Joint Economic Committee
1972. People's Republic of China: An Economic Assessment. 92nd Congress, Second Session, May.
24. U.S. Department of Agriculture
1973. Economic Research Service, Foreign Demand and Competition Division, Statistics Branch.
25. _____
1973. Foreign Agricultural Service, Fats and Oils Division, Estimate.
26. _____
1972. Agricultural Data Book For the People's Republic of China (Unpublished Draft). Econ. Res. Serv., Foreign Demand and Competition Div.

27.
1972. Agricultural Statistics: 1972.
28.
1972. Factbook of U.S. Agriculture. Mar., pp. 14-23.
29. U.S. Department of Commerce
1973. Population Estimates and Projections. Series P-25, No. 496, Feb.
30.
1972. Estimates and Projections of the Populations of the Communist Countries and the NATO Countries, Selected Years: 1938-1985. Foreign Demographic Analysis Div., Bureau of Economic Analysis, Social and Economic Statistics Admin., May.
31.
1973. Population Estimates and Projections. Series P-25, No. 507. Oct.
32.
1972. Statistical Abstract of the United States, 1972. Bureau of the Census. Table 512, p. 315.
33.
1972. U.S. Foreign Trade: Highlights of Exports and Imports. Tables E-3 and I-4. Dec.
34.
1971. 1970 Census of Population: Number of Inhabitants, U.S. Summary. Bureau of the Census. Dec.
35. U.S. Department of State
1972. Issues, No. 4, People's Republic of China, Publication 8,606, East Asian and Pacific Series 206, p. 5. Oct.
36. Walker, Kenneth R.
1968. Planning in Chinese Agriculture: Socialization and the Private Sector, 1956-62, pp. 40-41. Chicago.
37. Whitaker, Donald P., and Shinn, Rinn-sup
1971. Area Handbook for the People's Republic of China, DA Pam 550-66. Oct.

SELECTED BIBLIOGRAPHY

The following selected list of books and periodicals, published in English, may be of interest to readers seeking detailed information on Chinese agriculture.

Books

- Buck, John L.
1930. Chinese Farm Economy,
Chicago.
- Buck, John L., Dawson, Owen L., and Wu Yuan-li
1966. Food and Agriculture in Communist China.
New York.
- Chao, Kuo-Chün
1960. Agrarian Policy of the Chinese Communist Party, 1951-1959.
New Delhi.
- Dawson, Owen L.
1970. Communist China's Agriculture.
Praeger Publishers. New York.
- Donnithorne, Audrey
1967. China's Economic System.
Frederick A. Praeger Press. New York.
- Chao, Kang
1970. Agricultural Production in Communist China, 1949-1965.
University of Wisconsin Press, Madison, Wis.
- Kuo, Leslie T. C.
1972. The Technical Transformation of Chinese Agriculture.
Praeger Publishers. New York.
- Perkins, Dwight H.
1966. Market Control and Planning in Communist China.
Harvard University Press, Cambridge, Mass.
- Shen, T. H.
1951. Agricultural Resources of China.
Ithaca, New York.
- U.S. Central Intelligence Agency
1971. People's Republic of China: Atlas.
U.S. Government Printing Office, Washington, D.C. Nov.
1972. People's Republic of China: International Trade Handbook.
A72-38, Dec.
- U.S. Congress, Joint Economic Committee, 90th Congress, First Session
1967. An Economic Profile of Mainland China, Marion R. Larsen,
"China's Agriculture Under Communism." Feb.
- U.S. Congress, Joint Economic Committee, 92nd Congress, Second Session
1972. People's Republic of China: An Economic Assessment. May.

Periodicals

Agricultural Situation in Communist Areas.

Published each spring by the U.S. Department of Agriculture.
Economic Research Service.

China Quarterly.

Published by the Contemporary China Institute of the School of
Oriental and African Studies, London University. Research
Publications Ltd., Victoria Hall, East Greenwich, London,
SE 10 ORF.

Far Eastern Economic Review.

Published weekly.
P.O. Box 160. Hong Kong, China..

Farm Index.

Published monthly by U.S. Department of Agriculture.
Economic Research Service.

Foreign Agriculture.

Published weekly by U.S. Department of Agriculture.
Foreign Agricultural Service.

Foreign Agriculture Circular.

U.S. Department of Agriculture, Foreign Agricultural Service.

Survey of China Mainland Press.

Published five times a week by the U.S. Consulate General.
Hong Kong.

Daily Report: People's Republic of China.

Published Monday through Friday, U.S. Department of Commerce,
Technical Information Service.

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