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LAND REFORM AND LAND RECLAMATION IN JAPAN*

GLENN T. TREWARTHA

LAND reform and land reclamation are important elements in the general plan of the Allied Occupation in Japan for creating a more democratic and, if possible, a more economically sound national structure. Reform of the land system has been aimed primarily at the stabilization of agriculture and the removal thereby of one of the specific underlying causes of war. It was hoped by many and believed by some that land reform would also increase agricultural output. The land-reclamation program, on the other hand, was largely inspired by economic considerations and has as its goal improvement in the land situation; only incidentally is it associated with the general reform phase of the Occupation.

Agriculture has been in the past, and will probably continue to be, the backbone of the Japanese national economy. The phenomenal expansion in industry and trade between the two World Wars did not change the ranking position of agriculture. It normally employs 40–45 per cent of the population and supplies 80–85 per cent of the country's food requirements; before World War II it represented nearly half of the nation's invested capital, and it is the only part of the Japanese economy that has survived the war in a relatively good position. If Japanese agriculture were as prosperous and healthy as it is important to the economy, it would be in a flourishing state indeed; however, even in normal times rural Japan presented a picture of frugality, impoverishment, economic distress, and social unrest.

Historical Background of the Land-Tenure System[1]

Too little tillable land and too many people has been the cause of most of the woes that have beset agriculture in Japan, including the land-tenure system that has prevailed for nearly three-quarters of a century.

* Acknowledgment is made of the assistance rendered by the Natural Resources Section, General Headquarters, Supreme Commander for the Allied Powers, Tokyo, in collecting many of the materials contained in this paper. Valuable suggestions and criticisms were also offered while the paper was in the preliminary stage.

[1] In the sections on the land-reform program free use has been made of Laurence I. Hewes, Jr.: On the Current Readjustment in Japanese Land Tenure, GHQ, SCAP, January 14, 1949. Later published in *Land Economics*, Vol. 25, 1949, pp. 246–259. Mr. Hewes has also made a more comprehensive report on the subject: "Japanese Land Reform Program," *Natural Resources Section Rept. No. 127*, GHQ, SCAP, Tokyo, March 15, 1950.

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Throughout its history Japan has been a land of individual landholdings —small plots of "garden" dimensions cultivated by single families. During the long feudal period before 1868, although the economic condition of the peasant was often wretched, he nevertheless enjoyed a certain security of tenure. The Meiji Restoration in 1868 freed the peasants from their serfdom, but the degree of security afforded by the feudal system was destroyed by the introduction of individual landownership and legal alienation through sale. At the beginning of the Meiji period most of the peasants were nominally freeholders. However, as a result of the emancipation of the land from feudalism and the introduction of a money economy, the number of tenants increased rapidly, and by 1892 nearly 40 per cent of the agricultural land was operated by tenants who had formerly been landowners.[2] The rents paid by tenants were so exorbitant that many new landowners preferred to derive their incomes as absentee proprietors of tenanted land rather than undertake personal management. Thus an exploitive system of tenancy became securely fastened upon the country.

The terms of the tenant-proprietor contract were notoriously harsh. The shortage of agricultural land and the dearth of alternative occupations resulted in a lack of bargaining power on the tenant's part, so that he was obliged to submit to extortionate rental rates and other oppressive conditions. The terms of the lease rested on a generally vague and usually oral agreement. Riceland rents were almost universally paid in kind and as a rule amounted to 50 or 60 per cent of the crop; it was not unusual for the tenant to receive only 30 per cent as his net share. On other types of land rents were more commonly paid in cash. The only responsibilities assumed by the proprietor were to supply the land and pay the land tax. The tenant took all the risks and paid most of the expenses, including some of the taxes; he furnished the house and other farm buildings, implements, seed, and so on. The rental was a fixed charge based on yields in good years. In poor years the tenant was in desperate straits, and the landlord frequently became a creditor demanding usurious rates of interest. According to official sources, the average rate of interest on farm loans in 1932 was nominally 12 per cent, but actually it was much higher, probably between 20 and 30 per cent. The situation was most serious with tenants who rented from landlords with estates of only 5 to 10 acres; too often it was necessary to support both landlord and tenant on an impossibly small acreage. During the 1920's and the early 1930's the tenant's plight was aggravated by frequent collapse in rice prices, and in some years many farmers were obliged to sell rice and

[2] E. H. Norman: Japan's Emergence as a Modern State (Institute of Pacific Relations Inquiry Ser.), New York, 1940, p. 147.

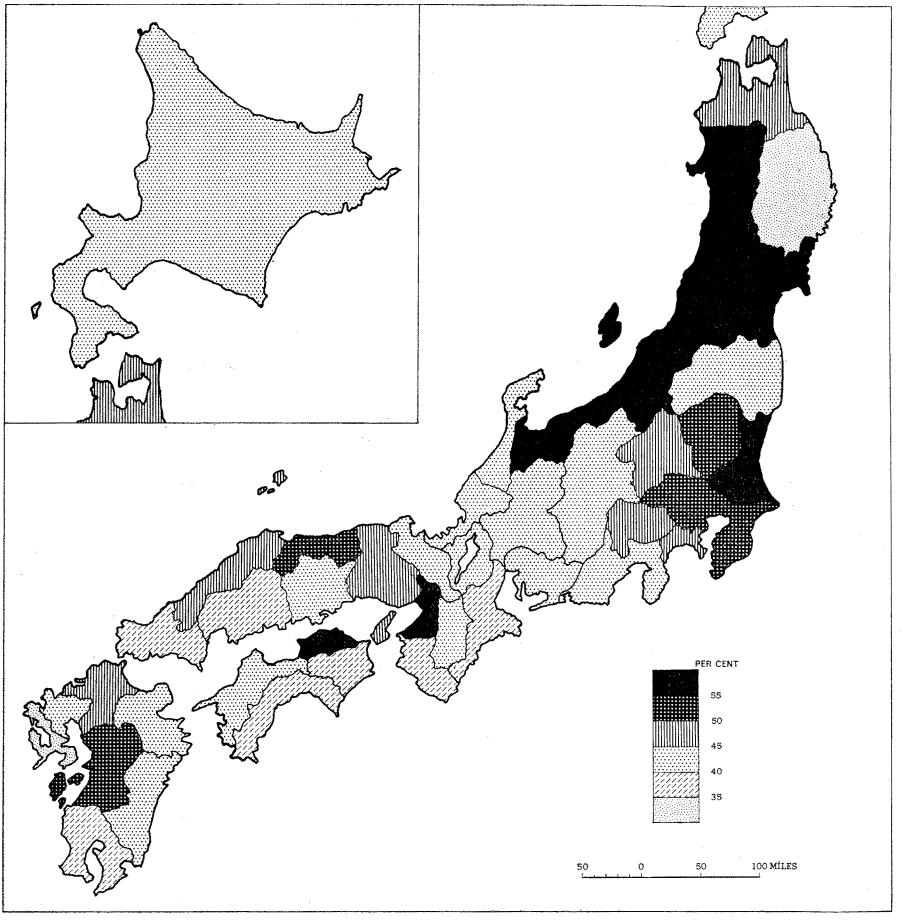

FIG. 1—Percentage of cultivated land operated by tenants, by prefectures, 1944. Source of data, "Farm Tenancy in Japan," *Natural Resources Section Rept. No. 79,* GHQ, SCAP, Tokyo, 1947.

other crops below cost. This worsening of the tenants' situation is reflected in the greatly increased number of landlord-tenant disputes—from 408 in 1920 to 5512 in 1935.[3]

By the 1920's the condition of the several million tenant farm families was so serious that the national government was spurred to attempt remedial measures, but these accomplished little. During the 1930's, when a political-minded military group was gaining control of the Japanese government, military and agrarian interests drew closer together. Many of the younger army officers were from rural areas and had personal knowledge of the tenants' distress. Possibly the farm group felt that the acquisition of new

[3] W. Ladejinsky: Farm Tenancy and Japanese Agriculture, *Foreign Agriculture,* Vol. 1, 1937, pp. 425–446; reference on p. 438.

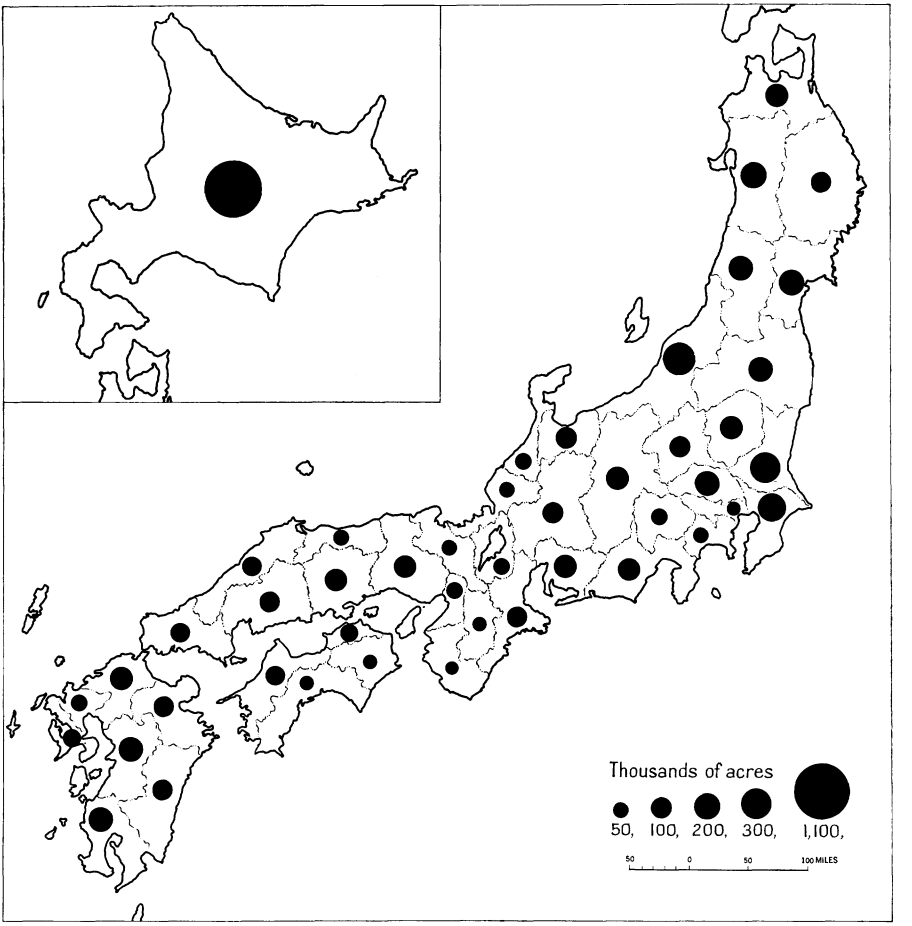

FIG. 2—Cultivated land operated by tenants, by prefectures, 1939. Source of data, *Norinsho Tokeihyo* [*Statistical Yearbook of the Ministry of Agriculture and Forestry*], Tokyo, 1939.

lands abroad resulting from the projected conquest of East Asia would ease the agricultural situation at home. Or there may have been a deliberate attempt on the part of the military to exploit the agrarian discontent. In any case, the poverty and distress of the rural areas, in part associated with the evils of the tenancy system, were at least indirectly responsible for the success of the Japanese war party. It was only natural, then, that reform of the land-tenure system should become one of the primary objectives of the Allied Occupation.

DISTRIBUTION OF FARM TENANCY

The distribution of farm tenancy is shown in Figures 1 to 3. In the immediate prewar period and during the war the proportion of the agri-

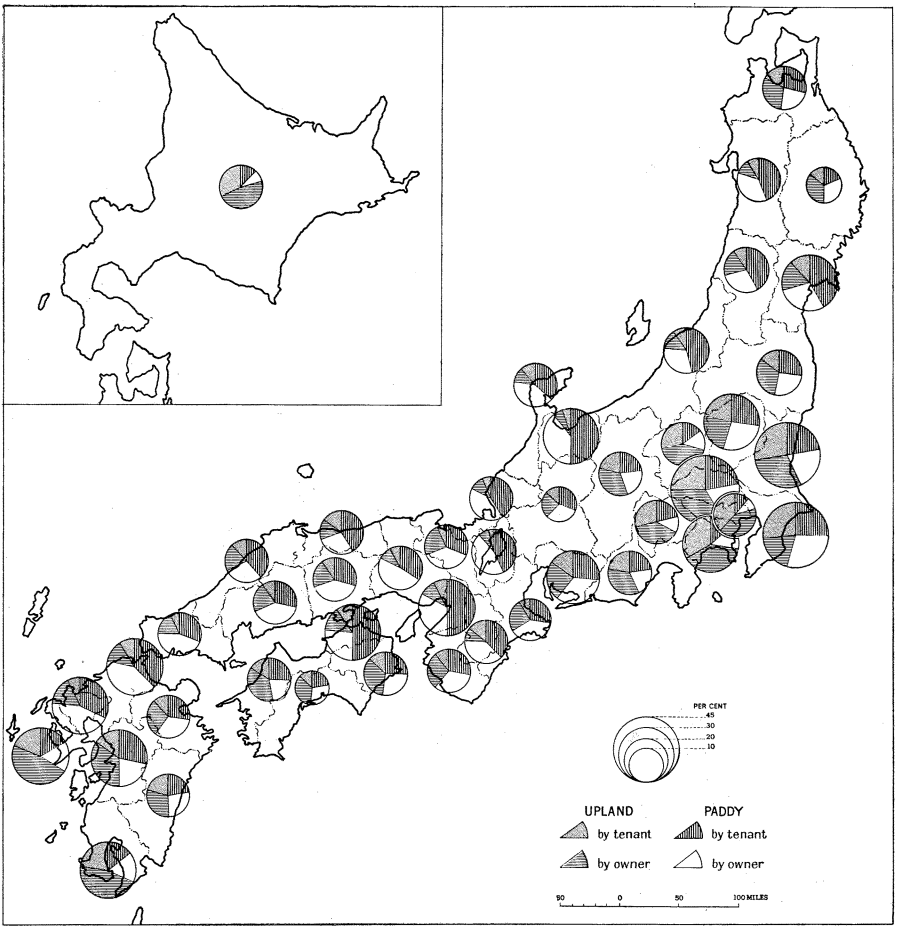

FIG. 3—Cultivated land as a percentage of total area, by prefectures. The percentage of upland and paddy land operated by tenants and by owners is also shown. Source of data, *Norinsho Tokeihyo,* 1939.

cultural land operated by tenants was about 47 per cent, ranging (1944) from 33+ per cent in Nagasaki prefecture in western Kyushu to almost 60 per cent in Miyagi prefecture in northern Honshu. Understandably, tenancy is concentrated on the highly cherished paddy lands (Fig. 3); tenancy on paddy lands and uplands is in the ratio of about 7 to 5. Patterns of distribution, however, are not well defined. Higher than average tenancy seems to be characteristic of most of the prefectures in which the proportion of paddy land is high (Fig. 3). This is clearly observable in a cluster of contiguous prefectures fronting on the Japan Sea in western north Honshu. Here the poorly drained plains are highly specialized in rice culture. The largest number of prefectures with lower than average tenancy are in southwestern Japan, but it is to be noted that in this same general region there are other

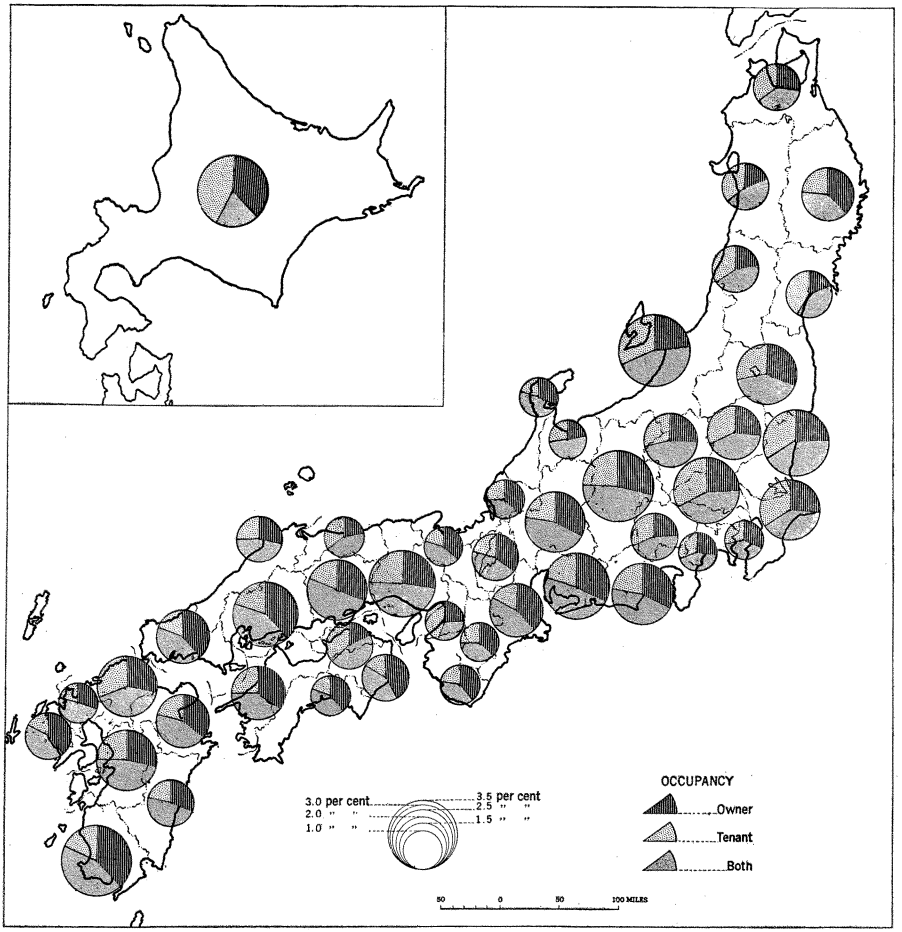

FIG. 4—Percentage of farm households and status of occupancy, by prefectures, 1939. Source of data, *Norinsho Tokeihyo*, 1939.

prefectures with very high percentages—Osaka and Kagawa with more than 55 per cent, for example.

Figure 4 attempts to show the distribution of tenancy in terms of farm households. In 1939 only about 32 per cent of the farm households owned their land; 40 per cent were part owners–part tenants; 28 per cent were wholly tenants. In Hokkaido the part owner–part tenant group is unusually small. In this region of later settlement and larger farms there has been less need for increasing the area of land worked, by renting additional plots. Throughout the rest of Japan it is the proportion of complete owners or of complete tenants that varies most. Owners are proportionally lower than average, and tenants higher, in all the prefectures of Tohoku (northern Honshu) except Iwate. The discrepancy is greatest in the prefectures with a

high proportion of riceland, such as Akita, Yamagata, and Niigata in the west and Miyagi in the east. The proportion of owner families appears lower than average also in the general Kanto area and in Osaka, Kagawa, and Tottori prefectures in southwestern Japan.

The Land-Reform Program

A necessary part of the Occupation's agrarian program has been a drastic reduction in the amount of farmland controlled by absentee landowners and a parallel increase in the amount of owner-operated land. This has required the transfer of large amounts of privately owned land to tenant-farmers at prices they could pay. Effective control of the landlord-tenant relationship in any remaining tenant-operated land and safeguards to prevent a reversion to tenancy of newly purchased owner-operated land were additional aspects of the Occupation's land-reform policy.

The Land-Reform Law

The details of the program were worked out by the Japanese, and the required legislation was passed by the Japanese Diet in 1946. The more important provisions of this legislation may be summarized as follows:[4]

1. *With reference to land purchase.* "The government is authorized to purchase the following land:

"(a) All 'tenant-farmer' land [i.e. land cultivated by a tenant] whose owners do not reside in the city, town or village in which the land is situated.

"(b) All 'tenant-farmer' land in excess of 1 cho [2.45 acres] (4 cho in Hokkaido) owned by residents of the city, town or village in which the land is situated. . . .

"(c) All 'owner-farmer' land [i.e. land cultivated by an owner] owned by cultivators in excess of 3 cho (12 cho in Hokkaido) unless it can be proved that the owner has sufficient family labor to cultivate efficiently a greater area or unless subdivision of the larger area would result in decreased production. In addition the government may purchase (1) agricultural lands owned by juridical persons whose agricultural land is not required for its principal purpose, (2) agricultural land not in use or which is being mis-used or ineffectively used, (3) non-agricultural lands adjacent to agricultural lands whose use is essential to operations on the agricultural land. In addition to agricultural land, purchase authority extends to water rights, trees, buildings, and equipment."

The purchase price of land, established by law, is subject to variation within legal limits at the discretion of the land commission. The sale price is paid in the form of 24-year annuity bonds bearing an interest rate of 3.65 per cent.

2. *With reference to land sale.* The government is authorized to sell land to eligible persons selected by elected land commissions in villages, towns, and cities. The tenant who

[4] Based mainly on Hewes, On the Current Readjustment in Japanese Land Tenure (see footnote 1, above), pp. 14–16 (*Land Economics*, pp. 252–253).

has been the established cultivator as of November 23, 1945, on a specific tract has first priority in the acquisition of that tract. The sale price to the purchaser is usually the same as the price paid by the government to the original owner. The purchaser may pay either in cash or in installments over a 24-year period at 3.2 per cent interest. Liens and encumbrances may not be created against lands purchased from the government.

3. *Other regulations on land transactions.* Rental ceilings have been established at 25 per cent for paddy fields and 15 per cent for upland fields.[5] All leases must henceforth be in writing. No transaction involving agricultural land shall be undertaken without the prior approval of the government land commissions.

Accomplishments of the Land-Reform Program

In 1945, at the end of the Pacific war, 54.2 per cent of the farmland was tilled by owners, who represented 32 per cent of the nation's 5½ million farm households, and 45.8 per cent[6] was tilled by tenants or part tenants, who represented respectively 28.2 and 39.8 per cent of these households.[7] About 7.5 per cent of the landowners owned 50 per cent of the land, whereas 50 per cent of the landowners owned only 9 per cent of the land. By the middle of 1949 the transfer phases of the land-reform program were practically completed (Table I). Nearly 4,600,000 acres of land had been purchased by the government, and 4,460,000 acres of it had been resold to owner-farmers. More than 27 million tracts of land have been transferred—more than one-third of all the agricultural land of Japan. A minimum of 2.7 million new owners possess agricultural land. Tenancy has not been entirely abolished, but it is estimated that "tenant-farmer" land retained by resident landlords will amount to only about 13 per cent of the total cultivated area, a reduction of 34 per cent. Absentee landlordism has been completely eliminated, and the proportion of resident cultivator-owners has been considerably increased (Table II). These changes greatly affect the distribution of income from more than two million farms. In terms of paddy land alone, about 55 million bushels of rice that formerly went to landlords is now retained by the new owners. There has been a large increase in the owner-farmer families and a corresponding decrease in the tenant and part-tenant families.

Figure 5 shows graphically the results of the land-reform program as late as October 2, 1948, when purchase was nearly 90 per cent complete. In only two prefectures, Ibaraki (in the Kanto area) and Osaka, did the gov-

[5] At the present time, under a separate order, they are set at a considerably lower rate.

[6] Includes all land under tenant operation whether cultivated by tenant or by part owner.

[7] From "Farm Tenancy in Japan," *Natural Resources Section Rept. No. 79,* GHQ, SCAP, Tokyo, 1947, p. 50.

ernment's land purchase amount to more than 35 per cent of the total agricultural area. In general, the proportions of land purchased are somewhat higher in the prefectures of central and northern Japan than in those of the southwest, but there are exceptions. As might be expected from the national ratio, in a majority of the prefectures purchases of paddy land exceeded

TABLE I—PROGRESS OF LAND TRANSFERS AS OF JULY 2, 1949*

In thousands of acres

STATUS	CULTIVATED LAND	PASTURE LAND	RECLAMATION LAND	TOTAL
Acquired by purchase or transfer	4,595	591	2,775	7,961
Sold	4,462	419	316	5,197
Awaiting disposal	133	172	2,459	2,764
To be purchased (estimated)	Negl.	100	2,450	3,050
To be acquired by transfer (estimated)	Negl.	500		
Percentage completed of total government monetary obligations to landlords for land bought	77.3	5.2	38.8	75.7
Percentage completed of total tenant monetary obligations to government for land sold	84.0	22.0	46.4	83.8
Percentage of purchased area registered[a]	12.4	2.6	ND[b]	ND
Percentage of sold area registered	3.3	0.2	ND	ND

*Source: Ministry of Agriculture and Forestry.

[a]Data are as of September 1, 1949, and cover 39 prefectures only. Source: Eighth Army, Civil Affairs Section.

[b]No data.

TABLE II—ESTIMATED CHANGES IN DISTRIBUTION OF OWNERS AND CULTIVATORS BY CLASSES*

In percentages

OWNERS	AUG. 1, 1947	DEC. 31, 1948	NET CHANGE	CULTIVATORS	AUG. 1, 1947	DEC. 31, 1948	NET CHANGE
Absentee	11.2	0.0	−11.2	Owner-farmer	36.5	70.0	+33.5
Resident noncultivator	3.3	2.97	− 0.33	Part owner	20.0	22.5	+ 2.5
				Part tenant	16.8	2.0	−14.8
Resident cultivator	85.5	97.03	+11.53	Tenant	26.7	5.5	−21.2
Total	100.0	100.0		Total	100.0	100.0	

*Source: Hewes, On the Current Readjustment in Japanese Land Tenure (see footnote 1, above), pp. 22 and 24 (*Land Economics*, pp. 256 and 257).

those of uplands. It is chiefly in Hokkaido, the Kanto area, and southern Kyushu that the proportions of upland purchased are as high as, or higher than, those of paddy land.

It is still too early to make any comprehensive appraisal of the effects of the land-reform program on agricultural productivity in general. Pride of ownership may well lead to better husbandry, and this in turn to increased quantity and improved quality of output. Opponents of the program have warned of the danger of diminished production associated with a shift in landownership and have cited the example of Puerto Rico. In

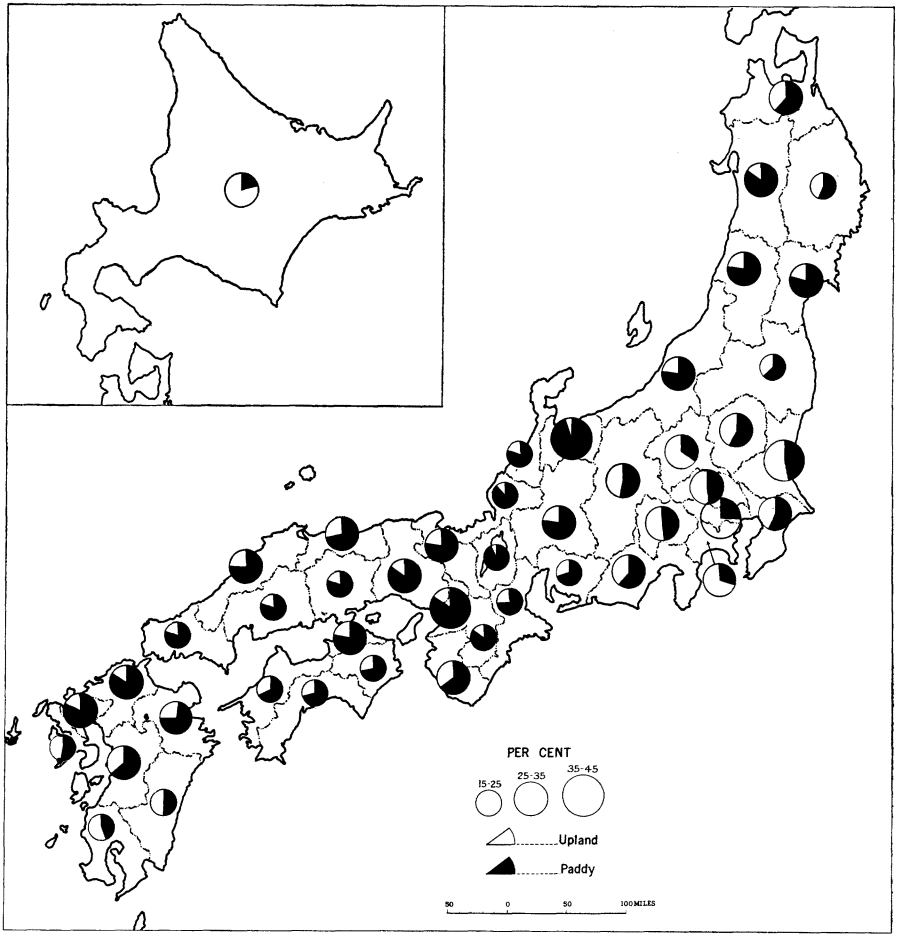

FIG. 5—Percentage of cultivated land purchased by the government to October, 1948. Compiled from (1) data on land purchases provided by Natural Resources Section, SCAP, and (2) data in "Civil Affairs Handbook on Japan," Section 7A, Agriculture, *Army Services Forces Manual M354–7A*, 1945.

Japan, however, change in ownership has not involved any important change in management; the individual operator, either owner or tenant, has always provided the management ability, and the landlord has contributed little or nothing. Moreover, it should be borne in mind that the land-reform program was not conceived primarily with a view to increased production and has involved no addition to the cultivated area. This problem is related to the second of the major elements in the Occupation's general plan, namely land reclamation.

RECLAMATION IN THE PREWAR YEARS

The basic problem of too little land and too many people has faced Japan for centuries, and the possibilities of reclaiming additional lands for

agriculture have been considered by many generations. However, under Allied influence, there has been a marked reactivation of government thinking on these matters.

Between 1877 and 1939 some 1,578,000 hectares[8] of land was reclaimed and added to the agricultural area—an increase of about 35 per cent. That increase in cultivated area did not keep pace with population growth is indicated by the figures for the amount of cultivated land per capita: 0.13 hectare in 1877 and 0.083 hectare in 1939. It is significant also that three-quarters of the total area reclaimed in the 62-year period was brought under cultivation during the first 33 years. The marked slowing up of reclamation during the three decades before 1939, in spite of increased government activity, more liberal subsidies, and accelerated population growth, may be explained by the fact that the most readily reclaimable land was already in use by 1910. From 1910 to 1939 the average annual reclamation of land was only 12,000 hectares, and in not a few years the area of tilled land lost to other uses was greater than the area reclaimed. Official statistics show a net loss of 167,000 hectares between 1920 and 1930, and in 1942 the area of agricultural land was 368,000 hectares less than in 1930. Even in 1946, when the effects of the war demands for increased food and raw materials should have been evident, the area of agricultural land was 300,000 hectares less than in 1920. These figures are not wholly reliable, and since underreporting was characteristic of later years, it is believed that a part of the decrease in cultivated area is a paper decrease. The fact remains, however, that since 1934, Japan's cultivated area has increased very little, if at all. The large acquisitions for military uses resulted in a decrease of about 200,000 hectares between 1937 and 1945. Reclamation was unable to keep up with the demands for land for new homes, factories, and transport systems. This would seem to indicate that a ceiling has been reached in the expansion of the arable area under the present Japanese agricultural system.

Postwar Reclamation Plans

The necessity of feeding a population augmented since the surrender by more than nine million has caused the Japanese government, under Allied pressure, to take a fresh look at the possibilities for increasing the area of agricultural land. The first of several ambitious government reclamation programs, covering the five-year period April 1, 1945, to March 31, 1950, had as its goal the reclaiming of 1,532,000 hectares. Several modifications

[8] One hectare equals 2.471 acres. It is therefore practically the equivalent of the Japanese cho (2.45 acres).

and revisions of this plan have been proposed by the Japanese Land Development Bureau and noted in SCAP publications. The reportedly latest revision, made in November, 1947, outlines a 10-year program for the reclamation of 1,537,135 hectares (3,798,261 acres) of uncultivated land, including the land already reclaimed under the Occupation up to that time. If there should be no loss of present cultivated land, fulfillment of the 10-year program would increase the total cultivated area of Japan to 7,200,000 hectares (17,784,000 acres) by 1957, or by about one-fifth.

TABLE III—TEN-YEAR DEVELOPMENT PROGRAM OF THE JAPANESE GOVERNMENT*

TYPE OF LAND DEVELOPMENT	HECTARES	ACRES
Extension of cultivated area		
Change of forest or grassland to irrigated fields	42,643	105,371
Change of swamp or shallow water to irrigated fields	49,585	122,525
Change of forest or grassland to dry fields	1,444,907	3,570,365
Subtotal: New land	1,537,135	3,798,261
Improvement of present cultivated area[a]		
Irrigation improvements	1,280,000	3,162,880
Drainage improvements	1,320,000	3,261,720
Soil dressing	620,000	1,532,020
Consolidation of small holdings	470,000	1,161,370

*Estimated by Land Development Bureau, Ministry of Agriculture and Forestry, November, 1947.
[a]Nonadditive owing to duplication of practices.

It will be noted that the total area to be reclaimed under this newest program is only a little larger than that in the original five-year program, and most of the other features are similar. An overwhelming proportion of the reclaimable land has at present a cover of forest, scrub, or grass (Table III). Seventy-five per cent is forested land, but as this represents only 5 per cent of the present total forested area, the reclamation program should have no important effect on the supply of forest products. Only slightly more than 3 per cent is swamp or shallow water. Of the land to be reclaimed, about 35 per cent is judged to be in Hokkaido; the remainder is divided among the other three islands, the largest amount in the somewhat backward Tohoku region of northern Honshu. Significantly, only 6 per cent of the new agricultural land will be usable for irrigated rice fields; the remaining 94 per cent is upland and therefore suitable for nonirrigated crops only. In its initial stages this new land will be generally of lower quality than that already under cultivation. Even after several years of careful husbandry and adequate applications of fertilizer, its productivity will probably be lower than the average productivity of the present upland cropland. Moreover, a large part of the land to be reclaimed lies in the higher latitudes, where unfavorable climatic conditions limit agricultural output.

Individual reclaimable tracts range in size from less than a hectare to several thousand hectares. The smaller plots are usually interspersed with areas already farmed and at present are used for wood lots, composting, or windbreaks.

In April, 1948, the Planning Department of the Land Development Bureau issued a document containing estimates of the reclaimable lands of Japan based on surveys carried out between August, 1947, and March, 1948.[9] It should be made clear that these figures do not form the basis for any present program or plan but rather represent a kind of "ultima Thule" of reclamation possibilities. The estimates are based on natural conditions only, and social and economic deterrents are not considered. Lands within the following limits are regarded as reclaimable:

1. Slope. Less than 15° to 20°.

2. Temperature. Average temperature from May to September more than 13° C. (55.4° F.) and more than 13° C. for more than 90 days.

3. Elevation. Within the temperature limits given above.

4. Water supply. Areas in which water can be made available in the future by proper construction works associated with reclamation.

5. Soil. Not to be especially poor.

The government estimate of April, 1948, indicates that a total of 5,012,760 cho is probably available for reclamation in projects of 50 cho or more. Land reclaimable in projects smaller than 50 cho had been estimated in earlier surveys at slightly more than 500,000 cho. The total recoverable land, therefore, as estimated by the Planning Department, would seem to be some 5,500,000 cho, or about 13½ million acres, which is nearly equal to the area under cultivation at the present time. This is by far the most optimistic figure that has ever been offered for the possible expansion of the agricultural area of Japan.

Of the potential agricultural land estimated to be ultimately reclaimable in 14,787 projects of 50 cho or more, 36 per cent is considered to be in Hokkaido and 64 per cent in Old Japan. Again the Tohoku region of northern Honshu is estimated to have the largest amount, some 26 per cent of the total. The reclaimable land is analyzed in terms of terrain character and present use (Table IV), but no definitions are given for the descriptive terms used. We may conclude that nearly 90 per cent of the reclaimable land is upland and nonirrigable, most of it with relatively steep slopes; "plateau" land probably includes areas of diluvial upland and higher upland surfaces in the hill and mountain land.

[9] "Brief Outline of Reclaimable Lands 21 April 1948," Planning Department, Land Development Bureau, Ministry of Agriculture and Forestry. (Typewritten.)

Evaluation of the Reclamation Programs and Estimates

It is the belief of SCAP officials most closely associated with the agricultural work that the Japanese government's reclamation proposals and estimates are highly ambitious and unrealistic.[10] My own field observations lead me to a similar conviction. Certainly this is true if the present system of agriculture, in which the overwhelming emphasis is on the growing of shallow-rooted annuals, especially cereals, is to be continued virtually unchanged. The amount of reclaimable land would be considerably greater if

Table IV—Reclaimable Area Classified as to Character and Present Use*

In cho

Character		*Use*	
Mountain	3,202,710	Forest	3,769,830
Plateau and hilly	1,197,830	Waste and grassland	1,129,940
Low	526,230	Swamp	41,690
Sand dune	16,720	Sand dune	2,030
Lake and sea surface	69,270	Lake and sea surface	69,270
Total	5,012,760	Total	5,012,760

*"Brief Outline of Reclaimable Lands" (*op. cit.*).

certain fundamental changes were made in the agriculture; for example, a greater use of grazing animals, pasturelands, hay and forage crops, and bush and tree crops. Nevertheless, Japan's ability to reclaim 1,500,000 hectares even by 1960 is highly problematical.

It is possible that SCAP's prodding of Japanese government officials in its eagerness to improve the food situation by getting a reclamation program under way is one reason for the formulation of a hastily conceived paper plan. A desire on the part of the Planning Department to please the SCAP officials may also have been a factor. Moreover, the Land Development Bureau (since March, 1949, the Agricultural Land Bureau) is staffed by men not trained in agricultural science, so that their planning programs and estimates have many impracticable features. No accurate information exists concerning the areas and locations of the different types of land suitable for reclamation, and no attempt was made to obtain this information by field surveys before the programs and estimates were prepared. One gathers that the army topographic maps, scale 1 : 50,000, were the principal source of information. Field inspection by SCAP officials has shown the desirability of excluding from the reclamation program certain kinds of lands included in the government's estimates of reclaimable areas, more especially those in high altitudes, and marshes, peat bogs, and lakes.

[10] "Outlook for Japanese Agriculture," *Natural Resources Section Preliminary Study No. 25*, GHQ, SCAP, Tokyo, 1948, p. 6.

Furthermore, in the first years of the program the annual goals were far from being attained. The land actually reclaimed in the fiscal year 1945 was only 55 per cent of the goal set, and reclamation at that time was proceeding on the most readily accessible land, much of it military land that had been out of crop production for only a few years. The greater and vastly more difficult part of the program remains to be carried out, and it seems likely that the future rate of reclamation will be even slower. Between July 1, 1945, and December 31, 1947, about 284,000 hectares were acquired for reclamation, an average rate of more than 9000 hectares a month. An examination of this average reveals a gradual decrease in the monthly rate from an average of 14,000 hectares in the period July 1, 1945, to June 30, 1946, to an average of 6000 hectares in the period July 31 to December 31, 1947. In the latter period the rate of reclamation fell from 11,000 hectares in July to 3000 hectares in December.[11] As of July 1, 1949, a total of only 356,000 hectares had been purchased for reclamation. A recent SCAP publication ventures the opinion that it may be possible to attain 75 per cent of the reclamation goal by 1960. This still seems an optimistic figure. There are certain to be losses of agricultural land resulting both from physical destruction and from diversion to other economic uses, so that the net gain will be materially reduced. In recent years losses due to physical causes alone have amounted to about 22,000 hectares annually. But even if the reclamation program looking to the addition of 1,537,000 hectares to the agricultural area should be completed by 1960, it is estimated that for a population of 92 million there would still be a food deficit of 20–25 per cent.[12] If Japan's population continues to multiply at the rate it did before and after the war, it seems impossible that the country can ever become self-sufficient in food. The realistic question is how far toward self-sufficiency reclamation and agricultural-improvement programs can carry the country and how rapidly these programs can be accomplished.

As a result of field surveys, SCAP officials discovered that the reclamation program was purchasing many lands unsuited to agriculture. Therefore, on September 1, 1948, instructions were issued to the prefectural governors by the Ministry of Agriculture and Forestry, with the approval of the Natural Resources Section of SCAP, to the effect that the target quotas set for land purchase in 1948 should be disregarded. In the future new land can be purchased only after adequate field surveys have shown that it is more suitable for agriculture than for other uses. These surveys are to be con-

[11] *Ibid.*

[12] *Ibid.*

ducted by committees of the *gun*[13] offices, the committees to be composed of local experts with knowledge of agriculture, forestry, and the livestock industries within a restricted political unit.

Land Reclamation and the Food Supply of Japan

It has been suggested previously in this paper that one of the handicaps to any reclamation program in Japan arises out of the nature of present-day Japanese agriculture. The overwhelming importance of paddy rice places a disproportionate value on lowlands, which can easily be flooded, and minimizes the value of upland or dry sites, the only extensive areas capable of being reclaimed for agriculture. Before going to Japan, I had been led to believe that every fragment of level or near-level land was intensively used in the production of crops, particularly food crops, for a dense and rapidly increasing population. Much to my surprise, on my first field excursion across the Kanto Plain, which supports the largest population cluster in Japan, including the metropolises of Tokyo and Yokohama, I observed relatively large upland areas planted in forest or grown up in shrub and wild grasses. I saw the same thing in other parts of Japan. Inquiry as to why such land was not under cultivation received the same general answer, "Because it is unsuited to rice growing."

There is no doubt that the reclamation programs of the Japanese would have a better chance of success if upland sites were more intensively utilized. Less dependence on rice as a staple food and greater use of food crops not requiring irrigation, especially tree and bush crops, and a greater consumption of foods from grazing animals would also make for success. I am not unmindful of the great difficulties involved in changing the centuries-old eating habits and agricultural methods of the Japanese. The stubbornness with which a people resists change is a well-known fact, but in the face of the dilemma confronting Japan even modifying the mores of a nation is worth attempting. A brief statement follows concerning possible modifications or improvements in Japanese agriculture and in the utilization of upland sites.

Consolidation of Small Holdings. A common feature of Japanese agriculture that has an injurious effect on production efficiency is the extreme subdivision of the farm units, their irregular shapes, and the widespread dispersion of the individual plots and fields. The several noncontiguous plots or fields making up a Japanese farm range in size from a few square yards to more than half an acre. Many times these plots are as much as a mile apart,

[13] A political subdivision intermediate between the prefecture and the village.

and not infrequently double that. The Ministry of Agriculture and Forestry estimates that about 470,000 hectares (1,161,370 acres) could be improved by consolidation, with a resulting possible increase in yield of about 4 per cent. However, this improvement probably could not be accomplished in less than 50 years, so that the total effect on food production would be small. Also, the scatteredness of a farm is not entirely disadvantageous; for a certain amount of dispersion spreads the risks against disaster and ensures a more equitable distribution of the best land.

Food and Feed Crops. In the United States it is the general practice to harvest only one crop annually from a field and then allow the soil to remain fallow until the next season's planting. In Japan, on the other hand, numerous fields are made to produce two harvests a year, or occasionally even more. Only in Hokkaido and northern Honshu, and at higher elevations farther south, does climate prevent fall planting. At the present time about a third of the nation's cultivated land bears more than one crop annually; for subtropical Japan the figure obviously is higher. Nevertheless, it seems probable that a considerably larger number of the upland fields could be made to bear a second crop. Of course, one of the major problems would be how to maintain and even increase the fertility of the originally infertile residual upland soils under such intensive cropping. Before the war large amounts of commercial fertilizer had to be imported. But it is much cheaper and requires less labor and ship tonnage to import fertilizers for additional crop acreage than to import the foodstuffs these fertilizers would produce.

If the same careful husbandry now lavished on the paddy lands were applied to upland fields, production would be considerably increased. The common practice in hillside farming of planting row crops of annuals parallel to the slope needs correction. Already the injurious effects of soil erosion are obvious in many upland farming areas. A more careful terracing of fields on the steeper slopes would greatly reduce erosion, but this is an arduous and expensive improvement. Intercropping rows of soil-retaining crops with others is simpler. An expansion of the animal industries would permit a greater use of slopes for tame pasture, hay and forage crops, and plants for green manure—forms of use that reduce slope wash.

Worthy of consideration, also, is the possible expansion of the upland winter-crop area in the paddy lands. The Natural Resources Section of SCAP estimates that some 44 per cent of the paddy area south of about latitude 37° is left unplanted in the fall after the harvest of the single rice crop. A part of this land is in the interior highlands, where the growing

season is too short for winter wheat and barley. Elsewhere lack of sufficient fertilizer has been a deterrent. A more widespread cause, however, is the inability to drain many rice fields adequately. The Ministry of Agriculture and Forestry estimates that within the part of Japan where double cropping is climatically practicable about 700,000 hectares (1,729,700 acres) of wet paddy land could be drained and thus made suitable for fall planting of unirrigated crops. To provide improved drainage facilities has been a part of the general Japanese land-reclamation program that has been accelerated under the Allied Occupation. However, as a result of shortages of materials and a variety of other causes, not much progress has been made, and the problem of draining the paddy lands for winter crops remains one of the important reclamation opportunities for an expansion of the area in food crops.

SCAP officials believe that the introduction of wholly new crops holds little promise as a means of increasing the food supply. More is to be hoped for from the introduction of new varieties with higher productivity or greater resistance to disease and the more widespread use of certain crops giving high per-acre yields. Among the latter is maize or Indian corn, which has found great favor in parts of subtropical and tropical Southeast Asia. In Java, for example, it is second only to rice in importance, and in some of the hilly provinces of Southwest China maize occupies as much as 14 per cent of the cultivated area. In Japan, on the other hand, it has been neglected, being grown on only about 1 per cent of the area in crops. Several characteristics of maize seem to make it a particularly satisfactory crop for the uplands of subtropical Japan. Maize thrives better and yields more than other grains on steep slopes and shallow soils. And although it lends itself well to machine culture on level lowlands, it may also be profitably planted, cultivated, and harvested by hand on steep slopes. Its yields of both grain and fodder are high, higher than those of any of the other cereals. Its high yields in forage or fodder make it a desirable adjunct of any expansion of the animal industries. It is not unthinkable, also, that the Japanese, like many other Asiatic peoples, could learn to incorporate corn more widely into their diet.

Some improved high-yielding varieties of grain sorghums might also with profit be more widely cultivated in Japan. Kaoliang is at present grown, but its yields in grain are not equal to those of certain improved varieties of milo, kafir, and their hybrids. Replacement of kaoliang, and perhaps of some of the millet, by these high-yielding varieties and expansion in the total acreage of such crops might well be considered part of any program for agricultural improvement in Japan.

Bush and Tree Crops. Any plans for an expansion of the crop area in the

hill lands of Japan should not neglect the suitability and advantages of arboriculture. Trees with their relatively deep and extensive root systems can thrive in areas of poor and thin surface soils where annuals are less at home. Bushes and trees need less extensive terracing on slopes than clean-cultivated vegetables and cereals, for their roots tend to anchor the soil and thus reduce erosion. Grasses and forage crops planted between orchard trees will reduce erosion still further. Slopes already seriously eroded of their topsoil are satisfactory for orchards if sufficient subsoil remains. Moreover, fruit and nut crops require an unusual amount of hand labor, so that in the pruning, spraying, harvesting, packing, and shipping good use could be made of the abundant and painstaking rural labor supply. And an increase in the amount of fruit and nuts in the Japanese diet would be good for the health of the nation.

Careful consideration should be given to the possible expansion of two relatively important bush crops—tea and mulberry. Tea is an ideal slope crop, since it requires little terracing and when planted in rows at right angles to the slope is an excellent preventive of erosion. It is not unusual to see tea gardens occupying hillside fields where the slope is 20°–30°. The problem that looms large in any expansion of the tea area is Japan's ability to compete for foreign markets with the regions of tropical South Asia, where labor is cheaper and the yield of leaf per unit area is larger.

Mulberry is the exclusive food of silkworms, and as such it is the basis for the most important animal industry in Japan. Since it does not require irrigation and is soil-tolerant, it is largely a crop of the slope lands. Mulberry is grown throughout Japan south of about the 39th parallel, and before the war only two crops, rice and wheat, exceeded it in acreage. First the depression of the thirties, and later the competition of synthetic fibers and the war, greatly injured the raw-silk industry of Japan, so that the mulberry acreage dropped from a peak of 714,000 cho in 1930 to 186,000 cho in 1946. As late as 1931, 40 per cent of the Japanese farm families derived their chief cash income from the sale of silkworm cocoons. The serious decline of raw silk has been a major disaster to the country's economy.

To what degree the raw-silk industry can be revived in Japan depends largely on the extent to which the foreign markets can be recaptured. Most textile men seem to feel that the outlook is not bright. The American market, which originally took about 90 per cent of Japan's silk output, has been increasingly monopolized by synthetic fibers, which will be difficult to displace. It is worthy of note that both Japanese and SCAP officials are not too optimistic about a large-scale revival of raw-silk markets abroad: the five-year plan, beginning in 1947, for expanding silk production calls for an increase in the mulberry acreage to 267,000 hectares in 1951—only about

80,000 hectares more than in 1946. But in spite of a not too bright outlook, the situation certainly warrants a most careful study with a view to presenting Japanese raw silk and silk fabrics to Western markets in the most favorable light possible. In so many ways the raw-silk industry, utilizing a large amount of hand labor and depending on a bush crop suited to slope sites, is ideal for Japan. Moreover, the export of raw silk is the equivalent of exporting human labor, one resource that Japan has in abundance. It is difficult to see at present just what can be substituted for raw silk as a source of cash income for a large percentage of Japanese farmers.

Animal Industries. Oriental agriculture has largely disregarded pastoral resources. Japan, with an abundance of hill and mountain land, most of which is unfit for ordinary cultivation, is conspicuously undeveloped in animal industries. The almost complete absence of flocks and herds strikes one as anomalous; for the grazing of cattle and sheep is a specialty in many other middle-latitude regions of the world that have a rugged terrain. Less than 30 per cent of the Japanese farm families own cattle, and 80 per cent of these have only a single head. More than 90 per cent of the cattle on the farms are draft animals. Census statistics of livestock in Japan in 1947 were as follows: 159,000 dairy cattle, 1,830,000 draft cattle, 1,054,000 horses, 100,000 hogs, 239,000 sheep, 278,000 goats, 2,000,000 rabbits, 18,000,000 poultry. The per capita number of grazing-animal units is only one-fifteenth of that in the United States.

Certain physical, economic, and social factors impose obstacles to a greater use of pastoral resources in Japan. The long, hot, humid summers characteristic of much of the country affect unfavorably both animals and most forage crops. Greatest of the physical handicaps, however, is the general lack of good natural pastureland. The native wild grasses of much of the hill land are coarse, harsh, and unnutritious, and also difficult to eradicate; and the subtropical climate and the associated poor acid soils make difficult the successful propagation of many of the well-known tame grasses. Little research has been done on the production capabilities of soils and native grasses for forage crops. It is recognized, however, that land exists which could be used for the development of a livestock industry. The Ministry of Agriculture and Forestry estimates that more than seven million acres bearing a cover of wild grasses, shrub, and thin forest could be used for grazing without any serious encroachment on the profitable forest area. Such a use would not only increase the nation's food supply but would also be a guarantee against erosion and greatly increase the supply of much-needed animal manures. It seems highly appropriate that in conjunction with the general land-reclamation program a careful survey be made of the po-

tential grazing and forage-crop land and plans be formulated for its more profitable use. It must be emphasized, however, that milk and beef animals require feeds other than pasture, and any large increase in grazing animals must therefore be accompanied by an increase in the present deficient supply of feed concentrates and winter fodder.

In addition to the physical handicaps that discourage the animal industries, there are those of a social and economic nature. The farm people lack capital for the purchase of livestock and equipment for their keep, so that government aid would probably be necessary in getting a program started. Commercial dairying is retarded by the small domestic market for milk and milk products, for which the Japanese have never acquired a taste. Moreover, the poverty of the great mass of the population greatly restricts the market for both meat and dairy products.

Without doubt numerous handicaps and discouragements do exist to the greater use of the uplands for pastoral purposes and as supply sources for feed concentrates and fodder. Nevertheless, the desperate situation in which Japan finds itself justifies a serious attempt at as complete a utilization of the meager resource base as possible, even though this should involve the gradual changing of some of the basic eating habits of the people.

Stranger even than the paucity of grazing animals raised to supply food is the much greater scarcity of scavenger animals such as the hog and the modest number of farmyard poultry. Such prolific animals, able to thrive, in part at least, on household waste, seem particularly suited to Japan. The unusual emphasis on swine and poultry in China, where the hog population is probably equal to that in the United States, strengthens the argument for a greatly increased number in Japan. Chinese agriculture and Japanese agriculture have so many features in common that animals which fit well into the Chinese rural economy would expectably be a satisfactory adjunct of Japanese agriculture as well.

I am well aware that I may be accused by many Japanese friends of having engaged in unrealistic speculation. The remarkable accomplishments of the Japanese people in agriculture and forestry have given them high rank among the earth's husbandmen. It may appear presumptuous, therefore, that a foreigner far removed from the scene of operations should be so bold as to make suggestions. My only excuse for this presumptuousness is a belief that occasionally an outsider, adjusted to another type of material civilization, may see a situation in a somewhat different light from one who has lived so long in his native atmosphere that perceptions have been dulled to the possibilities of change.