AGRICULTURE 5 MONOGRAPH

A Survey of Soviet Russian Agriculture

VOLIN

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UNITED STATES DEPARTMENT OF AGRICULTURE

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LAZAR VOLIN

INTRODUCTION

With an enormous crop area of nearly 340 million acres and more than half its population engaged in agriculture (before World War II), the Soviet Union is one of the leading agricultural countries in the world. Before World War I it was also one of the foremost exporters of agricultural products, particularly of wheat and other small grains. Although agricultural exports declined drastically during the interwar period and the country underwent considerable industrial development, agriculture has nevertheless continued to be the backbone of Russian economic life. This situation has not been changed by the acquisition, since World War II, of new territory, for that, too, is predominantly agrarian in character.

In dealing with agriculture, as with other branches of the Soviet economy, the question of the adequacy and reliability of statistical information immediately arises. More or less detailed statistical data on crops, livestock numbers, various types of farms, foreign trade, and population are available for the period preceding World War II, tapering off, usually, after 1937–38. In general, published statistical material in the 1930's was much less abundant and less regularly released than during the 1920's.

Publication of some valuable data, such as those of food budget surveys and of price movements, was discontinued by the Soviet Government. Gaps, concealment, and suppression of statistical data when they did not suit the regime became more frequent, and objective critical analyses of statistics much less frequent. A notorious case of suppression of important statistical information was that of the results of the population census taken early in 1937 and never published.

Since World War II, statistical information has been scarce and even when published it has been fragmentary in character, often given in the form of percentages of a base that is not stated, rather than in actual hectares, tons, or numbers of animals. Territorial changes that have taken place since the war, not only through incorporation of new territories into the Soviet Union but also through the reshuffling of administrative divisions within the old frontiers of the USSR, aggravated the situation by making comparison of postwar and prewar data extremely difficult. In general, for the period since World War II, whenever Soviet estimates of acreage and production of crops and of livestock numbers were lacking, attempts have been made to supply them in this monograph if at all possible. But often they have been made on the basis of highly incomplete data that tend to increase the margin of error of such estimates.

The reliability of published Soviet statistics is often diminished by successive wholesale purges of competent statistical personnel. The pressure or temptation on the part of administrators to report falsely the achievement of official goals, and the misuse of figures for propaganda purposes or for fiscal reasons, have also adversely affected the reliability of statistical data. The least reliable body of agricultural statistics are the figures of crop yields per unit of land and consequently the production figures.

Since 1933, Russian grain-yield figures have not been comparable with those for the preceding years, though such comparisons are commonly made without any qualification in official Soviet publications. In the Soviet Union, prior to 1933, and in all other countries, including the United States, yield figures apply to harvested grain, or so-called barn yields. However, the official yield figures published in the USSR since 1933 are those of the standing crop, forecast before the harvest. An official Soviet publication defines crop yields as follows:

"The yield of crops per hectare, or the actual outturn, is the yield of the standing crop determined according to conditions estimated approximately a week before the beginning of the harvest of such crops."[1]

In other words, the Russian figures of grain yields do not include harvesting losses, which, according to frequent Soviet reports, are as large as 10 to 20 percent or more. A correction up to 10 percent for "technically unavoidable" harvesting losses of grain apparently was made in the estimates of yields for 1933[2] and, perhaps, for some of the subsequent years, but in the later 30's this practice was stopped.

This so-called biological method of estimating yields has been applied to grains since 1933 and has since been extended to other crops. Thus, according to official instructions, issued on July 21, 1939, for estimating a number of crops (cotton, flax fiber and seed, hemp fiber and seed, sunflowers, castor-beans, sugar beets, and potatoes), the figures for "actual yields per hectare" must include crop losses. For instance, the estimates are to count all losses of potatoes from the beginning until the end of the harvest, including such items as "undug tubers of potatoes or parts of tubers, tubers which were left in the field during the harvest and also lost during the moving of the crop, stolen potatoes and those distributed to the workers during the harvest without proper accounting." Similar provisions were made for sugar beets and other crops.[3] This method of estimating yields has been followed even more strictly since World War II. According to the head of the Soviet crop estimating organization, "it is prohibited to gather data on threshing of crops in the collective farms," while the process of estimating yields is being carried out, because such information "distorts the actual situation with respect to yields and makes it possible to underestimate the actual size of the crop."[4] With respect to grains, there is enough evidence to indicate definite overestimation since 1933 of official yield data and, consequently, of production figures, which makes it impossible to use them in comparisons with other countries or with Russian figures prior to 1933 without some adjustment.

Fiscal considerations also tend toward overestimation of official crop yields. The collective farms pay the state-owned machine-tractor stations a certain quantity of the crop per hectare, which varies with the yields for the district as a whole. The higher the officially estimated yield per hectare, the larger the rate paid to the machine-tractor stations, which theoretically are supposed to help raise yields by improving farm practices. Here is an additional

[1] SLOVAR-SPRAVOCHNIK PO SOTSIAL'NO-EKONOMICHESKOI STATISTIKE, pp. 88-89. Moscow. 1944. *See also* NEMCHINOV, V.S. SEL'SKOKHOZYAISTVENNAYA STATISTIKA S OSNOVAMI OBSHCHEI TEORII, pp. 120–121. Moscow. 1945. *And* SHOLTS, S.V. KURS SEL'SKOKHOZYAISTVENNOI STATISTIKI, p. 38. Moscow. 1945.

[2] *See* OSINSKII, N. *In* Izvestiya, Sept. 21, 1933.

[3] Sobranie Postanovlenii SSSR, No. 45, p. 670, Art. 357. 1939.

[4] SAVEL'EV, B. [CURRENT PROBLEMS OF THE STATE INSPECTION FOR ESTIMATING CROPS OF THE GOSPLAN OF THE USSR.] Planovoe Khozyaistvo 1947 (2): 38. 1947.

incentive to over-report yields. Although there is no direct evidence that this is done, nevertheless, the fact that the extraction of as much grain and other products as possible from the farmer has always been a pivotal objective of the Soviet agricultural policy would favor the tendency towards overestimation. This would likewise have a fine propaganda value in demonstrating the superior productivity of the collective farms over the supplanted individual peasant holdings and in justifying high deliveries (taxation kind) of farm products to the state. Caution, therefore, is required in dealing with official Soviet crop figures, especially of grains. These were scaled down to an estimated harvested or "barn yield" equivalent when used in the present study.

I

NATURAL ENVIRONMENT

It is axiomatic that agriculture must adapt itself to its natural environment—the soil and climatic conditions—which can be changed only to a limited extent by man, and then only at a cost. At the outset, however, one must guard against exaggerated notions about the natural resources of Russian agriculture, which are often depicted in colors either too optimistic or too pessimistic.

THE LAND

Much of the Soviet Union is not suitable or is ill-adapted for farming. Among the unsuitable areas, which account for more than one-third of the country (1938 boundaries), are the tundra wastes and marshes in the north and the deserts in the east and south, where only oasis agriculture, depending largely on costly irrigation, is possible. Much of the huge northern forest zone is poorly adapted for farming and comprises nearly 40 percent of the USSR. In this zone about 90 percent is nonagricultural land, though the proportion is much smaller in the European than in the Asiatic part of the zone.[1]

The existence of these extensive, essentially nonagricultural regions largely explains the relatively small proportion of tillable land (land available for crops) in the Soviet Union. Before World War II only slightly more than 10 percent of the total area was classified as tillable,[2] and, if one added permanent meadows and pastures, much of which could be converted into cropland, more than 25 percent might be tillable. In Germany and France, comparable figures were more than 40 percent for tillable and more than 60 percent, including meadows and pastures; and in the United States, more than 20 and 60 percent.

Despite its having such large areas of nonagricultural land, the Soviet Union (prewar boundaries) possesses an enormous area of more than 570 million acres of tillable land, exceeding even the large tillable area of the United States. In addition, approximately more than 40 million acres of tillable land have been acquired by the Soviet Union in territories annexed since World War II.

The huge area of the Soviet Union is characterized by a great diversity of soils, distributed in rather well-defined geographical zones or belts (fig. 1). Beginning in the extreme north, a great zone of tundra extends southward from the shores of the Arctic, the Barents, and the

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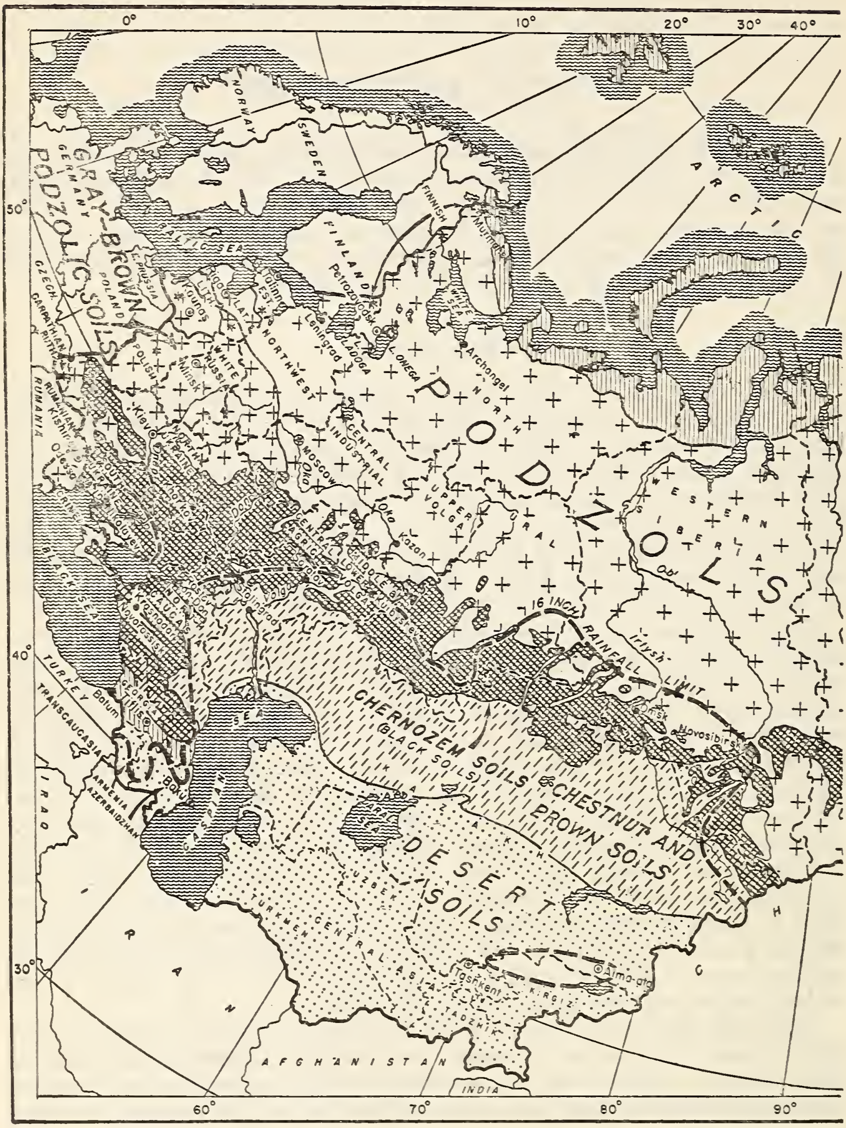
[1] STRUMILIN, S.G. [RESULTS OF NATURAL REGIONALIZATION OF THE U.S.S.R.] *In* D.G. VILENSKŬ, ed. ESTESTVENNOISTORICHESKOE RAIONIROVANIE SSSR (AKADEMIYA NAUK SSSR), p. 314. Moscow-Leningrad. 1947.

[2] Not all of this land is actually under crops in any particular year but some of it is in cultivated fallow or lying idle. Of the more than 570 million acres of tillable land about 340 million were actually under crops before World War II. For further details see chapter VI on Land Utilization.


PODZOLS
GRAY-BROWN PODZOLIC SOILS
CHERNOZEM SOILS
(BLACK SOILS)
CHESTNUT AND BROWN SOILS
DESERT SOILS
16 INCH RAINFALL LIMIT
ARCTIC
NORWAY
SWEDEN
FINLAND
FINNISH
GERMANY
POLAND
CZECH.
RUMANIA
TURKEY
TRANSCAUCASIA
ARMENIA
AZERBAIDZHAN
IRAQ
IRAN
AFGHANISTAN
INDIA
BALTIC SEA
BLACK SEA
CASPIAN SEA
ARAL SEA
WHITE SEA
L. LADOGA
L. ONEGA
NORTHWEST
NORTH
CENTRAL INDUSTRIAL
UPPER VOLGA
URAL
WESTERN SIBERIA
WHITE RUSSIA
UZBEK
TURKMEN
CENTRAL ASIA
KIRGIZ
TADZHIK
Murmansk
Archangel
Leningrad
Petrozavodsk
Tallinn
Minsk
Kiev
Moscow
Kazan
Stalingrad
Batum
Tiflis
Baku
Omsk
Novosibirsk
Tashkent
Alma-ata
Irtysh
Ob'
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60°
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80°
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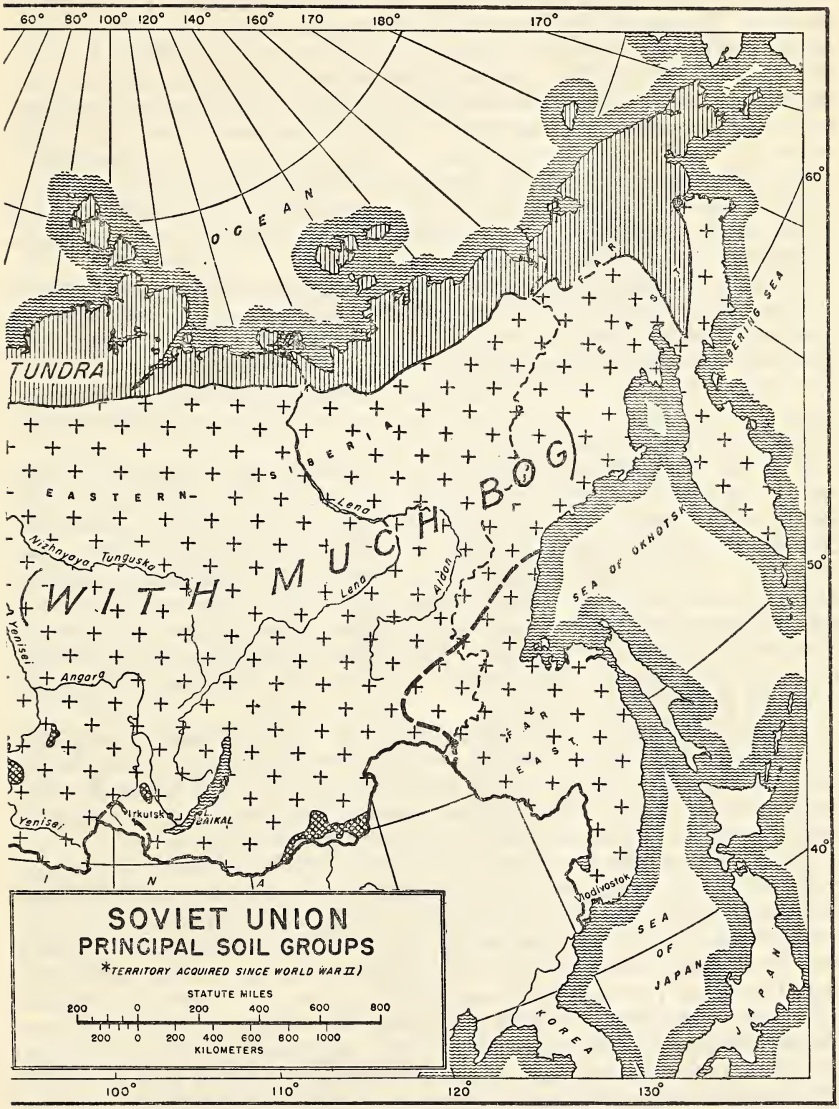

FIGURE 1.—Soils of the Soviet Union.

White Seas. South of the tundra lies a belt of forest-tundra soils. Next come the podzol and marshy soils of the coniferous forest zone of northern Russia. Still farther south are various types of chernozem or black soils, which cover much of the wooded steppe and steppe zones of the central and southern European part of the USSR and a limited area of southwest Siberia and northern Kazakhstan. Adjacent to these are the chestnut and brown soils of the dry steppes, which are much more extensive in the Asiatic than in the European part of the country. These soils merge into the desert types prevalent especially in Soviet Central Asia. Finally, there is distinguished a group of subtropical soils in the humid subtropics of Transcaucasia (mainly on the eastern coast of the Black Sea). The soil formations of the high mountains of the Caucasus and Asiatic Russia are also separated into a distinct group.

By far the most important of all these soil belts is that of the fertile chernozem, or black soils, which forms the natural foundation on which modern Russian agrarian economy has largely developed. This belt comprises roughly three-fourths of the total estimated land available for crops. In contrast, the much less fertile podzol, or non-black-soil zone, is more than four times as large, yet has only one-fourth as great an estimated acreage available for crops.[3]

Still the agricultural significance, especially the potential significance, of the non-black-soil region should not be minimized. Certainly, with proper use of fertilizers and with drainage of sections having excessive moisture, much of the non-black-soil region is well fitted for agricultural production, particularly of flax fiber, potatoes, and various root crops. High crop yields, in fact, can be achieved in the non-black-soil region, especially in its more western part, which benefits from a milder climate. The yields are also more stable there because the region is free from the recurrent droughts that plague much of the black-soil region.

A good deal of the non-black-soil region is in permanent meadows and suited for livestock raising, which provides manure essential for maintaining the fertility of the soil. For this reason alone, a larger proportion of the farm land in the non-black-soil regions, as compared with the black-soil area, must be devoted to forage crops.

The Soviet policy since the 1930's, influenced no doubt by strategic considerations, has been to foster agricultural production in the non-black-soil region, or, as the slogan had it, "to convert the deficit-consuming area into a producing one." That considerable progress was made can be seen from the fact that the acreage of all crops in the area increased between 1928 and 1938 by about 17 percent, potatoes by 43 percent, forage crops by 57 percent. Grain acreage, however, showed only a 3-percent increase. We can generalize, then, that soil conditions over a large part of the Russian agricultural area either are beneficial to crop production because of their natural fertility or can be made productive by the use of fertilizers.

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[3] PRASOLOV, L.I. [LAND AREA AVAILABLE FOR CROPS OF THE USSR FROM THE STANDPOINT OF SOIL GEOGRAPHY.] *In* RASTENIEVODSTVO SSSR, issued by Vsesoyuznyi Institut Rastenievodstva Narodnogo Kommissariata Zemledeliya Soyuza SSR, v.1 pt. 1, p. 36. Leningrad and Moscow. 1933. While this writer gives a smaller area of total tillable land than is used in this monograph, its rough distribution among different soil belts should not differ materially for the larger area.

CLIMATE

Considerable climatic differences are to be expected in so vast an area as the Soviet Union, which extends over 45° of latitude and 150° of longitude. Nevertheless, the Russian climate exhibits certain general characteristics that follow logically from the geographical position of the country. Most of the Soviet Union is situated either in the cold or the moderate climatic zones. Only the southernmost parts of the country—southern Crimea, parts of Transcaucasia and Central Asia (Turkestan)—have something resembling a subtropical climate.

Over a large part of the Soviet Union the climate may be described as continental in character. It is distinguished by a sharp contrast in temperature between the seasons—a cold, prolonged winter and a short, hot summer—and moderate or light precipitation that, coupled with the high summer temperature, results in considerable aridity for a large part of the country. In general, the continental character of the Russian climate becomes more pronounced as one moves eastward on the great Russian plain, and the moderating influence of the winds from the Atlantic Ocean lessens while the sway of the winds from the interior of Asia increases.

The Russian climate is a smaller obstacle to agricultural production in the more northern regions, and less of a boon in the southern, than it appears to be. In the north and north-central regions, low temperatures and sometimes excessive moisture hamper agriculture; but in the south and, more especially, in the southeast, moisture deficiency hinders production.

No other aspect of the Russian climate is so well known as the long cold winter, which is a justified part of the popular stereotype of Russia. Less commonly recognized, however, is the fact that even in the far north the celebrated Russian winter has its counterpart in the fairly warm, if short, summer. Thus, in Archangel (64° 35′ north latitude), where the normal temperature in January is 8.1° F., it is 59.5° in July. In Moscow, for the same months, the temperatures are 12° and 67°. Moreover, the temperature deficiency in the north is to some extent compensated for by the longer day during the growing season. These factors, together with the use of plant varieties and farm practices especially adapted to the climate and topography, explain the extension of agriculture into the far north of Russia. With the progress of plant breeding, the northern boundary of agriculture has been continuously pushed farther, and production on an experimental or small scale has been extended even into the arctic regions of the country.

The fact remains, however, that the average growing, or frost-free, season is rather short, even in southern Russia (table 1).[4] In Kharkov in the Ukraine (50° north latitude), for instance, it is 151 days long, about the same as Duluth, Minn. As far south as Krasnodar in North Caucasus (45° north latitude) an average of 190 days are frost-free,

[4] Actually, the minimum growing temperatures—temperatures below which growth is not possible—vary for different crops. It should be noted that "temperature range within which growth takes place is much more limited than that within which plants in inactive stages can survive." (HILDRETH, A. C., MAGNESS, J. R., and MITCHELL, JOHN W. EFFECTS OF CLIMATIC FACTORS ON GROWING PLANTS. U. S. Dept. Agr. Yearbook 1941: 294–295. 1941.)

about the same as Omaha, Nebr. In Moscow the average frost-free season of only 130 days corresponds to that of the northern part of North Dakota. It is still shorter beyond the Urals, is 124 days in Chelyabinsk, and decreases eastward to 121 at Omsk, 120 in Krasnoyarsk, and 95 in Irkutsk. The short season limits the choice of crops and their varieties, necessitates concentration of farm operations within a short period, thus increasing the seasonal load, and poses the problem of employment of the agricultural population during the relatively long period when there is little work on the farm.

TABLE 1.—*Average number of frost-free days each year, temperature in warmest and coldest month, annual temperature, and annual precipitation, at various meteorological stations*

Station	Latitude		Average frost-free period	Temperature				Precipitation	
				Length of record	Warmest month, average	Coldest month, average	Annual average	Length of record	Annual average
	°	′	*Days*	*Number of years*	°F.	°F.	°F.	*Number of years*	*Inches*
Arkhangelsk	64	35	120	35	59.5	8.1	32.4	35	18.3
Ashkhabad	37	57	229	38	85.3	32.7	[1]	38	9.1
Baku	40	21	296	61	78.6	38.8	58.3	61	8.1
Batumi	41	40	308	54	73.2	43.7	57.9	54	97.0
Chelyabinsk	55	10	124	35	65.5	2.8	[1]	25	14.2
Fergana	40	24	216	35	81.3	27.1	[1]	35	6.7
Gorki	56	20	149	35	66.9	10.0	38.5	25	23.1
Irkutsk	52	16	95	35	63.0	−5.6	29.7	25	15.5
Kazan	55	47	146	35	67.8	7.5	37.9	25	18.1
Kharkov	50	04	151	35	69.1	18.1	44.1	25	20.2
Kiev	50	27	172	35	66.7	21.2	44.4	35	23.2
Krasnodar	45	02	190	35	74.7	28.2	52.0	25	25.6
Krasnoyarsk	56	01	120	35	66.7	−0.8	33.1	35	12.1
Leningrad	59	56	160	35	63.5	18.1	39.4	25	20.6
Moscow	55	50	130	35	64.4	12.6	38.5	25	24.4
Omsk	54	58	121	35	66.4	−3.3	[1]	25	12.4
Orenburg[2]	51	45	147	35	71.6	4.3	38.8	25	15.2
Saratov	51	35	161	[1]	70.0	10.2	40.8	[1]	15.2
Sochi	43	34	288	65	73.4	42.8	57.6	65	55.5
Stalingrad	48	42	177	35	76.5	14.2	[1]	35	14.6
Tashkent	41	20	206	35	80.2	29.7	55.8	35	13.7
Tomsk	56	30	114	35	64.0	−2.9	30.6	25	22.2
Ulyanovsk	54	19	146	35	67.8	7.3	[1]	25	16.6
Vologda	59	14	128	35	63.7	10.4	36.3	25	22.8
Yalta	44	30	245	[1]	75.6	38.7	55.6	[1]	21.6

[1] Not available.

[2] Now called Chkalov.

SELYANINOV, G. T. MIROVOI AGRO-KLIMATICHESKII SPRAVOCHNIK: THE WORLD'S AGRO-CLIMATIC HANDBOOK, pp. 90–136, 297–299, 367–374. Moscow and Leningrad. 1937.

The handicaps to agricultural production imposed by the pro-

tracted and rigorous Russian winter and the resulting short cultural season are far surpassed by those arising from the deficiency of moisture. Annual precipitation in the central and western parts of the country is 20 to 25 inches. It decreases southward and eastward and is lowest in the desert steppes that extend from the Lower Volga east and south into Central Asia. The highest precipitation is found on the Caucasian coast of the Black Sea, in Batumi, where it reaches 97 inches.

The precipitation in the northern part of the country, accompanied by the low temperature and the consequent slight evaporation, is normally sufficient for the crops that are grown there. In fact, that region, with its abundant marshy lands and numerous lakes, suffers more often from an excess than from a deficiency of moisture. The reverse, however, is true in the south and east, where light rainfall is accompanied by high summer temperature and moisture is the limiting factor in crop production.

Not only is the annual precipitation light in most of the southern and eastern agricultural regions of the Soviet Union, but it is irregular from year to year and its seasonal distribution is often unfavorable to the growth of crops, particularly of the early spring cereals such as wheat. The maximum rainfall occurs in the summer months everywhere in the Soviet Union except in the southernmost regions (Crimea, Central Asia, and Transcaucasia), where it occurs in the winter and late autumn. In the north, August is the rainiest month; in the central regions, July; and in the south, June. The July and August rains, however, are too late to be utilized by the small grains and sometimes even cause damage by interfering with the harvest. Though the June rains in the south and southeast are more beneficial, they often come in the form of heavy showers that tend to run off the surface of the soil without increasing its moisture supply and, what is even more serious, often are so delayed that a more or less prolonged dry spell is likely to occur in May and June. These months are the critical period in the growth of the crops, for it is then that the moisture in the soil, accumulated during the autumn and winter months, is quickly depleted both by the growing plants and by the increased evaporation that accompanies the quickly rising temperatures. It is the latter factor—the high temperature—that makes the late spring and early summer droughts so much more dangerous in the south and especially in the southeast than they are in the more northern regions, which have lower temperatures and therefore less evaporation.[5]

When, as often happens in the southeast, a dry spring is preceded by a dry autumn and a winter with little or no snow, the situation becomes even more serious, for the winter crops are adversely affected and the supply of soil moisture in the spring is diminished. If, in addition, the scorching dry winds, the so-called sukhovei, which play havoc with the crops, also begin their destructive work, then the stage is all set for one of those catastrophic droughts that often mean famine conditions for the peasants, the destruction of their livestock, including the draft animals, and a general deterioration and retrogression in the Russian countryside.

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[5] NEKRASOV, P., and ROZOV, N. [METEOROLOGICAL FACTORS IN CROP YIELDS.] *In* Chayanov, A., ed., Problemy Urozhaya, pp. 112–113. Moscow. 1926.

The Middle and Lower Volga areas and the adjacent European and Asiatic regions constitute the principal areas of the recurrent droughts. During the 48 years since the catastrophic crop failure of 1891, there have been only 11 years of good moisture supply in this region; in 22 there were partial droughts during the growing season; and in 15 there were full-fledged droughts.[6] In the 1930's more or less extensive drought conditions were recorded in 1931, 1934, 1936, 1938, 1939; and, after World War II, in 1946 and 1948.

East of the semiarid zone, toward and beyond the Caspian Sea, is the desert, where only oasis agriculture is possible. The desert, however, casts a spell over Russian agriculture far beyond its boundaries, for it strongly influences the climate of the neighboring regions of eastern and southern Russia. It has been likened to a gigantic suction pump, siphoning off and wasting in its vast blazing spaces a tremendous quantity of moisture brought by air currents and rivers from other regions.[7] Moreover, there is evidence that the desert itself has been expanding westward and that its blighting effect on the agriculture of neighboring regions has accordingly increased.

The total area of deficient moisture, the northern boundary of which follows the line of annual precipitation of 16 inches or less, has been estimated by a Russian authority to constitute about one-quarter of the total area of the Soviet Union.[8] It is the consensus of Russian scientists that the aridity of this vast area has been aggravated by the destruction of forests, especially on watersheds, and by the continued cultivation of the land, which removes the protective natural vegetative cover and pays no heed to soil erosion.[9]

The semiarid zone includes many of the most fertile regions of the black-soil area. It is in this precarious zone that most of the expansion in Russian crop acreage has taken place since the latter part of the nineteenth century. The valuable wheat crop—above all, of spring wheat, which normally accounts for more than 60 percent of the Russian wheat acreage—is strongly concentrated in the semiarid zone. Most of the Russian cotton is grown under irrigation in the dry regions of Central Asia. It is not surprising, therefore, that the problems of the semiarid and dry zones have long been in the foreground of public and official attention, especially after every recurrence of a dry season.

The Russian semiarid zone has its counterpart in the United States. In precipitation and summer temperatures it resembles Montana, Wyoming, the western parts of North and South Dakota and Nebraska, and the intermountain sections of Washington and Oregon. It is difficult to compare the size of such areas in the two countries. It seems, however, that unirrigated agriculture has been extended into more hazardous areas in the Soviet Union than in the United States, and it is a safe generalization that the proportion of agricultural output originating in such regions is larger in the Soviet Union than it is in the United States.

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[6] ITSKOV, N. YA. *In* Sotsialisticheskoe Zemledelie, Oct. 22, 1938.

[7] MIRONOV, A. [IRRIGATION OF THE TRANS-VOLGA AREA AND COMBATING THE DROUGHT.] Planovoe Khozyaistvo 1934 (8–9): 125. 1934.

[8] TULAIKOV, N. M. AGRICULTURE IN THE DRY REGION OF THE U.S.S.R. Econ. Geog. 6: 54–56. 1930.

[9] KOVAL, T. A. BOR'BA S ZASUKHOI, pp. 15, 36, 40–41. Moscow. 1948.

It can be generalized therefore that the crucial disadvantage of the continental Russian climate is the reverse relation between the territorial distribution of heat and moisture, both of which are essential for plant life.[10] As the amount of heat increases, from north to south and west to east, moisture tends to diminish and the maximum of heat is accompanied by a minimum of moisture. Only in the subtropical regions of the eastern (Caucasian) coast of the Black Sea, with their high moisture and temperature, and in parts of western and central Ukraine and in the Kuban region of North Caucasus is there a more advantageous combination of various climatic elements.

Enough has been said without indulging in excessive pessimism to indicate that the Russian farmer has to wage a stiffer battle against nature, particularly the climate, than the farmers of western and central Europe and, especially, of the United States. "Russia has nothing corresponding to three of the most productive regions of the United States—the Mid-Latitude Region [the area just south of the Great Lakes region], the Corn Belt, and the Cotton Belt, all of which have been of tremendous importance in the production of the agricultural wealth of the United States."[11]

[10] SELYANINOV, G. T. [SPECIALIZATION OF AGRICULTURAL REGIONS ACCORDING TO THE CLIMATIC PRINCIPLE.] *In* RASTENIEVODSTVO SSSR, v. 1, pt. 1, p. 10.

[11] MARBUT, C. F. AGRICULTURE IN THE UNITED STATES AND RUSSIA. A COMPARATIVE STUDY OF NATURAL CONDITIONS. Geog. Rev. 21: 612. 1931.

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II

AGRICULTURAL POLICY AND LAND TENURE

In approaching the problem of the relation of government to agriculture in the Soviet Union, one must make, at the outset, a fundamental distinction between the situation as it exists in Russia and that prevailing in other countries—a distinction that lies in the pervasiveness of government control and administration of the whole economic system, of which agriculture forms an integral part. While many other countries have gone far along the path of government intervention, Russia has gone much farther. In no other country, therefore, is government policy of such crucial importance to agriculture as in the Soviet Union.

The Soviet state exercises a monopolistic control over the whole economic structure and resources of the country. It owns and operates large-scale industry, mines, power plants, railways, shipping, and other means of communication. It engages in farming on its own account through the institution of state farms, and it largely controls peasant agriculture through the organization of collective farming. It has an exclusive monopoly of banking, foreign trade, and exchange operations. It controls the domestic channels of distribution in its capacity as a manufacturer, farmer, merchant, shipper, and banker. Moreover, by administrative measures it can suppress such private competition as still exists.

All these branches of economic life are subject to the system of economic planning by the state; they are within the orbit of "planned economy" as it is understood and practiced in the Soviet Union.

It is true that the private market, however diminished or limited in scope, has never become entirely extinct, at any rate so far as petty trade is concerned. Although the Soviet policy toward private enterprise has generally been unmistakably restrictive, it has occasionally relaxed in the direction of greater liberality, at least in the realm of trade. But whatever its concessions to private enterprise, the Soviet state has maintained, unaltered, its dominance in the economic sphere. From the fields of large-scale industry and foreign trade, over which the Soviet state early asserted a monopoly, it extended its dominance to domestic trade and finally to agriculture—that branch of economic life that had been the citadel of economic individualism in the Soviet Union. Since the early 1930's collectivization of agriculture has been an achieved fact. For an understanding of how it has come about, it is necessary to review briefly the course of recent Russian agrarian development.

PRECOLLECTIVE PERIOD

The trend in Russian agriculture from the time of the abolition of serfdom in the middle of the nineteenth century until the 1930's was

toward small farming by the individual peasant cultivator. In fact, small-scale—though by no means economically uniform—peasant-family agriculture predominated even before the revolution of 1917. By that year the peasant farmers, through an allotment they received upon emancipation from serfdom in the 1860's and by subsequent purchase, owned two-thirds of all farm land in European Russia, exclusive of Poland and Finland.[1] They leased a considerable proportion of the remaining land, which was in large estates, but at a heavy price. Siberia was almost entirely a land of peasant farming.

Most peasants lived in villages and not on separate farmsteads as in the United States. Only in some of the western Provinces were separate farmsteads, or khutor, fairly common, although during the period of so-called Stolypin reform during the last decade of the tsarist regime, the khutor type of farms increased under strong encouragement from the Government. The fields the peasants cultivated were usually divided into a number of rather narrow strips, and the holding of each peasant family consisted of a number of noncontiguous strips in different fields, which were usually separated from each other by strips belonging to other families. In addition, a peasant family ordinarily had a plot of land around the house that was used as a kitchen garden.

The strip system in Russia was a result of the attempt to equalize holdings with respect to soil, topography, and the distance from the village. Over a large part of Russia, particularly in the central and eastern Provinces, such equalization was associated with the communal, repartitional type of land tenure, the so-called mir, or land commune.[2] The mir allotted holdings to its members on some uniform basis, with general or partial repartitions of land at regular or irregular intervals. Where a hereditary system of land tenure prevailed, as in the western Provinces of Russia, the strips resulted from successive division of holdings among heirs. The less uniform the soil, topography, and other conditions, the greater the divisibility of holdings and the greater the number of strips. Often the cultivated area of a mir consisted of a number of widely scattered plots, and it was customary, with a view to equalization of holdings, to allot land to each member in every plot. For, the more remote the field from the farmstead, the greater was the expenditure of time in reaching it, and the less advantageous was it considered. Such fields were usually not manured and, in general, were cultivated less intensively than those nearer to the village. The divisibility of holdings also was increased through this practice.

This scattered or noncontiguous strip system of farming was conducted on an individualistic basis. Each peasant family farmed its often numerous strips independently, even under the communal system

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[1] CHELINTSEV, A. [ESTATE FARMING IN RUSSIA BEFORE THE REVOLUTION.] Zapiski Instituta Izucheniya Rossii 1: 10. Prague. 1925. The total farm-land area of 666 million acres in the 50 former provinces of European Russia (including the present Baltic states and Bessarabia), of which peasant holdings constituted 446 million acres, did not include the public domain, which was situated mostly in the northern regions and was of little agricultural significance.

[2] For a brief discussion of the mir, *see* VOLIN, LAZAR. THE PEASANT HOUSEHOLD UNDER THE MIR AND THE KOLKHOZ IN MODERN RUSSIAN HISTORY. *In* Cultural Approach to History, ed. for American Historical Association by Caroline F. Ware, pp. 125–139. New York. 1940.

of land tenure. However, strip farming was usually associated with a common crop rotation. It was hardly possible to plant in the different strips of the same field crops with various seasons and maturities, especially since the stubble frequently was used as common pasture. Such a system of farming made difficult the use of modern power machinery, involved considerable waste of land in boundaries between strips (which provided a fertile breeding ground for weeds and pests), and wasted the time of the farmer by forcing him to travel from one field to another. During the decade preceding World War I, a strong effort was made by the Government to transfer the communal repartitional, or mir, tenure into individual hereditary tenure and to promote consolidation in a single tract of the scattered strip holdings. But such consolidated holdings were divided again by the peasants during the revolution.

The peasant revolution of 1917–18, sanctioned by early Soviet agrarian legislation, resulted in the liquidation of the landlord system and a full triumph for small individual peasant farming. The peasants divided not only the estates, with the insignificant exception of land turned into so-called state farms, but also the larger peasant holdings. It is true that during the so-called War Communism Period, which soon ensued (1918–21), the peasants were harassed by Government requisitions of crops and suppression of a legal free market in farm products. It was at this time that the first attempt at agricultural collectivization was made by the Soviet Government. However, the results were insignificant. Only 3 to 4 percent of the farm land area was in state-owned and collective or cooperative farms and constituted a small island in the ocean of peasant agriculture. The supremacy of small peasant farming was confirmed by the New Economic Policy.

The New Economic Policy, or NEP, which supplanted War Communism in 1921, restored the free market for agricultural products and substituted taxes for requisitioning of crops. Although land legally remained the property of the state, the peasants were granted much freedom in their choice of land tenure and were permitted to lease land and employ labor, activities that had been prohibited under War Communism. Considerable agricultural and general economic recovery followed the introduction of the NEP.

COLLECTIVIZATION OF AGRICULTURE

Toward the end of the 1920's, however, the Soviet agrarian policy took a decisive new turn. It followed a bitter factional struggle in the Communist Party, in which Trotsky and Stalin were the chief protagonists and in which the issue of the future of socialism in a single predominantly peasant country loomed large. Stalin won and soon out-Trotskyed Trotsky, who advocated, among other things, a stronger socialistic line in the countryside. The relatively liberal attitude that the Kremlin had displayed toward individual peasant farming during the NEP period was jettisoned.[3] The pivotal objec-

[3] The discussion in this section is largely based on VOLIN, LAZAR. AGRARIAN INDIVIDUALISM IN THE SOVIET UNION: ITS RISE AND DECLINE. Agricultural History 12: 11–31, 118–141. 1938. *Also* VOLIN, LAZAR. AGRARIAN COLLECTIVISM IN THE SOVIET UNION. Journal of Political Economy 45: 606–633, 759–788. October and December 1937.

tive of the Soviet agrarian policy now became the liquidation of individual peasant agriculture and the development of new large-scale socialist types of farming, thus reversing the long historic trend toward small farming in Russia.

When we inquire, very briefly, into the reasons and motives for this shift in Soviet agricultural policy, we must first note that, ideologically, large-scale socialist agriculture has always been the Bolshevik goal and the NEP a temporary "strategic retreat." The old Marxist belief in the superiority of large-scale methods of production in agriculture, as well as in industry, had been strengthened by Lenin's unbounded enthusiasm for the tractor, which he believed would lead the peasant into the promised land of socialistic agriculture.

All that was necessary, he said, was to give the peasants 100,000 tractors and the needed fuel and they would be in favor of communism. Lenin recognized that, in 1918, when he said this, it could be only a fantastic dream; but toward the end of the 1920's Lenin's dream as far as tractors were concerned began to take a more realistic shape. By the autumn of 1929 there were 35,000 tractors on the farms and a good possibility of importing many more from the United States. In 1927 the first machine-tractor station to help the peasants with their field work was established—an institution that was destined to play a seminal role in the development of collective agriculture.

Entirely apart from communistic ideological bias, objective evidence was not lacking that, under Russian conditions of extensive farming, the continuous fragmentation of the peasant farm unit had many disadvantages. The decrease in size of the peasant holdings was due to the division of land during the agrarian revolution and the subsequent growth of the rural population. Peasant households in the territory of Soviet Russia (most of which were engaged, at least partly, in farming) increased from less than 18 million in 1916 to nearly 24 million in 1925 and 25.6 million in 1928.[4] [5] The small size of the individual Russian peasant farm unit can be better visualized by a comparison of the acreage sown per farm in the leading Russian and United States wheat regions. In the former, the average acreage ranged, in 1927, according to a sample census, from 13.5 to 35 acres,[6] whereas in the latter, according to the census of 1925, the range was from 78 to 266 acres.

Being more self-sufficient, the small peasant farm unit placed a smaller proportion of its output on the market.[7] [8] It also, as a rule, made for uneconomic utilization of manpower, draft power, and implements. This situation was aggravated by the above-mentioned scattered strip system of farming, which became more intense with the frequent division of land during revolutionary and post revolu-

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[4] VAINSHTEIN, A. [NUMBER AND TREND OF PEASANT HOUSEHOLDS IN PREWAR RUSSIA.] Statisticheskoe Obozrenie 1929 (7): 9–19. 1929.

[5] STATISTICHESKII SPRAVOCHNIK SSSR ZA 1928, p. 82. Moscow. 1929.

[6] VOROB'EV, K. [BASIC SOCIO-ECONOMIC FEATURES OF PEASANT FARMING BY REGIONS OF THE USSR.] Statisticheskoe Obozrenie 1929 (4): 3–18. 1929.

[7] LYASHCHENKO, P. I. RUSSKOE ZERNOVOE KHOZYAISTVO . . . [RUSSIAN GRAIN FARMING IN THE SYSTEM OF WORLD ECONOMY], pp. 337–342. Moscow. 1927.

[8] MIKHAILOVSKII, A. [THE BALANCE OF THE MARKET GRAIN SUPPLY.] Statisticheskoe Obozrenie 1930 (5): 37. 1930.

tionary periods.[9] Moreover, many of the small holdings lacked draft animals and implements.

More than 30 percent of the peasant households in the principal grain regions, according to a sample census of 1927, lacked draft animals.[10] Peasants were often faced with the alternative either of hiring implements and livestock from their more well-to-do neighbors in order to continue farming at all, or of leasing their land and, perhaps, selling their services to their neighbors.

This resumption of the process of economic stratification of the peasantry into different layers of prosperity after the great leveling of the revolution caused much apprehension in the Soviet rulers. It served to strengthen the ever-present Marxist bias against the small peasant producer,[11] who was considered to provide a perfect breeding ground for the growth of capitalism. Lenin's dictum that "Small-scale production gives birth to capitalism and the bourgeoisie constantly, daily, hourly, with elemental force, and in vast proportions," was never forgotten.

The more prosperous peasants, dubbed kulaks, or fists, were especially suspected even though they too were very small producers when judged by capitalistic standards. How small the number of such kulak farms could possibly be is indicated by the fact that, in 1926, in so important an agricultural region as North Caucasus, for instance, the number of peasant holdings with four or more draft animals amounted to 4.8 percent of the total; in Crimea it was 6.9 percent; in all other European regions of the USSR the proportion was less; and in the Central Black-Soil area it was only a fraction of 1 percent. Holdings with a sown area of 10 desiatines (27 acres) or more accounted in only a very few regions for 10 percent or more of the total number of holdings and constituted a much smaller proportion in most regions.[12] However, the influence of the kulaks, who it is safe to say were usually the better farmers, was considered by the Bolsheviks to be out of all proportion to their relatively small number. This explains the kulak specter, which was first raised by Trotsky and his Left Opposition in the middle 1920's and again, towards the end of the decade, by the ruling Stalin group of the Communist Party.

What undoubtedly hastened the decision of the Kremlin to collectivize agriculture was the conflict that its program of accelerated industrialization precipitated. In pursuing this program, the Government was anxious to obtain at low prices the largest possible supply of grain and other agricultural products, both to feed and clothe the rapidly increasing industrial population and to export enough to pay for the essential imports of machinery and raw materials.

But while the Government strove to maintain prices of agricultural products, particularly grain, at low levels, it fixed high prices for manufactured products of the monopolistic nationalized industry. Moreover, with low industrial efficiency and with the emphasis on develop-

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[9] STUDENSKII, G. A. [INTENSITIVITY AND PSEUDO-INTENSITIVITY OF RUSSIAN PEASANT AGRICULTURE.] Trudy Samarskogo Sel'sko-Khozyaistvennogo Instituta (Annals of the Samara Agricultural Institute) 4: 45–81. 1927.

[10] VOROB'EV, op.cit., p. 7.

[11] *See* MITRANY, DAVID. MARX V. THE PEASANT. *In* London Essays in Economics: In Honour of Edwin Cannan, ed. by T. E. Gregory and Hugh Dalton. 336 pp. London. 1927.

[12] STATISTICHESKII SPRAVOCHNIK SSSR 1927, pp. 78–83. Moscow. 1927.

ing industries that made primarily heavy—or producers'—goods, there were chronic shortages of consumer goods, many of which were poor in quality. Under such conditions, the natural tendency of the small peasant farms toward self-sufficiency was greatly enhanced, especially in the years of poor harvests. The peasants would not part with their surplus and frequently went so far as to curtail production; hence arose the mutual hostility between the Bolsheviks and peasants, particularly the more prosperous ones who had any surpluses to sell.

In the spring of 1929 the first 5-year plan of economic development was promulgated, and it had as one of its major objectives the socialist reconstruction of agriculture. The plan, however, did not contemplate an immediate, thoroughgoing agricultural collectivization, as it called for a crop area on collective farms by 1932 of about 36 million acres as against the 298 million acres to remain in individual holdings. Nevertheless, with the beginning of the winter of 1929–30, Soviet Russia was definitely entering on the road of wholesale collectivization and the elimination of the upper strata of the peasantry. This move, which only half a year earlier would have seemed Utopian, was defended by Stalin at a conference of the Marxian agricultural specialists on December 27, 1929, in a speech entitled "Concerning the Questions of Agrarian Policy in the U.S.S.R."[13] In this speech, after demonstrating the impossibility of building up socialism on two different bases—large industry and petty agriculture—Stalin asserted that even the pooling in the collective farms of the simple peasant implements and animal draft power would lead to a great increase in productivity and, particularly, would enable the peasants to expand their acreage considerably. Stalin believed that this effectiveness would be greatly augmented with the introduction of the new machine technique and tractor farming. Psychological difficulties of such a transformation were minimized, the managerial and agrotechnical difficulties, which will be discussed later, were overlooked.

But what about the kulaks? Here Stalin announced a transition from a policy designed merely to limit "the exploitation tendencies of the kulaks" to a policy aiming at the "liquidation of the kulaks as a class," involving the so-called raskulachivanie, or complete rooting out of the kulaks. This process was looked upon as part and parcel of the collectivization movement in the regions of mass collectivization. Stalin held that it could not have been accomplished earlier in view of the important part played by the kulaks in the commercial production of grain, but that it became feasible with the growth of collective and state farms, which were considered capable of replacing the production of the kulaks. The kulaks, no longer needed, could be dispensed with without any qualm. "When the head is taken off," said Stalin, quoting a Russian adage, "there is no use crying about the hair."

Shortly after Stalin's speech, wholesale collectivization and "liquidation of the kulaks as a class" were made the official goals by a decree

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[13] KOMMUNISTICHESKAYA AKADEMIYA. AGRARNYI INSTITUT. TRUDY PERVOI VSESOYUZNOI KONFERENTSII AGRARNIKOV-MARKSISTOV, v. 1, ed. 2, pp. 431–448. Moscow. 1930. The speech was reprinted also in Stalin's PROBLEMS OF LENINISM, 11th ed., pp. 306–327. Moscow. 1940.

of the Central Committee of the Bolshevik Party,[14] goals which were steadfastly pursued by the Soviet Government to their consummation. It was considered that collectivization, in the main, could be completed in the most important surplus-grain regions in the autumn of 1930 or, at the latest, in the spring of 1931 and in other grain regions in the autumn of 1931 or in the spring of 1932. The kulaks were not to be admitted into the collectives. Noteworthy was the warning against any attempt to retard the collective movement because of the lack of tractors and other modern machinery.

Other legislation in a similar vein followed in rapid sequence. A decree of the Central Executive Committee and of the Council of People's Commissars of the USSR, dated February 1, 1930, revoked the law permitting the renting of land by individual peasant farmers and the employment of hired labor in regions of collectivization. The authorities of the different regions and autonomous Republics were empowered to use "all necessary measures for the struggle with the kulaks" up to complete confiscation of their property and deportation. The confiscated property of the kulaks was to be transferred to the kolkhozy, except such amounts as were due to the state. "The penal code was also amended to enable the courts to impose upon the kulaks punishment for acts which hitherto had not been considered criminal and to punish them more severely for ordinary offenses, e.g., for failure to pay taxes on the date due. It rested with the court to classify an offender with the kulaks, and the rulings of the R.S.F.S.R. Supreme Court [R.S.F.S.R. is the largest of the Constituent Republics of the Soviet Union] show that it was not so much the prosperity of a peasant as his attitude towards collectivization which determined his class characteristics."[15]

The local authorities thus had a "green light" to proceed with collectivization as rapidly as possible and to deal severely with recalcitrant elements. More than 5 million of the peasant population labeled as kulaks were uprooted, their property confiscated, and many of them deported to remote regions.[16] The Soviet press during the first 2 months of 1930 was filled with stories of glowing success on the collectivization front. Suddenly, on March 2, 1930, there was published in the Soviet press the famous article by Stalin entitled "Dizziness from Success," in which the local party and Soviet authorities were taken to task for pushing collectivization too fast and too far, for dragooning the peasants into kolkhozy and extending collective

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[14] These goals were expressed in a decree of the Central Committee of the Communist Party, Jan. 5, 1930, "Concerning the Tempo of Collectivization and Assistance of the State in the Organization of Kolkhozy." The decree can be found in a collection of decrees dealing with agriculture compiled by V. V. Kilosanidze (VAZHNEISHIE RESHENIYA PO SEL'SKOMU KHOZYAISTVU, ed. 2, p. 411. Moscow. 1935).

[15] GSOVSKI, VLADIMIR. SOVIET CIVIL LAW. PRIVATE RIGHTS AND THEIR BACKGROUND UNDER THE SOVIET REGIME, v. 1, p. 712. University of Michigan Law School. Ann Arbor. 1948.

[16] According to A. I. Gaister, the vice-commissar of agriculture of the USSR, the kulak population declined between 1928 and 1931 from 5.4 million to 1.6 million. (LADEJINSKY, W. COLLECTIVIZATION OF AGRICULTURE IN THE SOVIET UNION. Political Science Quarterly 49: 1–43, 207–252. 1934.) The official Soviet agricultural yearbook, SEL'SKOE KHOZYAISTVO SSSR, EZHEGODNIK 1935, gives the number of kulaks in 1928 as 5.6 million and on Jan. 1, 1934, as 149,000.

farming into regions that were not ripe for collectivization, and for skipping over the intermediate "artel" type of collective farming in favor of the full-fledged "commune."

Stalin's caustic attack attributed the errors in the process of collectivization to the dizziness resulting from the easy successes on the part of Soviet and party administrators. Stalin's article was followed on March 15, 1930, by similar criticism in a decree issued by the Central Committee of the Communist Party, entitled "Concerning the Struggle with the Deviations of the Party Line in the Collective Movement." Another article of Stalin's on the same subject, entitled "The Reply to Comrades—Collective Farmers," appeared on April 3.

Thus, the whole blame for the blunders committed in speeding up collectivization was placed by the Kremlin on the lower echelons of the party and Soviet administration. The latter, however, often against their better judgment, were executing what they took to be the general party line of the moment, which was to bring the peasants into the kolkhozy. The following account of collectivization by a village communist, reported by an American writer long resident in the Soviet Union, may be considered as fairly typical.[17]

> When we were told of collectivization. . .I liked the idea. So did a few others in our village, men like me, who had worked in the city and served in the Red Army. The rest of the village was dead set against it and wouldn't even listen to me. So my friends and I decided to start our own little cooperative farm, and we pooled our few implements and land. You know our peasants. It's no use talking to them about plans and figures; you have to show them results to convince them. We knew that if we could show them that we earned higher profits than before, they would like it and do as we did.
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> Well, we got going. Then, one day, an order comes from the Klin [a county seat in the Moscow province] party committee that we had to get 100 more families into our little collective. We managed to pull in about a dozen. And, believe me, this was not easy. It needed a lot of coaxing and wheedling. But no coaxing could get us even one more family. I went to Klin and explained the situation to the party committee. I begged them to let us go ahead as we started and I promised them, if they did, to have the whole village in the collective by next year. They wouldn't listen to me. They had orders from Moscow, long sheets saying how many collectives with how many members they had to show on their records. That was all. They told me that I was sabotaging collectivization and that unless I did as I was told I would be thrown out of the party and disgraced forever. Well, I knew that I couldn't get our people in, unless I did what I heard others were doing, in other words, forced them. When I had first heard of people doing that, I thought I would rather die than do it myself. I was sure that my way was the right way. And here I was with no other choice. I called a village meeting and I told the people that they had to join the collective, that these were Moscow's orders, and if they didn't, they would be exiled and their property taken away from them. They all signed the paper that same night, every one of them. Don't ask me how I felt and how they felt. And the same night they started to do what the other villages of the U.S.S.R. were doing when forced into collectives—to kill their livestock. They had heard that the government would take away their cattle as soon as they became members of a collective.
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> I took the new membership list to the committee at Klin, and this time they were very pleased with me. When I told them of the slaughter of cattle and that the peasants felt as though they were being sent to jail, they weren't interested. They had the list and could forward it to Moscow; that was all

[17] FISCHER, MARKOOSHA. MY LIVES IN RUSSIA, pp. 49–51. New York. 1944.

they cared about. I couldn't blame them, they were under orders as well as I was.

. . . In our village as well as elsewhere, even though the peasants had formally joined the collectives, they wouldn't work and went on killing the cows and chickens.

Then last March the papers and radio were full of Stalin's article "Dizziness with Success." He laced into us for forcing peasants to join the collectives. We village Communists had gone too far, Stalin scolded.

That was exactly what I had said right from the beginning. But our local authorities wouldn't listen because they had orders from Moscow and were afraid to disobey them. Everybody in the village now laughed at me. I wanted to go away and never return. But the committee wouldn't let me go. "No," they said, "you carry on but do it right this time." As if they didn't know that I had been right all along and that I was made to pay for other people's mistakes. They made me spit into my own face. And here we are now, the same twelve families working together as we had started only with our livestock gone, our minds confused, and the villagers laughing into my face. The other night at a meeting when I told them about new taxation, they made fun of me and asked: "How do we know that you are not going to blunder again this time?"

Following Stalin's denunciation, the Soviet press became filled with reports dealing with various malpractices in connection with collectivization.

The attempt at organizing communes to collectivize all property of the peasants, including even domestic utensils and clothing, provoked the greatest discontent and resistance on the part of the peasants.[18] This tendency toward complete collectivization was coupled with what the Russians called "gigantomania"—formation of huge and unwieldly units. A good example was the case in the Ural region where, within a period of 10 days, 5,000 families were forced into a single commune already consisting of 4,000 families.[19]

The official attack on the methods pursued in collectivization and the new emphasis on the "voluntary" nature of the kolkhozy were undoubtedly prompted by a serious unrest among the peasantry, which endangered the 1930 spring sowing campaign. As permission was given to the peasants to leave the kolkhozy into which they had been forced against their will, a large-scale exodus took place. Its extent may be gaged from the fact that a region like the Central Black Soil (which, incidentally, was not supposed to be in the first group of collectivized regions) reported 82 percent of the peasant households collectivized in March and only 18 percent in May 1930. Similar contrasts were characteristic of many other regions. For the country as a whole, less than one-fourth of the peasant households were in collective farms in May 1930, whereas in February one-half had been reported collectivized. The extent to which the rapid wholesale collectivization in the winter of 1929–30 had been forced on peasants, and often achieved merely on paper, is well revealed by these figures.

Serious as was the set-back suffered by collectivization in the spring of 1930, there were still, in June 1930, nearly 86,000 collectives as against 57,000 a year earlier, and the number of peasant households in the kolkhozy was 6 times as large (table 2). Even more impressive was the growth of the collective acreage, the share of which in the

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[18] TSYL'KO, F. [THE BASIC LANDMARKS OF THE COLLECTIVE MOVEMENT OF 1929–30.] Na Agrarnon Fronte 1930 (5): 19–45. 1930.

[19] Ibid., p. 31.

total crop area increased from 3.5 percent in 1929 to 30 percent in 1930.[20]

The campaign for collectivization was resumed in the autumn of 1930, and by the middle of 1931 the number of kolkhozy increased

TABLE 2.—*Development of collectivization, 1918–40*[1] *and 1950*[2]

Year	Collective farms	Households in collectives	Proportion of peasant households collectivized
	Thousands	*Thousands*	*Percent*
1918	1.6	16.4	0.1
1919	6.2	81.3	.3
1920	10.5	131.0	.5
1921	16.0	227.9	.9
1922	14.0	217.0	.9
1923	16.0	228.0	.9
1924	16.3	211.7	.9
1925	21.9	293.5	1.2
1926	17.9	247.0	1.0
1927	14.8	194.7	.8
1928	33.3	416.7	1.7
1929	57.0	1,007.7	3.9
1930	85.9	5,998.1	23.6
1931	211.1	13,033.2	52.7
1932	211.1	14,918.7	61.5
1933	224.6	15,258.5	65.6
1934	233.3	15,717.2	71.4
1935	245.4	17,334.9	83.2
1936	244.2	18,448.4	90.5
1937	243.7	18,499.6	93.0
1938	242.4	18,847.6	93.5
1939	241.1	19,300.0	----
1940	236.3	19,200.0	96.9
1950	[3]252.0	----	----
1951	123.0	----	----

[1] Prewar boundaries.
[2] Postwar boundaries.
[3] The number of collective farms decreased considerably toward the end of 1950 because of widespread mergers, described in a later section.

Sources: Data for 1918–38, SAUTIN, I. V., ed., KOLKHOZY VO VTOROI STALINSKOI PYATILETKE, p. 1, Moscow and Leningrad, 1939; for 1939–40, SHEPILOV, D., KOLKHOZNYI STROI SSSR, Problemy Ekonomiki 1: 35, 1941; for 1950, Sotsialisticheskoe Zemledelie, Mar. 3, 1951.

to 211,000, as compared with 86,000 a year earlier, and included nearly 53 percent of all the peasant households. In the principal grain-producing regions from 60 to 80 percent of the peasant households were collectivized. Collective farms accounted for 58 percent of the total crop acreage.

[20] The ratio of the collective crop acreage to the total crop area for all types of farms is based on data in SOTSIALISTICHESKOE STROITEL'STVO SSSR. STATISTICHESKII EZHEGODNIK, pp. 179 and 183. Moscow. 1934. These figures are smaller than the percentages of collectivization of crop acreages usually cited in Soviet statistics, which include under the kolkhoz crop acreage also the kitchen garden plots of the members and represent the ratio of this area to the total land cultivated by peasants, including the individual peasant holdings and excluding state farms and plots of industrial workers. *See* SLOVAR-SPRAVOCHNIK PO SOTSIAL'NO-EKONOMICHESKOI STATISTIKE, p. 128.

The Sixth Congress of the Soviets of the USSR (the former official parliament of the Soviet Union), which assembled in March 1931, in reviewing the results of collectivization, declared:

"We have surmounted the grain crisis; we have conquered famine."

Starvation, however, was far from being overcome. Actually, famine stalked the Russian countryside, especially in 1932 and early 1933, as the Soviet Government was heavily requisitioning the mediocre crops produced by the bewildered and sullen peasants on the new and inefficiently operated collective farms.

Collectivization was also marked by a catastrophic decline of livestock due to the wholesale slaughter of animals by the peasants when they were forced to join the collective farms, and by the high mortality of livestock due to poor care and lack of fodder and shelter in the new collective farms. Thus was canceled the whole laborious recovery of Russian animal husbandry during the NEP period after the plight of the revolutionary era. A new serious livestock crisis began, from which Soviet Russia had not completely recovered when World War II broke out, and made matters much worse. Because horses shared the fate of other livestock, there resulted a serious shortage of draft power that, in the early years of collectivization, could not be immediately relieved by the introduction of tractors.

Despite all these difficulties, the Kremlin succeeded, in the course of a few years, in forcing the Russian peasantry into a new collectivist mold of its own design, an accomplishment that made possible thorough regimentation of agriculture, subjection of it to over-all economic planning and, above all, Government control over the distribution of farm output. By 1936, more than 90 percent of all peasant families remaining on the land were in kolkhozy.

There was no significant change in the policy of agrarian collectivism during the war with Germany. Nevertheless, the system of collective farming suffered even in the uninvaded zone from the depletion of human and material resources; the mobilization of many of its managerial personnel and skilled workers; the shortages of tractors, combines, and other farm implements; the abandonment of progressive farm practices, such as crop rotation; and the encroachment of individuals and institutions on the kolkhoz land and other property. A still more considerable disintegration of collective farming took place in the invaded zone.

A significant relaxation of the collectivist agrarian policy at the end of the war was apparently expected both within and without the Soviet Union. An appeal to history seemed to substantiate such an expectation, since most major wars brought in their train a drastic shake-up of the Russian agrarian structure. There were, however, important exceptions, such as the Napoleonic wars at the beginning of the nineteenth century. World War II appears to be a similar exception, as it was not followed by any essential modification of the collective-farm structure. On the contrary, restoration of the kolkhoz system in its prewar purity has been the keynote of Soviet policy since the close of the war, as set forth in detail in two Government decrees, of September 19, 1946, and February 1947, which will be discussed in detail later. The firm grip of the Kremlin over Russian agriculture has continued unabated and, if anything, has been tightened still further with the far-reaching campaign for merger of collective farms that began in 1950.

III

THE FARM SYSTEM

Three types of new Soviet farm units may be distinguished—the collective farms, or kolkhozy;[1] the state farms, or sovkhozy;[1] and the state-owned machine-tractor stations, or MTS, which themselves do not carry on farming but only serve kolkhozy with tractors, combines, and other farm machinery.

COLLECTIVE FARMS (KOLKHOZY)

Organizational Structure

Collective farms were first organized shortly after the Bolshevik revolution in 1918. But, until the 1930's, despite considerable assistance from the Soviet Government, collective farming was merely a small island in the ocean of Russian peasant agriculture and its role in the Soviet agricultural economy was insignificant. In 1928, though the number of collectives had already increased considerably, they still accounted for only a little more than 1 percent of the total area sown in crops and included less than 2 percent of the total number of peasant households.[2]

Initially, the collective farms were organized as completely communistic associations, so-called communes, in which not only production but consumption as well was fully socialized.[2] In the late 1920's, however, the communes constituted only 5 to 6 percent of all collective farms, the predominant form being the so-called toz.[3] The latter is a loose producers' association in which the peasants, while continuing private ownership of the means of production, unite for a season or longer for common cultivation of the land, sharing the product in accordance with the labor, land, and capital contributed. The kolkhozy during this period were small; in 1928 each comprised, on the average, 13 peasant households with a total sown area of 101 acres.[4]

Since the forced mass collectivization in the early 1930's, the commune and the toz were supplanted by the intermediate form, the so-called artel, which, in 1932, accounted for 95.9 percent of all collective farms. The present artel type of kolkhoz is a farm production unit consisting predominantly of former individual peasant farmers and organized and operated in accordance with a certain pattern prescribed and rigidly controlled by the Government. It forms an integral part of the Soviet planned economy.

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[1] Singular of *kolkhozy* is *kolkhoz* and of *sovkhozy, sovkhoz.*

[2] KONYUKOV, I. A. KOLLEKTIVNOE ZEMLEDELIE, ed. 2, p. 40. Moscow. 1925.

[3] SOTSIALISTICHESKOE STROITEL'STVO SSSR 1934, p. 162.

[4] SAUTIN, I. V., ed. KOLKHOZY VO VTOROI STALINSKOI PYATILETKE, p. 6. Moscow and Leningrad. 1939.

In a kolkhoz all land that formerly was held by individual peasant farmers is collectivized, with the exception of small plots for family kitchen gardens. Boundaries are done away with, and the noncontiguous strips into which the peasant holdings were divided are consolidated into larger fields. Most of the other means of production, such as horses and, to a lesser extent, other livestock and farm implements, are also collectivized.

As it has done since the early Soviet period, the state continues to own, legally, all of the land, but each kolkhoz holds the land it occupies for an unlimited period, that is, in "perpetuity," as the Soviet law puts it. The title of the kolkhoz to the land is secured by a title deed issued on the basis of an official land survey. The land can neither be sold by the kolkhoz nor leased and cannot be taken except, with proper compensation, for important public needs. Illegal leasing of land, however, has been reported from time to time in the Soviet press. Even more common has been the seizure of collective land by outsiders, mostly officials or institutions, an abuse that became so flagrant during World War II that a special Government decree (September 19, 1946) was required to control it.

In addition to land, farm capital has also been collectivized. This includes such items as draft animals and other livestock beyond certain rather narrow limits to be mentioned later, farm implements, seed, forage supplies for collective stock, stables, barns, and similar property. New members who possess such property must surrender it in good faith to the kolkhozy. The confiscated property of some 5 million liquidated kulaks, who were driven off the land as a result of collectivization, was transferred to the kolkhozy.

One-fourth to one-half the value of collectivized peasant capital is counted as indivisible surplus of the kolkhoz, and the remainder is considered an invested share of the member, which he may recover but in cash only upon withdrawal from the kolkhoz. With the scarcities of goods in the Soviet Union, such cash payments were not to the advantage of the withdrawing members even prior to wartime inflation. Recovery in kind is permissible only when a member is transferred from one kolkhoz to another for reasons approved by Government authorities. The withdrawing member cannot recover his old holding but must depend upon the state to allot him land from the public domain. Allotment, however, is left to the discretion of the state, which has been trying hard to discourage individual farming.

Obviously, the kolkhoz has little in common with the old mir, under which there was no joint cultivation but only individual farming by peasant families. Essentially, the kolkhoz is an economy of socialized production and individual consumption. While the kolkhoz performs certain welfare and cultural functions (libraries, theaters, clubs, child nurseries, canteens, and so forth) that come under the heading of communal consumption, its present artel form is an institution primarily of production and not of consumption. The latter is basically a matter for each individual peasant household, as it was during the precollective period.

The peasant families whose holdings have been pooled in a kolkhoz continue to live in villages just as they did before collectivization. In addition to their dwellings, each peasant family is entitled, if land is available, to a small plot for a kitchen garden, varying regionally from

0.6 to 1.2 and, in some sections, to 2.5 acres.[5] A peasant family may also own a small number of cattle, hogs, sheep, and goats. But horses, except in the nomadic or seminomadic regions, are collective property. A member of a kolkhoz who needs a horse for his own use must ask to borrow it from the kolkhoz; the kolkhoz management may or may not grant his request.

It should be noted that the allotment of kitchen garden plots is made not to any individual member of a kolkhoz but to a family labor unit—the peasant household, the able-bodied members of which are supposed to participate, with some exceptions, in the work of the kolkhoz. Likewise, the peasant household owns jointly the dwelling, the private livestock, the few farm implements, etc. Thus, the traditional institution of joint family property among Russian peasants is retained insofar as the private farming of the peasant in the kolkhoz is concerned; but it does not apply to any earnings obtained from the farm operations of the kolkhoz, which constitute his or her personal property.[6]

Such personal farming as a member of a kolkhoz does on his little plot is supposed to have a strictly supplementary character, subsidiary to the basic economy of the collective farm. In practice this brings an economic dualism into the kolkhoz economy, resulting, as we shall see later, in competition and conflict between the collectivist and the individualist elements, which the artel organization of collective farming is supposed to reconcile.

Legally, the kolkhoz is intended to be a self-governing organization, managing its own affairs within the limits set by Government plans and regulations. Each kolkhoz has a charter patterned after the model charter that was approved by the Government in 1935.[7] Although, as a rule, entrance into the kolkhoz has been a family affair, membership is legally an individual matter for men and women alike. The governing body of the kolkhoz is theoretically the general meeting or assembly of its members, which elects by majority vote the officers who constitute an executive board headed by the chairman, or manager, and who are accountable to the general assembly. The latter also elects an auditing commission, approves the budget and production program of the kolkhoz, and admits and expels members. In practice, however, the Government and party officials are in the habit of appointing, dismissing, and transferring officers from one kolkhoz to another at will, and the kolkhoz general assembly actually has little or no voice in the management of its kolkhoz affairs.

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[5] A tendency to diminish the size of the kitchen garden plots is discernible in connection with the campaign for the merger of the kolkhozy in 1950. See, for instance, a report of a considerable reduction in size of such plots in the Leningrad Province, by D. Brezhnev, in *Izvestiya* of Aug. 26, 1950. Even the idea of a complete abandonment of personal farming by members of kolkhozy in the not too distant future is being broached. *See* PAVLOV, I. V. [THE STRENGTHENING OF THE ORGANIZATION AND ECONOMY OF KOLKHOZY.] Sovetskoe Gosudurstvo i Pravo, 11, 1950, pp. 50–51. The future, therefore, of this highly important element in the economic life and welfare of the collectivized peasantry appears to be uncertain in the spring of 1951.

[6] *See* NIKITIN, A. N., PAVLOV, A. P., and RUSKOL, A. A., eds. KOLKHOZNOE PRAVO, 341–367. Moscow. 1939. *Also* GSOVSKI, op. cit., v. 1, pp. 104–105.

[7] An English translation of the charter will be found *in* GSOVSKI, op. cit., v. 2, pp. 441–462; and *in* HUBBARD, L. E. THE ECONOMICS OF SOVIET AGRICULTURE, pp. 131–147. London. 1939.

Such violations of the law have been chronic, despite frequent official censure, and they make the self-government of kolkhozy essentially a fiction. As a writer in the July 1947 magazine of the Soviet Ministry of Agriculture puts it:

> What kind of a democracy is there in those kolkhozy where chairmen are not elected by the members but are appointed by Soviet administrators, where the general assembly is either not convoked at all, or convoked very seldom, and poor preparations are made for it? In such kolkhozy the rank-and-file members actually are removed from the management of kolkhoz affairs and do not feel any responsibility for the state of affairs in the kolkhoz.[8]

As a result of such violations of the self-government of the kolkhoz, the members "begin to consider the manager not as an elective official responsible to his constituents. They cease to feel that they are full-fledged proprietors of the kolkhoz, and this, of course, diminishes their interest in production and in kolkhoz affairs."[9]

Likewise, frequent interference with the kolkhoz manager's orders and decisions by Government officials "inevitably leads to loss of authority by him among the members of the kolkhoz and to the lowering of the working discipline and order."[10] In their turn, "Some kolkhoz managers no longer consider a kolkhoz as an artel [that is, a cooperative institution]. They forget that the boss of the artel is the general assembly of the members of the kolkhoz. It not infrequently occurs that the general assemblies are not convoked for half a year or longer and questions which according to the charter can be decided only by the general assembly are settled by the executive board of the kolkhoz or the manager himself."[11]

Such an attitude of a manager usually stems from the fact that his job normally depends upon the discretion of the local "party boss" and not of the kolkhoz membership. Moreover, he is not likely to stay long on his job in a particular kolkhoz. If the manager makes mistakes and is considered incompetent, he is removed even though he may have little training or experience to gain competence. If the manager is efficient, he is often used as a "trouble shooter" to reform inefficient kolkhozy, a transfer that does not help the farm from which he is taken. That the rapid turn-over of kolkhoz managers is a serious evil was repeatedly recognized in Soviet official circles, but it has never been remedied. The same condition seems to prevail in some of the newly merged kolkhozy, judging from an editorial in *Sotsialisticheskoe Zemledelie* of February 2, 1951, which complains that in some districts kolkhoz managers were selected without sufficient scrutiny and with insufficient knowledge of agriculture, or who were "previously compromised by gross violation of the kolkhoz charter." As a result, some managers were removed soon after the merger of kolkhozy. However, there are straws in the wind, such as an article dealing with selection and training of kolkhoz managers by a Ukrainian Provincial party official in *Pravda* of January 23, 1951, pointing to greater aware-

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[8] KOSHELEV, F. [DEMOCRATIC BASIS OF MANAGEMENT OF AN AGRICULTURAL ARTEL.] Sotsialisticheskoe Sel'skoe Khozyaistvo 1947 (7): 24. 1947. For a typical example, *see* GROSS VIOLATION OF KOLKHOZ DEMOCRACY. Pravda, Mar. 27, 1950.

[9] Pravda Vostoka, May 26, 1944.

[10] Kazakhstanskaya Pravda, May 30, 1944.

[11] Pravda Severa, Aug. 29, 1944.

ness by the Soviet bureaucracy of the need of a more tolerant attitude toward initial errors committed by inexperienced farm managers, many of whom, since World War II, have been former army officers. Special training courses for kolkhoz managers have also been organized.

Whereas lawless habits and greed of local officials account for some illegal interference with the kolkhozy, such interference is largely rooted in the very system of Soviet regimentation and control of collective farming. That the smooth functioning of collective farming requires continuous, not merely sporadic, responsibility and direction by Government and party authorities, was the thesis propounded by Joseph Stalin as far back as 1933.[12] This thesis was constantly reiterated by other important officials, such as that member of the mighty Politburo, Andreev, who at the Eighteenth Communist Party Congress in the spring of 1939 scorned the practice "of noninterference in the internal life of kolkhozy."[13]

Certainly, the Government has manifested a high-handed attitude towards the peasantry and the kolkhozy often enough to encourage emulation by the lower echelons of Soviet bureaucracy. An outstanding recent example of arbitrariness of the Politburo is the wholesale merger of kolkhozy to be discussed below. It is not difficult to understand, therefore, why the oft-repeated denunciations of the violations of the charter have so little effect.

> But, even if the provisions of the charter are strictly adhered to, the autonomy of the kolkhoz is, nevertheless, circumscribed by the very fact that it must work within the plan laid down by the central government and interpreted by its local agents. This is clearly set forth in article 6 of the charter, which states: "The 'artel' is obliged to carry on collective farming according to the plan, observing precisely the plans of agricultural production and of the obligations to the state laid down by the organs of the peasant-workers' government." The various plans which the "artel" must carry out are then again enumerated in detail. This necessity of dovetailing into the scheme of compulsory Soviet planned economy is bound to result in a large measure of control over collective farming on the part of officials charged with the execution of the plans, and . . . must restrict the self-government of the kolkhoz. The charter makes the kolkhoz legally the "boss" of its land, but a "boss" whose powers are qualified and limited by the supremacy of the national plan.[14]

In general, the Government has assumed, with respect to collective peasant agriculture, much of the responsibility for management that formerly devolved upon millions of independent peasant farmers. The Soviet Government not only has its say as to what is to be produced by collective farms and what proportion of the output is to go to the state, but it also prescribes, regulates, or plans many details of farm operation and practice with a view to increasing farm output—always the central objective of Soviet agricultural policy.

Such problems as assembling seed and forage supplies, timely and efficient sowing and harvesting, proper care of livestock, crop rotation, internal organization of the farm unit, and other details of farming, with which the Government once rarely concerned itself directly, now occupy its attention. Many of these problems, including the acreage to be sown to different crops from year to year, the number of live-

[12] [WORK IN THE RURAL DISTRICTS.] Sotsialisticheskoe Zemledelie, Jan. 17, 1933. Republished in STALIN, J. V. PROBLEMS OF LENINISM, 11th ed., pp. 441–454. Moscow. 1940.

[13] Pravda, Mar. 14, 1939.

[14] VOLIN. AGRARIAN COLLECTIVISM IN THE SOVIET UNION, pp. 762–763.

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stock, and even the yields per acre, are dealt with by national plans, which establish goals for the various Republics and Provinces of the Union. The authorities who are responsible for execution of these plans set up local goals, including, ultimately, targets for each kolkhoz, on the basis of which the kolkhozy are supposed to prepare their annual production programs. Nonfulfilment, actual or threatened, of such goals usually involves increased intervention by state and party organs and their representatives.

Among the various kinds of plans applied to agriculture there is, first of all, the general 5-year plan of economic development, which embraces all phases of Soviet economy. Three such plans were promulgated before World War II (in 1929, 1933, and 1939) and a fourth postwar 5-year plan in 1946. On the basis of the 5-year plan, annual plans of acreage and production for agriculture are drawn up and were published in considerable statistical detail in the 1930's. Since World War II, however, while a decree dealing with sowings and a lengthy decree pertaining to harvest and Government procurement of crops were published annually, the statistical data in such decrees have been meager. Special problems, such as the development of the livestock industry or reforestation and soil conservation or irrigation development, are dealt with by special plans.

Thus, collective farming is subjected to detailed regulations and plans laid down by Moscow and supervised by local officials who are responsible for carrying them out. State control over collective farming has been further strengthened because the Government, in the face of a severe shortage of animal draft power resulting from the wholesale slaughter of horses during the collectivization campaign, has increasingly supplied the power and machine requirements of Russian agriculture through the state-owned MTS.

Considerable rigidity and, at times, ignorance and disregard of expert opinion have characterized the control and direction of collective farming by the Communist bureaucracy. Among the numerous examples found in the Soviet press may be cited the situation in the important sugar-beet-growing district of Kharkov in the Ukraine. Here, in the spring of 1949, according to an editorial in *Pravda* of September 10, 1949, many kolkhozy decided to take the advice of the agronomists and postpone sugar-beet planting for 2 or 3 days because of frosts and rains. However, the secretary of the raion (county) party committee (the local party boss) reversed this reasonable decision and ordered planting to begin at once, overruling objections by saying, "Why do you consult with the agronomists? They don't know anything." As a result, many kolkhozy harvested a smaller crop of sugar beets.

Though the *Pravda* editorial does not mention it, the party official responsible in this case was doubtless influenced by the enormous stress laid by Moscow on the speedy completion of planting; and he probably feared that the delay, however well merited, might bring on him the disfavor of his superiors, the expression of which might range from a reprimand to relegation to a concentration camp. This situation illustrates not only the inflexibility, combined often with stubborness and ignorance of agricultural conditions in the lower echelons of Communist officialdom, but also the excessive centralization of

authority, inspiring fear and generating rigidity in subordinates and a tendency to avoid responsibility for making decisions.

Local officials who prevent the management of a kolkhoz from exercising independent judgment on farm operations are bound by a hard and fast plan laid down by Provincial authorities, who, in turn, are bound by similar plans laid down by the Government of a Republic, say the Ukraine, and ultimately, of course, by Moscow. The latter sets deadlines for the execution of its plans and directives and demands strict conformity, which often leads to falsification of achievement reports. Thus, bureaucratic regimentation stifles the initiative of those best informed and most concerned—the farmers, kolkhoz managers, and agricultural specialists—those at the grass roots.[15]

Much of the difficulty grows out of the fact that limitations imposed by nature on agricultural planning, particularly the interference of weather conditions with field work and planned crop yields, are either disregarded or at best belittled by the Kremlin. The much-publicized damage of the drought of 1946, when the USSR was anxious to continue receiving UNRRA aid, was an exception that proves the rule.

With the dependence of the kolkhozy on plans emanating from various higher authorities, delay in making or transmitting them "often disorganized or delayed work in the kolkhozy . . . ," as a local party official put it.[16] In general, the detrimental consequences of faulty planning in Soviet agriculture are usually magnified by the large scale, sometimes nation-wide, on which it is applied. Further discussion of this subject will be found in Chapters IV and V.

Labor and Management

The membership of a kolkhoz, the kolkhozniki, constitutes its labor force. According to article 13 of the charter, employment of outsiders (nonmembers) is permitted in cases of specialists and technicians, such as agronomists, engineers, etc. Hiring of other workers is allowed only as an exception and on a temporary basis, when the kolkhoz labor force is fully occupied and cannot complete urgent work on time. Another exception is construction labor. Actually, however, a Government decree of April 19, 1938 (Concerning the Incorrect Distribution of Income in Kolkhozy), published in the Soviet press on April 20, 1938, revealed a costly and apparently widespread employment of hired labor by kolkhozy beyond the rather narrow scope envisaged by the charter.

In its organization of work a kolkhoz resembles a large plantation or factory. It deals separately with each worker member and not with whole families. In his day-to-day work, a member of the kolkhoz is subject to the orders and supervision of the management, just as a worker is in a Soviet factory or on a state farm. Poor or careless work, violation of the kolkhoz rules, and absenteeism are supposed

[15] For a realistic description of the planning practices in the Soviet Union, *see* ROZANOW, MIKH. [HOW PLANNING IS DONE IN THE U.S.S.R.] Novoe Russkoe Slovo (Russian daily, published in New York), June 30, 1949; *and* BORODIN, ANDREI. [PLANNING FALSIFIERS.] Novoe Russkoe Slovo, Dec. 13, 1949.

[16] Pravda Vostoka, Feb. 11, 1949.

to be punished by reprimands, fines, demotions, temporary dismissal from work, withholding payment for work that must be redone, and, when all other corrective measures fail, by expulsion from the kolkhoz, which also means loss of the private garden plot. Expulsion, however, must be sanctioned at a general assembly, when no less than two-thirds of the members are present, with a right of appeal to the Praesidium of the Raion Executive Committee. That expulsion from the kolkhoz, with all its dire consequences, has often been freely used may be seen from the fact that a special decree had to be passed, in April 1938, to stop this practice.[17]

The large size of many kolkhozy, with a labor force of several hundred workers and an area of several thousand acres, early posed the problem of developing a more convenient unit of actual operation and supervision of labor. Such a unit is supposed to be the brigade, or working group. It consists of 40 to 60 workers headed by a brigadier, or foreman, appointed by the management.

There are separate field-crop and livestock brigades. Large kolkhozy often employ specialists in charge of field-crop or livestock production. Field-crop brigades are supposed to be kept together for the duration of the crop-rotation period, usually for several years, to have their own equipment, and to cultivate the same plots of land. And livestock brigades are supposed to be kept together for a period of not less than 3 years. Judging from the Soviet press, however, these officially much-emphasized requirements are honored more often in breach than in performance, and the instability of the brigades has been a frequent source of complaint. Difficulties often arising from the need to dovetail plots to be farmed by a brigade year after year with the annual acreage plan, the requirements of the crop-rotation cycle, and tractor operations of the MTS, militate against the stability of brigade plots.[18] However, the principle of stability of brigades has gained in importance as a greater role has been assigned to the performance of these units in the process of distribution of incentive payments, discussed in another section. There are also separate construction brigades, organized in connection with the extensive building activity in the newly merged collective farms in 1950–51.

In the early and middle 1930's the official emphasis was on the brigade as a unit of kolkhoz operation. A decree of the Central Committee of the Communist Party of February 4, 1932, stated that "A brigade must become the most important element [link] in the organization of labor in the kolkhozy."[19] The model charter of 1935 still further strengthened, theoretically, the position of the brigade in the kolkhoz structure.

During the years immediately preceding and following World War II a smaller unit, the so-called zveno (literally, link), came to the fore. A zveno usually consists of a dozen workers under a leader. This group cultivates a plot that is supposed to be assigned to it each

[17] Pravda, Apr. 20, 1938. *See also* NIKITIN AND OTHERS, op. cit., pp. 265–268. *And* VOLIN, LAZAR. EFFECTS OF THE DROUGHT AND PURGE ON THE AGRICULTURE OF THE SOVIET UNION. Foreign Agr. 3: 193–194. May 1939.

[18] KHOLOSTOVA, A., and SHESTAKOV, M. [CONCERNING THE STABILITY OF BRIGADE PLOTS IN KOLKHOZY.] Sotsialisticheskoe Sel'skoe Khozyaistvo 1949 (3): 18–23. 1949.

[19] [CONCERNING THE CURRENT MEASURES FOR ORGANIZATIONAL ECONOMIC STRENGTHENING OF THE KOLKHOZY.] *In* KILOSANIDZE, op. cit., p. 429.

year. The zveno originated for use on, and was found especially suited to, such intensive crops as sugar beets and cotton, for the care of which a great deal of hand labor is necessary throughout the growing season.

In the late 30's, the zveno began to be used in grain farming also. Theoretically, it is not supposed to supplant the brigade but represents merely a section of it under the supervision of the brigadier. The smaller unit simplifies supervision and also is claimed to make for better working discipline, to arouse greater personal interest on the part of the workers, and to facilitate incentive payments based on production results. Table 3 gives an example of the distribution of crop acreage in five zvenos of a kolkhoz in Stalingrad Province.

TABLE 3.—*Distribution of crop acreage in five zvenos of a kolkhoz in Stalingrad Province*

Crop	Zveno 1	Zveno 2	Zveno 3	Zveno 4	Zveno 5
	Acres	*Acres*	*Acres*	*Acres*	*Acres*
Spring wheat	202.6	215.0	148.3	264.4	182.9
Barley	86.5	98.8	98.8		
Oats				118.6	59.3
Millet	86.5	86.5	61.8	74.1	61.8
Sunflower seed	69.2	66.7	69.2	66.7	66.7
Melons			9.9	9.9	
Potatoes	9.9	9.9			
Total	454.7	476.9	388.0	533.7	370.7

SAFROSHKIN, F. [PERMANENT ZVENOS IN KOLKHOZ BRIGADES.] Sotsialisticheskoe Zemledelie, Dec. 25, 1945.

It will be noted that not all of these zvenos have similar crops or acreages. Those that have barley, for instance, are not given oats. The idea of dividing all crops equally among the zvenos, with consequent fragmentation of the sown area of the kolkhoz, has been frowned upon.

At the Eighteenth Congress of the Communist Party of the USSR, in the spring of 1939, the zveno system was strongly advocated by A. A. Andreev, the spokesman of the Bolshevik leadership, or the Politburo, on agricultural matters. Andreev stated that, "The more the labor in kolkhozy is individualized through the zveno or individual kolkhoz workers, the more their labor is materially rewarded, the more productive it is with respect to crops and livestock. . . . Depersonalization of labor in the large brigades is the principal obstacle to the further increase of labor productivity in kolkhozy." The zveno was also endorsed by V. M. Molotov, then the Soviet Premier, and by the whole Congress in its formal resolution. Hereafter, for more than a decade, the zveno occupied the place of honor in the official Soviet theory and policy pronouncements and was accordingly widely used in kolkhoz practice.

However, a sudden turn-about with respect to the zveno was indi-

cated when an unsigned article, entitled "Against Perversion in the Organization of Labor in Kolkhozy," appeared on February 19, 1950, in the authoritative *Pravda* (the organ of the Central Committee of the Communist Party of the USSR). The article criticized Andreev for his advocacy of the zveno, attacked its use in grain farming on the ground that it is inconsistent with mechanization, reasserted the basic importance of the brigade, and only grudgingly admitted the usefulness of the zveno in the case of some technical and row crops and vegetables, "insofar as production of these crops is as yet insufficiently mechanized."

The article entirely overlooks the numerous claims made in Soviet publications that the crops received better care under the zveno system. This is highly important under Soviet conditions, even in mechanized grain farming, because of the often slipshod work of the state machine-tractor stations and the abundant growth of weeds, which require much hand labor to eradicate. Moreover, Russian grain farming, as will be shown later, was far from being completely mechanized even before World War II, and has been less so since the war.

What had influenced the Government's attitude toward the zveno was the apprehension that the small zveno unit might eventually supplant not only the brigade but also the kolkhoz itself. According to the above-mentioned *Pravda* article, the substitution of the zveno for the brigade "would mean the breakdown of large unified collective farms into small producing cells, the dissipation of the power and means of the artel, and the changing over from advanced technology and collective forms of labor to hand labor of the individual. It would mean the shaking of the basic foundations of the large collective socialist agriculture." The shortage of machinery since World War II, with the consequent increased reliance on hand labor, doubtless tipped the scale in favor of the zveno. From the small zveno unit, it is a relatively easy step to the assignment of plots for individual cultivation and, in some cases, this was actually done. In any event, the control over the peasants from above is less difficult when the kolkhoz is split into a few brigades than into a large number of zveno units, especially when the zveno also takes care of the discharge of compulsory obligations for delivery of farm products to the state. Certainly, it would be necessary to secure a larger number of "politically reliable" supervisors under the zveno principle of organization as compared with the brigade principle. Moreover, the brigadier, who, unlike the zveno leader, is not a worker himself but an administrator, is likely to be a stricter supervisor. The trend toward the tightening of the state control of collective farming led, as we shall see later, to widespread mergers of kolkhozy, and it is reasonable to assume that it has also been at the root of the related brigade versus the zveno issue.

Be it as it may, the zveno is definitely on the wane, though the possibility cannot be excluded that another reversal of policy may revive it.

In a kolkhoz, unlike a small peasant farm or even a good-sized American farm, management is a specialized function and division of labor in general is carried out farther than on individually owned farms. Under such conditions the proportion of the administrative and service personnel to the labor force actually engaged in produc-

tion poses a problem. Much evidence has been adduced in Soviet literature over a period of years that the kolkhozy have been bedeviled by an inflated and costly administrative and service apparatus.[20] [21] Its maintenance has been a heavy drain on both the income and manpower of the kolkhozy and has often resulted in a shortage of labor for field work. For example, an investigation in Voronezh Province showed that in one kolkhoz 19.4 percent of all persons capable of work were engaged in tasks not related directly to agricultural production. The figure for another kolkhoz was 21; for a third, 27.5 percent.[22]

A kolkhoz in Krasnodar Province, with a total of 867 persons capable of work, had 7 bookkeepers, 10 timekeepers, 12 production specialists, 15 foremen, 12 blacksmiths, 3 mechanics, 2 tinsmiths, 48 guards, 4 chauffeurs, 1 garage man (for 2 machines), 3 club workers, 1 agriculturist, and 1 horticulturist. Altogether, 136 members of this kolkhoz were in administrative or service jobs, and in addition it had also hired an agronomist, a physician, an animal husbandry specialist, a veterinary assistant, and an orchestra conductor.[23] Similar reports could be cited from many other regions.

A sample survey, made presumably in 1939 by the Commissariat of Agriculture of the USSR, of 132 kolkhozy in 26 Provinces showed that two-fifths of the kolkhozy had from 10 to 20 percent of the members capable of work in administrative or service jobs, one-third of the kolkhozy had from 20 to 30, and one-eighth had more than 30 percent.[23] Strong, healthy men, it was claimed, flock to the administrative and service positions in preference to field work. This was given as one important reason for the kolkhozy's need to hire outside help. In 1939, two-thirds of the kolkhozy hired outside workers, and 12 percent of these used them for field work.[24]

In terms of the share of income going to the administrative and service personnel, the situation apparently worsened during the war. A study of collective farms in 6 regions showed that the proportion of the total earnings of the members devoted to paying such personnel increased from 7 to 10 percent in 1940 to 12 to 18 percent in 1945.[25] The rise was made more pronounced by the fact that the total earnings in terms of workdays increased but little or remained stationary or even declined. In the Uzbek Republic, for instance, total earnings declined 13.6 percent, but those of the administrative and service personnel increased by 13.2 percent. In Sverdlovsk Province, total earnings increased by 4 percent and those of administrative and service personnel by 67 percent.

Many of the administrative and servicing positions in the kolkhozy are actually part-time jobs. But when the remuneration for such work was set, it was treated generally as full time, with the result that kolkhoz members engaged in such activities did not lend their hands

[20] CHUVIKOV, V., and SAFROSHKIN, F. [CONCERNING THE REDUCTION OF INFLATED ADMINISTRATIVE AND SERVICE SET-UP IN KOLKHOZY.] Sotsialisticheskoe Sel'skoe Khozyaistvo 1941 (2): 32. 1941.

[21] ABRAMOV, V. [GREATER ROLE OF "WORK DAYS" IN DISTRIBUTION OF KOLKHOZ INCOME.] Sotsialisticheskoe Sel'skoe Khozyaistvo 1946 (10–11): 22–23. 1946.

[22] Izvestiya, Nov. 15, 1940.

[23] CHUVIKOV and SAFROSKIN, op. cit., p. 32.

[24] Ibid., pp. 32–34.

[25] ABRAMOV, V., and ERMOLINSKII, I. [CONCERNING THE ADMINISTRATIVE STRUCTURE OF KOLKHOZY.] Sotsialisticheskoe Sel'skoe Khozyaistvo 1947 (2): 22. 1947.

in the fields or in the barns. There was, thus, a considerable loss of manpower in production, while expenditures for administrative and service personnel were swelled at the expense of the earnings of other kolkhoz members.

A factor that has contributed to overexpansion of administrative and service personnel is that the small kolkhozy have tended to copy larger kolkhozy and have increased their administrative and service staffs beyond any real need. An instance was given of a kolkhoz in Penza Province, in which 14 out of 65 of its able-bodied members, or 22 percent, were engaged in some managerial or servicing capacity.[26] The animal husbandry specialist of this kolkhoz merely supervised the 2 or 3 persons caring for 7 cows, 7 calves, and 26 sheep. There were 8 guards in the kolkhoz, of whom 5 were employed throughout the year. Parenthetically, the guarding of collective farm property, including crops ripe for harvest, has always been a major task, demanding considerable manpower, in the collective farm system.

Padding of payrolls has been another source of personnel inflation. Persons who might be connected with local administration but who had absolutely nothing to do with the kolkhoz were often maintained on a kolkhoz payroll. The extent to which all this bureaucracy had become inflated can be gathered from the fact that, after the passage of the decree of September 19, 1946, condemning this inflation, 535,000 members of the kolkhozy were transferred to productive work and 213,000 persons who had no real connection with the kolkhozy were removed from the payrolls.[27]

Nevertheless, the problem was far from being solved, and 2 years later it called for yet another Government decree, which was published on September 14, 1948. This decree complained that, despite considerable progress during the 2-year period, the personnel not immediately engaged in production was still excessive in many kolkhozy and "sometimes there are simply unnecessary positions of secretaries, timekeepers, production managers, coachmen of the kolkhozy executive boards, and other workers." In small collective farms the managerial personnel does not work in the fields as they could and should. In a number of kolkhozy the expenditures for the managerial and service personnel not only had not decreased, in accordance with the requirements of a decree of December 19, 1946, but had actually increased. New measures to reduce administrative and service personnel were prescribed by the latest decree of September 14, 1948, but past experience teaches that the road of deflation of kolkhoz bureaucracy is strewn with numerous stumbling blocks.

Not only has the Soviet Government been faced with the problem of deflating the overexpanded bureaucratic set-up in the kolkhozy, but it has also had to take steps to raise the generally low labor efficiency in many of them. It was possible to drive the majority of peasants into collectives by terror and fear of starvation, coupled with a promise of a more abundant life. It was another matter to make them work even as efficiently in these unfamiliar and often poorly managed organizations as they did when they farmed their own small holdings.

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[26] Ibid.

[27] Editorial *in* Sotsialisticheskoe Zemledelie, Sept. 11, 1948.

The peasant obviously did not have the same attitude toward work and property that he had on his own farm. V. M. Molotov, then chairman of the Council of People's Commissars, complained in 1933 that once the peasant ceded his horse to the kolkhoz he ceased to consider the horse his own and to take proper care of it.[28] Moreover, the whole problem of farm management, on which, to a large extent, the efficiency of labor depends, became a much more complicated affair with collectivization. As the former Commissar of Agriculture Yakovlev put it:

> In a farm of 4 desiatines [equivalent to about 11 acres] the peasant knew well when to plow, when to sow, when to fix things. . . . But how to organize the work in a kolkhoz of 2,000; 5,000; 10,000 members? Here everything must be based on a precise division of labor to avoid confusion, so that everyone should know what work he is going to do, how he will do it and how much he will receive for it.[29]

Reports have frequently appeared in the Soviet press, especially during the early years of collectivization, of the dangerously delayed sowings, of fields overgrown with weeds, of huge harvesting losses and consequent low crop yields, and of high mortality and poor condition of such livestock as was left after the wholesale slaughter by the peasants as a prelude to their joining the collectives.

Although improvement took place during the late 1930's, still much remained to be done to bring a more efficient utilization of kolkhoz labor. This subject was increasingly in the spotlight of official attention during the years preceding World War II. A new urgency has been given to it since the war by manpower shortages and the swollen labor requirements of the postwar program of industrial reconstruction. In this connection one should remember that the peasant population constitutes the principal reservoir of labor that was tapped for the rapid expansion of industry under the prewar 5-year plans.

Extremely high labor requirements were reported in crop production and animal husbandry by a sample survey of 428 kolkhozy in 10 Provinces in 1937. It showed that, on the average, 46 man-days were required per cow, 21 per head of other adult cattle, 21.3 per head of young cattle, and 23.1 per calf.[30] The same survey showed that even where farming was highly mechanized before the war, as in southern Ukraine and North Caucasus, labor requirements were very high. For example, production of winter grains (predominantly winter wheat), including all preharvest and harvest operations and hauling of the crop to the delivery points, required 2.5 to 3.6 man-days per acre.

Comparison with the United States is hazardous, since corresponding data in this country are given in man-hours rather than man-days, and conversion of Russian man-days into man-hours is risky in the light of what is said below concerning the use of working time. Moreover, the great use of woman labor in Russian agriculture must be borne in mind. But despite these and other qualifications, such a comparison, for all its lack of precision, furnishes a significant clue to the relative scale of efficiency in the agriculture of the two countries.

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[28] Ekonomicheskaya Zhizn', Jan. 29, 1933.

[29] YAKOVLEV, YA. A. VOPROSY ORGANIZATSII SOTSIALISTICHESKOGO SEL'SKOGO KHOZYAISTVA, p. 262. Moscow. 1933.

[30] SAUTIN, I. V., ed. PROIZVODITEL'NOST I ISPOL'ZOVANIE TRUDA V KOLKHOZAKH VO VTOROI PYATILETKE, pp. 50–51. Moscow and Leningrad. 1939.

As a typical small grain we shall take wheat, a commodity in which the United States and Russia have long competed in international markets. The number of man-hours required for wheat production averages in the United States only 8.7 per acre and is as low as 4.6 in Kansas and 5.9 to 6.5 in the Dakotas.[31] The differential in favor of the United States would be even greater if the overhead expenses for such items as management were included in the figures for the two countries.

What are some of the inefficient labor practices in the kolkhozy? For one thing, there is often a wide gap between the time on the job and actual work. Studies made in 1939–40 in different kolkhozy showed that, in farm operations involving hand labor or the use of horses, an average of only 67 percent of the working day was productively utilized.[32] This means, of course, that full utilization was not made of manpower, draft animals, and agricultural implements.

The daily working period itself in some kolkhozy is short, a fact that has often invoked official condemnation. Sometimes the short working period is caused by the very easy work tasks set in the kolkhozy. For example, in one kolkhoz in Kalinin Province, the daily task for plowing was 0.45 hectare (1.1 acres), although a worker was able to plow 0.11 hectare (0.27 acre) per hour and could thus complete his task in about 4 hours.[33] In the same kolkhoz the daily task for planting flax could be exceeded in 5 hours. Similar instances have been reported in other kolkhozy, though strong effort has been made since the war to correct this situation. It should be borne in mind that, unlike the farmer who owns and operates his own property, the average kolkhoznik is as free, on completing his task, from further responsibilities or chores in the kolkhoz as an average factory worker is after the whistle blows at the end of a working day. There are, of course, exceptions—the so-called Stakhanovists,[34] for example, who lavish extra care on animals or crops, particularly such intensive crops as sugar beets, cotton, or flax. But it is a safe generalization that the vast majority of the kolkhozniki put that extra effort into the cultivation of their own little plots and into the tending of their few personally owned animals and poultry.

There is, however, a general tendency, familiar to all foreign observers in Russia, to have two or more persons doing a job on a collective farm that is usually performed by one person in the United States. Then, such aftereffects of faulty farming as weeds, which have plagued Russian agriculture, require much effort for eradication. Russian agriculture also has less technical equipment than is found in America and it is often inferior in quality. The inferiority, coupled with a lack of know-how, results in frequent breakdown of equipment, which slows farm operations. The situation is often aggravated by poor

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[31] COOPER, M. R., HOLLEY, W. C., HAWTHORNE, H. W., and WASHBURN, R. S. LABOR REQUIREMENTS FOR CROPS AND LIVESTOCK. U. S. Bur. of Agr. Econ., F. M. 40. 140 pp. 1943.

[32] ELISEEV, F. [UTILIZATION OF WORK TIME IN SPRING OPERATIONS IN KOLKHOZY.] Sotsialisticheskoe Sel'skoe Khozyaistvo 1941 (3): 31–32. 1941.

[33] Ibid., p. 33.

[34] From the name of Alexis Stakhanov, a Russian miner who helped to inaugurate, in 1935, a movement for increased industrial efficiency. The term has often been applied to pace-makers employed in a sort of a speed-up system, to increase production.

supply organization—shortages of fuel and spare parts for tractors and machinery, and inadequate repair facilities. The lower educational and, especially, living standards of the Russian collective farmer adversely affect his efficiency. The ordinarily inadequate compensation of kolkhoz labor does not provide sufficient incentives to work well and encourages soldiering on the job. In 1939, a compulsory minimum of labor for the farmers in kolkhozy was established in terms of so-called workdays, which will be discussed in a later section.

Migration from Kolkhozy

Despite the inefficient utilization of labor in the kolkhozy, it has been possible for the Government to divert, since collectivization, considerable manpower into industry, transportation, construction work, and similar activity. The urban, that is, the essentially industrial, population in the Soviet Union more than doubled between the censuses of January 1926 and January 1939. (The data of the census taken in January 1937 were suppressed.) Of the over-all increase in urban population of 29.6 million, 23 million migrated from the countryside.[35] [36] This figure possibly included relatively few of the forced laborers from the rural areas, who swelled still further the reservoir of nonagricultural labor.

The Government took special measures to recruit labor for industry from the kolkhozy. A decree issued on June 30, 1931,[37] gave various privileges to the members of the kolkhozy who accepted employment with industrial and other state enterprises. The management of the kolkhozy was prohibited from interference with such employment of their members and was, in fact, encouraged to divert labor to industry and to make agreements for this purpose with various state enterprises. Kolkhozy making such agreements were supposed to receive priority in the distribution of agricultural machinery, in the establishment of schools, nurseries, and other educational and cultural institutions, as well as in the distribution of equipment for canteens and similar organizations.

There were thus, theoretically, two methods of approach that industry could follow in recruiting labor from the kolkhozy: (1) Direct contact with individual members and (2) action through the kolkhoz management. In practice the first method was pursued to a considerable extent, and the kolkhoz management was neglected or sidestepped, often even to the detriment of kolkhoz production. Thus, the kolkhozy had no control over the outside employment of their members. There were many cases of so-called flying collective farmers who disappeared from the kolkhozy during the seasonal peaks of sowing or harvesting and reappeared in time for distribution of the kolkhoz income.

A new decree, therefore, was issued on March 17, 1933, which repealed the decree of June 30, 1931, and slowed recruitment of kolkhoz labor. Employment contracts of members had to be recorded by the executive board of the kolkhoz, which could refuse to do so if it con-

[35] KULISCHER, EUGENE M. EUROPE ON THE MOVE. WAR AND POPULATION CHANGES, p. 107. New York. 1948.

[36] LORIMER, FRANK. THE POPULATION OF THE SOVIET UNION: HISTORY AND PROSPECTS, p. 149. League of Nations, Geneva. 1946.

[37] Ekonomicheskaya Zhizn', July 1, 1931.

sidered outside employment of a member contrary to the interest of the kolkhoz. The new regulations also empowered the kolkhoz management to expel those members who left the kolkhoz without permission.[38]

At present it is illegal for a member of a kolkhoz to accept employment elsewhere without permission of the kolkhoz management.[39] Recruiting officers are supposed to coordinate their activities with the kolkhoz management. If the recruiting of labor should threaten the production program of a kolkhoz, its management may refuse to record the employment contracts of the kolkhoz members and may appeal to the district (raion) administration. By the same token, passport regulations provide an additional stumbling block to the movement of the peasant away from the kolkhoz when the authorities are opposed to such a step.

The campaign for siphoning off kolkhoz labor into industry became intensified during the last few years preceding World War II. At the Eighteenth Communist Party Congress, Stalin stated that Soviet industry needs 1.5 million young kolkhoz workers annually. The labor recruiting system in the countryside, which was characterized by competition for workers on the part of different state industries and establishments, has been centralized since 1938.[40] Since the summer of 1947 this function has been assumed by special regional labor-procurement offices of the Ministry of Labor Reserves, created in the spring of 1946.

On October 2, 1940, a law was passed that permitted the Government to draft 800,000 to 1,000,000 rural and urban youth, 14 to 17 years of age, for 6 months to 2 years training in special vocational (skilled trades), railroad, and factory schools. After graduation, these draftees are obliged to work 4 years in industry, mines, and railroads, in establishments assigned by the Government. The 14- to 15-year group is assigned to vocational and railroad schools for a 2-year course, and the 16- to 17-year group to the factory schools for a 6-month course. In the kolkhozy, according to the 1940 regulations, 2 boys are drafted for each 100 men and women 14 to 55 years of age. Quotas for city youth are set up annually by the Government. A kolkhoz is supposed to provide clothing and food to last until draftees reach their schools. While attending the schools, pupils live in dormitories at Government expense. The draft first applied only to boys, but it was later extended to girls. Higher age groups are also drafted for vocational training. It was officially reported in the Soviet press on January 26, 1951, that 494,000 workers graduated from such vocational schools in 1950.

Distribution of Income and Incentives

There are, broadly speaking, three claimants to the income of the kolkhoz: (1) The state, (2) the kolkhoz as a collective enterprise inter-

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[38] ARISTOV, N. [NEW PROBLEMS OF THE ORGANIZATION OF MIGRATION OF LABOR FROM THE KOLKHOZY.] Voprosy Truda, No. 6, pp. 21–25. 1933.

[39] [LEGAL CONSULTATION ON KOLKHOZ PROBLEMS.] Sotsialisticheskoe Zemledelie, June 19, 1948.

[40] Decree of June 21, 1938. SOBRANIE POSTANOVLENII I RASPORYAZHENII PRAVITEL'STVA SSSR [COLLECTION OF DECREES AND ORDERS OF THE GOVERNMENT OF THE USSR], No. 34. Aug. 7, 1938.

ested in expansion and the growth of its capital, and (3) the members of the kolkhoz, constituting its labor force and managerial personnel.

The state is not only the director of but also the most important partner in collective farming and has the first claim on its production. In understanding the functioning of the collective farm system, the significance of this fact cannot be exaggerated. A kolkhoz must deliver to the Government at low fixed prices certain specified quantities of crops and animal products, and such deliveries have an overriding priority. Between 1933 and 1939 the basis on which crop deliveries were made was the acreage that the Government required each kolkhoz to plant. Since 1939–41, however, most crops have been delivered on the basis of kolkhoz tillable land, and livestock products on the basis of total land.

The rates of delivery per unit of land (hectare) are 15–25 percent higher for the kolkhozy not served by machine-tractor stations. Kolkhozy that are served by the stations must make added payments in kind to them. Until 1947 the rates of delivery were uniform for each district, but, since then, lower quotas have been permitted for specified groups of collective farms that were suffering from a shortage of draft power relative to their land area and vice versa. Thus, the rates now vary.

In the aggregate, kolkhoz deliveries to the state and payments in kind to MTS constituted 26 percent of their bumper grain crop in 1937 and 31 and 34 percent, respectively, of the smaller crops in 1938 and 1939. During 1935–37, an average of 68 percent of the meat and animal fats, 45 percent of the milk, and 53 percent of the wool produced collectively went to the state. No statistics are available for subsequent years, but the proportion was doubtless larger, because, as was explained above, deliveries have been based on total or tillable kolkhoz acreages since 1940 and not on the area to be seeded to crops or on the number of livestock. The importance that the Government attaches to the fulfillment of the so-called procuring plan for deliveries of farm products to the state is underscored by the fact that Stalin characterized this obligation of the collective farmers as a "first commandment." This term, which has penetrated into common official usage, gives a clue to the gravity with which the violation of the rule is regarded in official circles.

It will be recalled, in this connection, that to acquire farm products cheaply has always been among the main preoccupations of the Kremlin, especially since it embarked on its ambitious industrialization program under the 5-year plans. The obtaining of increased farm supplies was, as we saw earlier, at the root of agricultural collectivization.

The procuring process has involved a great deal of friction with the collective farmers, especially in the early years of collectivization, when it turned into a veritable tug of war with the peasantry. By using force without stint, and not stopping even at wholesale starvation of the countryside, the Government mastered the situation by 1933.

Although the turbulent procuring campaigns of the early years of collectivization gave way to a smoother process, difficulties still continued to be encountered, especially in years of poor crops when Government pressure for early delivery of quotas fixed irrespective of

yields proved onerous to the peasants. Some kolkhozy, under such conditions, found themselves without seed for sowing next year's crop, and in the end the Government often had to advance grain for seed. A scheme that has been used since World War II to stimulate delivery of farm products, preferably in excess of the goals set, is to put such obligations of the kolkhozy in the form of public pledges to Stalin. Such pledges have an even greater driving force than an ordinary law.

It has been a stock Soviet assertion that the peasants in the USSR do not have to pay any rental or other charges for the land and that the farm taxes are very light, constituting, for instance, in 1937, only 2.8 percent of the total income of the kolkhozy from collective farming, the earnings of the members from personal farming, and other sources.[41] However, such estimates do not include the low-priced compulsory deliveries of farm products made to the state. The extent of this contribution can be gaged by considering the gap between the procuring prices paid by the state and the prices at which peasants are able to sell their products on the free market. Such information has been zealously kept out of Soviet statistical publications, however. When some fragmentary data found their way into a pamphlet published in 1948, which dealt with the income taxes on kolkhozy, they revealed that free-market prices were, as a rule, 15 to more than 40 times as large as Government procurement prices.[42] This disparity had increased during the war as a result of the inflationary rise of the free-market prices. By 1951, the spread has probably become less, but it is doubtless still very large. Not only are the farmers taxed by being forced to sell their produce to the Government at very low prices, but, in common with the rest of the Soviet population, they are also subject to extremely high indirect taxation in the form of the so-called turnover tax, levied on commodities sold in Government-controlled stores, which account for the great bulk of the volume of retail trade, especially of manufactured goods.

When the kolkhoz has met all obligations to the state, including taxes in kind, payments to MTS, and repayment in kind of any seed loaned by the Government during the preceding year, the next step is to set aside seed supplies for the following year's sowing, forage supplies for the collectivized livestock until next harvest, and emergency reserves for these purposes. When all this is done, a kolkhoz is free to dispose of the remainder of its production. It may sell a part to the state at somewhat higher prices than those received for the compulsory deliveries and sometimes obtain thereby a preference in the distribution by the Government of scarce manufactured goods. A kolkhoz may also sell some of its products on the free market. But it must take the products to the market, since employment of a middleman is illegal. Moreover, free-market sale of grain and breadstuffs usually is not permitted until the grain-procuring plan for the whole Province or Republic is fulfilled.

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[41] LAPTEV, I. [KOLKHOZ INCOME AND THE DIFFERENTIAL RENT.] Bol'shevik 16: 12. 1944. The existence, with certain modifications, of the differential rent as the concept is known in economic theory and its partial appropriation by the state is admitted by the author (p. 15).

[42] DANKOV, V. S. O PODOKHODNOM NALOGE S KOKHOZOV, pp. 64–65 and 70–71. Moscow. 1948.

The free market for a kolkhoz, therefore, is usually limited to a nearby town, though such kolkhoz trade has been an important factor in the over-all marketing of foodstuffs. Sometimes kolkhozy also sell foodstuffs to their members either for communal feeding or for individual use, at lower than prevailing free market prices. Such sales are also made to outsiders, especially Government officials, who often are able to apply pressure on the kolkhozy. The practice of selling below the prevailing price results in a considerable financial loss to the kolkhozy.[43]

From cash income, a kolkhoz must pay income tax, required insurance premiums, and various current expenses, including those for administration and for educational and cultural purposes. An "undivided surplus" must also be set up to cover necessary capital expenditures. Any left-over products or cash are distributed among the members of the kolkhoz. Thus, except for small advances in kind permitted at harvesttime, the peasant is a residual claimant to the output and cash income of the kolkhoz. He is paid at the end of the season.

Even though the peasant in the kolkhoz has lost the status of an independent farm proprietor, becoming in most respects indistinguishable from a worker in the Soviet factory, still he must share in the risks inherent in farming. Thus, he has neither the advantages of a specified income that a Soviet wage worker possesses nor the degree of independence of the small peasant farmer who is his own master.

Labor contributed by a member of a kolkhoz is supposed to serve exclusively as a basis for distribution of income.[44] [45] All earnings are required to be on a sort of task system, according to the quantity, skill, and quality of work performed by an individual and output obtained. Equal distribution and payment by the day, or on some other time basis, have been officially proscribed in the kolkhozy.

The arrangements by which this principle is implemented are complicated and result in a cumbersome system of remuneration. The first step is the setting up in a kolkhoz of daily tasks of performance for various farm operations, called norms. Standard norms developed by the Government form the basis on which the kolkhozy are supposed to establish their own norms. The first set of such standard norms was developed in 1933 and was not revised for years. This explains the many official complaints of the obsoleteness of several of these norms, which were considered far too low. To insure that the norms keep pace with technological progress, the Council of Ministers of the USSR required, in its decree of April 19, 1948, that each kolkhoz annually review its norms.[46]

After a norm has been established, a certain value is assigned to it. For this purpose an arbitrary unit, a so-called trudoden, literally translated as workday, was adopted, which should not be confused with

[43] ADRIANOV, L. *In* Sotsialisticheskoe Zemledelie, May 27, 1948.

[44] NIKITIN AND OTHERS, op. cit., pp. 294–316.

[45] ZAL'TSMAN, L. M., ed. ORGANIZATSIYA SOTSIALISTICHESKIKH SEL'SKOKHOZYAISTVENNYKH PREDPRIYATII, pp. 558–561. Moscow. 1947.

[46] Examples of such standard norms for a day's work proposed by this decree are: plowing of 0.7 to 0.9 hectare (1.7 to 2.2 acres) with a one-bottom plow to the depth of 20 centimeters (7.9 inches); plowing of 1.0 to 1.3 hectares (2.5 to 3.2 acres) with a two-bottom plow to the same depth; harvesting with a reaper 4.0 to 5.5 hectares (9.9 to 13.6 acres) of grain in the steppe and wooded steppe regions.

actual man-days of labor. All farm operations are divided into several categories on the basis of the difficulty, importance, and skill required in the performance of the work. The work requiring least skill and effort, such as that of a guard or messenger, is rated as less than one workday; whereas a skilled tractor driver, who is classified in the highest labor category, is entitled to several workdays for the performance of his daily task. Additional workdays are supposed to be accorded to those who exceed their norms, and nonfulfillment of the norm or poor quality of work theoretically involves a reduction in the number of workdays credited to the worker. The brigadier and the kolkhoz manager are required to inspect all completed work and officially accept or reject it. Each member has a record book into which the brigadier enters his earned (credited) workdays.

To determine how much a workday is worth in terms of cash or products, all the workdays earned by members of a kolkhoz are added together. This figure is divided into the amount of cash and products set aside for distribution, thus establishing the value of one workday. If, for instance, all members of a particular kolkhoz earned during the year a total of X workdays, then the total quantity of cash, grain, and other products subject to distribution are divided by X. Let us suppose, for example, that only grain and cash are distributed in a kolkhoz in a particular year, and that one workday is worth 4 kilograms of grain and 1 ruble in cash, and that a member of a kolkhoz is credited with 200 workdays during the year. His annual earnings, therefore, will be $4 \times 200 = 800$ kilograms of grain and $1 \times 200 = 200$ rubles. Those members of the kolkhoz who earned a larger number of workdays because they possessed certain skills that were highly valued or because they worked harder, or both, are paid more than the others in cash and in kind.

A serious complication developed, however, because many cases came to light wherein two brigades, working presumably under identical conditions on two equal plots of land, obtained various yields per acre, and sometimes higher yields were associated with the expenditure of a smaller number of workdays. As a result, the workers in a brigade that obtained higher yields earned less than those in a brigade with lower yields. This has been usually cited by Soviet spokesmen as a case of rewarding inferior work and penalizing the more efficient workers. However, the underlying assumption that two similar plots of land in a kolkhoz will produce identical yields if worked equally well is often unjustified. Yields of crops depend not only on human effort but also on weather and other natural and technical conditions, which frequently are highly variable even within the territory of a particular farm, especially when it is as large as the usual kolkhoz. It is not easy to segregate these various factors. Still, it cannot be denied that a large number of workdays may be indicative not of superior performance but of inefficiency.

Soviet leadership, in its eagerness to increase farm production, has been casting about for a better method to link output with the workday. The present system, elaborated by the decree of April 19, 1948, is to credit, in accordance with a complicated formula, a certain proportion of supplementary workdays for each brigade or zveno as a bonus for production in excess of the goals set by the Government

plan. Similarly, workdays are deducted for failure to reach the goals, except in the event of an officially verified natural adversity.

The decree of April 19, 1948, prescribes two methods of adjusting earnings in accordance with output, either of which could be adopted by the kolkhoz. According to one method, for each percent an individual brigade or zveno exceeds its planned production of a crop or group of crops, it is credited with one additional percent of the total number of workdays credited to the members of the brigade or zveno in raising such a crop or group of crops. Likewise, when the actual outturn is below the plan, a deduction is made up to 25 percent of the total number of workdays used in raising the crop. Thus, if the outturn of a brigade is 10 percent above or below the plan, the total number of workdays credited to the members of the brigade for raising the crop is correspondingly increased or decreased by 10 percent. If the brigade or zveno succeeds in obtaining the planned outturn, no more and no less, no increase or decrease is made in the number of workdays credited to its members. The addition or deduction of the workdays is then distributed among the members of the brigade in proportion to the number of workdays originally credited to each individual. But those kolkhozniki who have not earned, without a valid reason, the prescribed minimum of workdays are not supposed to be credited with any additional workdays under this system. Adolescents below 16 years of age and those who are not fully able-bodied are exempted from any deduction of workdays.

The second method is based on the comparison of the fulfillment of the planned production goals for a brigade or zveno with that for the kolkhoz as a whole. The brigade or zveno obtains an addition or deduction of the number of workdays to the extent that the percent of fulfillment of the planned production goal of a brigade or zveno is above or below the fulfillment of the planned production goal for the kolkhoz as a whole. The deduction is not to exceed 25 percent of the number of workdays credited to the members of the brigade or zveno raising a particular crop or group of crops. But a brigade or zveno that fulfills or overfulfills its planned goal, even though to a lesser extent than the kolkhoz as a whole meets its planned goal, is, nevertheless, not subject to any deduction of workdays. The decree also specifies that the count of workdays and production estimates must be made separately for each plot assigned to a brigade or zveno. In animal husbandry, the workdays are also related to outturn. A woman tending dairy cattle, for instance, must take care of from 8 to 14 cows and, for each 100 litres (227 pounds) of milk obtained during the pasturage season, she is credited with from 1.2 to 1.8 workdays and during the barn feeding period from 2.2 to 3.2 workdays; for each healthy calf born, 7 workdays; and for each calf raised from 15 to 20 days, 12 workdays.

In addition to rewarding larger output through supplementary workdays, the value of the workday itself is enhanced by special bonuses. A Government decree of December 31, 1940, first applied to the Ukraine and later extended to other regions, provided that kolkhoz brigades that exceed planned goals for crop yields and livestock products are to obtain a certain proportion of such surpluses in kind or the equivalent in cash. For instance, for grain, it was to be one-fourth

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of the amount harvested in excess of the plan; for sunflower seed, soybeans, rapeseed, and flaxseed, one-third; for milk, 15 percent; and for sugar beets and cotton, an extra 50 percent of the average official delivery price for each additional quintal (220.46 pounds) produced above the plan.

These bonus payments are distributed to individuals on the basis of the number of workdays earned, and they are in addition to the payments described earlier. There is, however, an important prerequisite for eligibility to these bonuses: A recipient must have put in a certain minimum number of *actual days* of labor during the agricultural season from March 1 to November 10. This requirement is in addition to the provision of the decree of May 27, 1939, and April 17, 1942, that a member of a kolkhoz must earn a certain minimum number of workdays during a year in order to be in good standing.

In many cases the bonus scheme was reported to have been nullified by the setting of production goals beyond the reach of even the most efficient farmers. The better kolkhozy, with their high standards of performance, were said to be particularly affected by this malpractice. In recent years, little has been heard of the bonus payments.

In 1937, the latest year for which detailed data are available, an average of 438 workdays were credited to a kolkhoz peasant household and 194 to an able-bodied worker; 21.2 percent of the kolkhoz workers were credited with 50 or fewer workdays; 15.6 with 51 to 100; 25 percent with 101 to 200; 18.4 percent with 201 to 300; 11.3 percent with 301 to 400; and 8.5 percent with more than 400 workdays.[47] Among those who earned only 50 workdays, or less, there were undoubtedly many young persons and women with family responsibilities. In the group that earned most—more than 300 workdays—there was probably a heavier representation of the more efficient kolkhozy, where labor is more fully and effectively employed.

By a decree of May 27, 1939, there was established a minimum number of workdays for each member of the kolkhoz without distinction as to sex. The country was divided into three zones, and for each a corresponding minumum of 60, 80, and 100 workdays was set up. Nonfulfillment of the minimum was penalized by expulsion from the kolkhoz and loss of kitchen-garden plots. The minimum was raised during the war by a decree published in *Pravda*, April 17, 1942. A novel feature of this decree was the specific allocation of the required minimum of work during different periods of the year. For instance, in a kolkhoz of the Moscow Province, 25 workdays "must be worked up to June 1; 25 between June 1 and August 1; 35 between August 1 and October 1, and the remaining 15 workdays after October 1." Those who did not fulfill these requirements without valid reasons are liable on conviction by court to a penalty of up to 6 months of "correctional labor" in the kolkhoz and a deduction of 25 percent of their pay in favor of the kolkhoz treasury.

To sum up, earnings of the peasant from his work in the kolkhoz depend on four factors: first, on the nature of the tasks assigned to him and their rating in terms of workdays; second, on his performance of these tasks—the quantity and quality of the work done; third, on the output achieved by the brigade or zveno, which serves as a basis for adjusting upward or downward the number of workdays earned and

[47] SAUTIN. KOLKHOZY VO VTOROI STALINSKOI PYATILETKE, p. 38.

for determining incentive payments in kind; and fourth, on the output and income of the kolkhoz as a whole, since the higher they are the greater theoretically is the residual share distributed to members on the basis of workdays. In addition to earnings from the work in the kolkhoz, members derive some income from personal farming and may also obtain some earnings by working outside the kolkhoz, especially during the nonagricultural season.

A system of payment differing from that of the rank and file of members has been adopted for kolkhoz managers (chairmen). The wages of a manager comprise (1) a flat number of workdays per month, increasing with the size of the crop area of the kolkhoz, the numbers of communal (collectivized) livestock, and the length of the manager's service; (2) supplementary workdays as a bonus for the overfulfillment of production goals or, conversely, a reduction in the number of workdays for underfulfillment; thus, on the basis of the workdays, the manager obtains farm products and cash just as all other members do; and (3) a specified monthly cash payment, increasing with the total income of the kolkhoz.

In agriculture, as in industry, use has been made of pace-setters, so-called shock workers (udarniki), Stakhanovists, etc. Especially favorable working conditions have often been provided for such pace-setters, enabling them to earn an income far above that of the average kolkhoz member.

Such are the mechanics of payment for labor in the kolkhoz. The cumbersomeness of the system is obvious. The very complexity of computing, recording, and supervising, which has increased with the introduction of production bonuses and deductions, described above, would tax the capacity of those concerned even where educational and efficiency standards are much higher than in Soviet Russia. The workday system, however, is apparently considered the only effective means of inducing peasants to work reasonably hard and well in the kolkhozy, dedicated primarily to supplying the needs of the Soviet state.

Making the peasant work in the kolkhoz has not been an easy task. He is neither a hired man who can be as easily fired as an industrial worker (although, as we saw above, illegal expulsions have not been uncommon in the kolkhozy), nor does he work independently, as he once did, except in his little kitchen-garden plot. The Soviet press has frequently complained that peasants prefer to work their little plots of land and tend a few animals, neglecting the kolkhoz fields and livestock. Such private farming has often proved more profitable, especially when the distance to a neighboring city makes it possible for kolkhoz members to sell vegetables, dairy products, and such on the private market. But the most important cause of the lukewarm attitude of many kolkhoz members toward collective farming, so frequently reported in Soviet publications and stressed in numerous official pronouncements, has been the low reward under the workday system.

The principal item distributed in payment for workdays in most regions has been grain, which has always constituted the most important index of the economic well-being of the Russian peasant. Skipping the starvation period of the early 1930's, or an exceptional year of bumper crops like 1937, and taking a relatively good year like 1935,

we find that the per capita supply of grain distributed in the kolkhozy was reported at 249 kilograms (549 pounds), of which 18 kilograms (40 pounds) were obtained from the little family plots intended to serve only as kitchen gardens.[48] This quantity may be compared with the 250 to 260 kilograms[49] (550 to 570 pounds) consumed on the average during the precollective period of the middle 20's, according to special nutrition studies (which were then conducted but discontinued during the increasing statistical blackout and purge of statisticians in the 1930's). The difference is even greater when it is considered that out of the 249 kilograms the peasant had not only to feed himself but also to provide a small quantity of grain for his livestock and poultry and lay in a reserve for a possible harvest failure. Thus, the average human consumption of grain, even in a year of good harvest, was less than during the precollectivization period, when the available supply of other foods was also larger. Peasant grain consumption was doubtless much less in a poor crop year like 1936, as indicated by the decline of more than 30 percent in the distribution of grain per workday compared with 1935.

While data on the payment of kolkhoz members since World War II are entirely inadequate, inasmuch as only occasional figures for single kolkhozy have been published, there is every reason to believe, judging from the size of the crops and the requirements of the Government, that the average amount of grain distributed among members was considerably reduced during the war and early postwar years and probably had not reached the prewar levels by 1950.

Another item distributed fairly widely by the kolkhozy is potatoes. In 1937, more than 140,000 collective farms out of a total of more than 240,000 distributed an average of 2.7 kilograms (6 pounds) per workday. As a rule, little cash is distributed in the kolkhozy. In 1936 and 1937, more than 30 percent of the kolkhozy distributed 0.2 ruble or less per workday;[50] more than 50 percent, 0.4 ruble or less; and 14 percent distributed more than 1 ruble per workday.[51] Only in those kolkhozy that specialized in the production of valuable industrial crops needed by the Government, like cotton, or were near large cities, where they could advantageously sell their produce, were the cash receipts relatively high.

Cash receipts of kolkhoz members, however, were increasing before World War II. They amounted, on the average, to 108 rubles per household in 1932, 147 in 1935, and 376 in 1937. While the low prices paid by the Government for compulsory deliveries held down cash receipts, this was somewhat offset by the growing sales of surpluses on the free market. The physical volume of such kolkhoz trade from 1932, when it was initiated, to 1939 was said to have increased five-

[48] CHMELEVSKII, N. [THE INCOME OF COLLECTIVE FARMERS IN 1935.] Plan (21): 31. 1936.

[49] LOSITSKII, A. [DYNAMICS OF GRAIN CONSUMPTION IN THE USSR. . . .] Statisticheskoe Obozrenie 1927 (12): 21. 1927. (Flour and groats converted to grain basis.)

[50] One ruble in 1937 was equal to 19 cents U. S. currency at the legal rate of exchange, which, however, was considerably overvalued. Actually, the purchasing value of the ruble at that time was probably equal to not more than 4 or 5 cents U. S. currency.

[51] RUD, DM. RASPREDELENIE DOKHODOV V KOLKHOZAKH, p. 25. Moscow. 1938.

fold.[52] The importance to the collective farm economy of trading on the free market can be gaged from the fact that such sales were claimed to have accounted for an average of 30 percent of the cash income of all kolkhozy before World War II.[53]

During the Russo-German War, in those kolkhozy that were near enough to the cities to sell their produce on the free market, the cash receipts increased considerably. Even in 1947 when prices declined, free-market sales still accounted for 50 to 90 percent of the cash income of six collective farms studied in Moscow and Gorky Provinces.[54]

In addition to the kolkhozy selling part of their produce for cash on the free market, their members were also extensively engaged in similar operations on their own account. Thus, to repeat, in districts where distance to cities made free-market sales possible, the cash receipts of kolkhoz members from the disbursements by the kolkhozy and from private sales were undoubtedly high. It should be borne in mind, however, that those were greatly inflated rubles that would buy little food and fewer manufactured goods. The peasant, of course, could and did hoard the rubles in expectation of better days. But the Soviet currency reform of December 1947, which drastically devalued the ruble (in the ratio of 1 new ruble to 10 old), largely destroyed the hoards.[55]

Other items besides grain, potatoes, and cash were distributed in various kolkhozy as payment for labor, but such distribution has been much less common. Data on the total earnings of members of a representative group of kolkhozy were published for one year only, that of 1937, which, as was pointed out above, was a year of bumper crops. These figures are based on a survey of 16,786 collective farms in 28 different regions and give the earnings per household and per capita of the kolkhoz population. Earnings credited for kolkhoz workdays and those derived from the personal farming of its members are not segregated, and payments in kind are valued in the relatively high free-market prices. The average earnings per kolkhoz household were 5,843.2 rubles and per capita, 1,304.3 rubles.[56] Assuming that the actual purchasing power of the ruble equaled approximately 5 cents, U. S. currency, we obtain a per capita income of about $65 and the income of a household of $292.

Considerable variation in the income of kolkhoz members from region to region is shown by the 1937 figures, extending from 899.9 rubles per capita in the Armenian Republic to 1,579.0 in the Urals. Of course, there is also considerable variation within smaller districts, sometimes even among neighboring collective farms. The 10 to 30 percent of so-called backward kolkhozy in each administrative district[57] have, as a rule, low per capita income. At the other pole are

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[52] CHERNYI, G. [KOLKHOZ TRADE AND FINANCES OF KOLKHOZY.] Sotsialisticheskoe Sel'skoe Khozyaistvo 1949 (2): 37. 1949.

[53] Ibid. Presumably this refers to sales by the kolkhozy and not to private trading of their members.

[54] Ibid., p. 38.

[55] Savings in banks were devalued at much more favorable rates, but the peasants, for the most part, did not keep their cash in savings banks.

[56] SAUTIN. KOLKHOZY VO VTOROI STALINSKOI PYATILETKE, p. 114.

[57] KULAGIN, N. A. [DIFFERENTIATED INCOMES OF KOLKHOZY.] Izvestiya Akademii Nauk SSSR, Otdelenie Ekonomiki i Prava 1949 (6): 459. 1949.

the so-called advanced (progressive) kolkhozy with an income above average.

The difference in the size of per capita income among kolkhozy, even of a relatively small district, may be the result of a number of causes operating singly or jointly. The efficiency, honesty, and stability of a kolkhoz management, the fertility of the soil, the degree of diversification of the production pattern, and the adequacy of capital equipment and labor supply are some of the important factors that influence production and income. From the standpoint of maximizing income, the importance of a kolkhoz location in relation to urban markets, especially considering the primitive state of Russian roads and the inadequate means of transportation, has already been emphasized. The availability of tractors and other modern farm machinery, which are concentrated in state machine-tractor stations, and, what is extremely important, the efficiency of their operations also significantly affect output and, therefore, the income of the kolkhozy. The production practices adopted, the extent of agronomic assistance, and, last but not least, local variations in weather conditions that affect crop yields, all play their part in varying the volume of production and the size of the income of kolkhozy. A favorable combination of the above-mentioned factors may place one kolkhoz in the millionaire class (that is, having an income of a million rubles or more), whereas an unfavorable combination may relegate another to a low income group.

In addition to the strictly economic incentives, the Soviet Government has also striven, through so-called socialist competition propaganda, to organize a rivalry for higher production goals among individuals, separate kolkhozy, and even whole and sometimes distant regions. Special occasions such as the National Agricultural Exposition held in 1939 and 1940 or a national holiday such as the Anniversary of the October Revolution, for instance, are utilized for this purpose. Public pledges to Stalin by collective farmers of a whole region, promising achievement of certain goals, have been widely employed since World War II because of their value in whipping up effort on the part of Soviet citizens. Many awards of medals and honorary titles for superior performances by collective farmers have also been made. In 1947, for example, 1,931 members of kolkhozy and other workers in the field of agriculture were awarded the honorary title of Hero of Socialist Labor, 4,348 were awarded the Order of Lenin, 12,500 the Order of Labor Red Banner; and more than 40,000 other medals were awarded.[58]

It should be noted that, prior to January 1, 1948, the awarding of medals as a rule entailed a number of privileges, such as free transportation on streetcars, railroads, and steamers, some cash payments, reduced housing rents, and exemption from the income tax. By a decree of September 10, 1947, of the Praesidium of the Supreme Soviet of the USSR, all privileges except exemption from income tax were abolished.[59]

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[58] LAPTEV, I. [SOCIALIST COMPETITION AND LABOR DISCIPLINE IN KOLKHOZY.] Pravda, June 24, 1948. *See also* BENEDIKTOV, I. SOVIET PEASANTRY, LED BY J. V. STALIN, HEADS FOR NEW VICTORIES. USSR Information Bulletin, p. 768. Dec. 21, 1949.

[59] Vedomosti Verkhovnogo Soveta SSSR, No. 41. Nov. 30, 1947.

A special decree[60] prescribed in great detail the standard conditions that had governed in 1948 and 1949 the awarding of honors in kolkhozy on the basis of target yields for each of 10 specified crops. It was followed by similar regulations dealing with a number of other crops. For this purpose the whole country was divided into 8 zones. For instance, if in the Krasnodar region of North Caucasus a kolkhoz brigade obtains 32 quintals per hectare of wheat or rye (48 and 51 bushels, respectively, per acre), on an area of no less than 60 hectares (150 acres), the brigadier is awarded the title, Hero of Socialist Labor. To warrant the Order of Lenin, the yield on the same area must be 26 quintals (39 and 41 bushels of wheat or rye, respectively, per acre). Still lower yields suffice for the awarding of other medals. For a kolkhoz manager or agronomist to obtain one of the honors, it is necessary to achieve these yields on a larger area, 150 hectares (371 acres) of wheat and rye. These targets vary for different zones. For example, in Kharkov Province of the Ukraine the standard yield for the awarding of the title, Hero of Socialist Labor, is 31 quintals of wheat or rye per hectare (46 and 49 bushels, respectively, per acre).

The target yields seem to be high, certainly very much above the average published figures for the various regions, even for years of excellent crops before World War II. Moreover, it appears that only the so-called barn yields are taken into consideration in awarding honors and not the preharvest figures of the Soviet official statistics, which usually are overestimated as compared with the actual barn outturn. There are obvious escape clauses throughout the text of the above-mentioned decree, which are probably placed there to facilitate the balancing of inequalities that are likely to arise where arbitrary administrative boundaries are used in regionalization. These escape clauses can probably also be used to reward staunch party members and other influential persons.

Economic incentives and propaganda are buttressed in collective agriculture, as in other branches of Soviet economy, by terror. The gruesome story of how force was used without stint during the collectivization campaign in the Russian countryside in the early 1930's, and how wholesale starvation resulted in several millions of deaths, has already been told. In the same period also came the famous law of August 7, 1932, which prescribes the death penalty as a punishment for theft of kolkhoz or cooperative property or, when extenuating circumstances exist, imprisonment for a period of no less than 10 years, with confiscation of all personal belongings and no possibility of amnesty. This law was applied, among others, to so-called barbers —an epithet denoting the wretched and hungry people who stole grain from the fields by cutting the ears with scissors.

Purges through expulsion from a kolkhoz, accompanied by the loss of the precious little kitchen-garden plot, also hang like a Damocles' sword over the peasant's head. Although there are safeguards against easy expulsion on the statute books, these regulations, as we saw

[60] A decree of the Praesidium of the Supreme Soviet of the USSR, concerning the bestowal of the title of Hero of Socialist Labor and the awarding of orders and medals of the USSR to members of kolkhozy and workers in the MTS and state farms, for the obtaining of high yields of wheat, rye, corn, rice, cotton, sugar beets, sunflower seeds, clover, alfalfa, and timothy grass. Issued on Apr. 24, 1948. Izvestiya, Apr. 25, 1948.

above, are frequently flaunted. There is, finally, the Soviet enigma of the concentration camp or "slave labor" system.[61] This subject is, perhaps, one of the most closely guarded of Soviet secrets. But it is hardly open to doubt that the terror of the concentration camp stalks not only the cities but also the countryside, which likewise contributes a generous quota to the teeming millions of "slave workers."

Number and Size

The number of kolkhozy, which was small and even declining prior to 1928, increased rapidly during the following 3 years of mass collectivization (table 2). After remaining stationary in 1932, the number increased again during the next 3 years, but much more slowly. The maximum was reached in 1935. Between that year and 1940, the number of collective farms decreased by 9,000, or 3.7 percent, as a result of the merger of smaller farms. Since World War II, the process of consolidation of the kolkhozy has been resumed and new kolkhozy were organized in the western regions annexed since World War II. We shall return to this subject later.

The total number of peasant families, or households, included in kolkhozy increased continuously after July 1927, but very unevenly. At first, during the mass collectivization period, 1928–32, the pace was spectacularly rapid. Then, 14.9 million families were included. Between 1932 and 1936 the kolkhozy gained another 3.5 million families and during the following 4 years only 750,000. Some of the increase in the later 30's can probably be attributed to the splitting up of large, or old, families already in the kolkhozy.

By 1938, 93.5 percent of all peasant families were in kolkhozy as against less than 2 percent 10 years earlier. But the aggregate number of such households (including both those in the kolkhozy and those who did not join) decreased sharply from 24.5 million in 1928 to 20.2 million in 1938. The liquidation and deportation of the kulaks, the extensive migration into the cities, and the urbanization of many rural communities in the course of the industrial development under the 5-year plans combined to produce this result.

In 1938, the last year for which detailed data are available, a kolkhoz had, on the average, 78 households and 1,500 hectares (about 3,700 acres) of land, of which 484 hectares (1,196 acres) were sown to crops, or about 6.2 hectares (15.3 acres) per household. Considerable regional variation, however, existed in the size of the kolkhozy (table 4 and figs. 2 and 3). These data suggest four broad regional divisions of the country with respect to the prewar size of the kolkhozy: (1) In the northern and north-central regions of European Russia, in which the landscape is criss-crossed by forests, lakes, and marshes, the kolkhozy were small, measured in terms both of the number of peasant households and of sown area, but the size of the kolkhoz was increasing both before and after World War II. (2) In the fertile, densely populated regions of the central black-soil area and the Ukraine, there were many families per kolkhoz, but the proportion of sown area per family was low. (3) On the treeless steppes of the eastern and southern parts of the country, the kolkhozy were large in terms

[61] *See* DALLIN, DAVID J., and NIKOLAEVSKY, BORIS. FORCED LABOR IN SOVIET RUSSIA, 331 pp. New Haven. 1947.

FIGURE 2.—Land seeded on collective farms.

FIGURE 3.—Land seeded per household on collective farms.

of both people and land, but the size of the kolkhoz was decreasing in the 1930's. (4) In the extreme southeast, in the mountainous districts and irrigated oases, the kolkhozy included many families but little sown area per family.

In the early years of mass collectivization no limit to the size of the kolkhoz was apparently recognized, and the maxim "the larger the better" guided Soviet collectivization practice. However, in the

TABLE 4.—*Number of kolkhozy, households per kolkhoz, and distribution of sown area per kolkhoz and per household, by regions, 1938*

Region	Kolkhozy	Households per kolkhoz	Sown area			
			Per kolkhoz		Per household	
	Number	*Number*	*Hectares*	*Acres*	*Hectares*	*Acres*
North	9,722	47	154	380.5	3.3	8.1
Northwest	32,501	37	164	405.2	4.4	11.0
WhiteRussia(Belorussia)	9,665	74	294	726.5	4.0	9.8
Central Industrial	34,146	56	259	640.0	4.6	11.4
Central Agricultural	23,041	94	518	1,280.0	5.5	13.6
Upper Volga	21,828	52	338	835.2	6.5	16.1
Middle and Lower Volga	7,003	136	1,655	4,089.5	12.2	30.1
Ukraine	27,393	141	780	1,927.4	5.5	13.7
North Caucasus and Crimea	8,779	140	1,253	3,096.2	9.0	22.1
Transcaucasia:						
Armenia	1,077	160	360	889.6	2.2	5.6
Georgia	4,190	92	174	430.0	1.9	4.7
Azerbaidzhan	3,677	88	267	659.8	3.0	7.5
Ural	14,357	83	770	1,902.7	9.3	22.9
West Siberia	14,354	63	612	1,512.3	9.7	24.0
East Siberia	6,304	62	504	1,245.4	8.1	20.1
Far East	1,191	47	566	1,398.6	12.0	29.8
Kazakh	7,347	79	700	1,729.7	8.9	21.9
Central Asia:						
Turkmen	1,654	71	227	560.9	3.2	7.9
Uzbek	8,452	89	298	736.4	3.3	8.3
Tadzhik	3,862	48	193	476.9	4.0	9.9
Kirgiz	1,849	92	474	1,171.3	5.2	12.7
Total or average USSR	242,392	78	484	1,196.0	6.2	15.3

KOLKHOZY VO VTOROI STALINSKOI PYATILETKE. Moscow and Leningrad. 1939.

middle 1930's the inefficiencies resulting from unlimited growth of the farm unit began to be discerned and subdivisions of large farms were not uncommon. For example, 4 large kolkhozy in the Spassk district of Ryazan Province of Central Russia were divided into 2 each.[62] On the other hand, the existence of very small collective farms of 5 to 10 households in the Northern and North Central regions was long considered a brake on efficiency, and "voluntary" merger of such kolkhozy was recommended by the decree of December 19, 1935,

[62] GULYAEV, L. M. SEL'SKOE KHOZYAISTVO SPASSKOGO RAIONA, p. 24. Moscow, 1949.

"Concerning the Organizational-Economic Strengthening of the Kolkhozy of the Non-Black-Soil Area."[63] A renewed emphasis on the increase in the size of the kolkhoz on the part of the Soviet top policy-makers became evident in 1950. The first significant statement on the subject was made by the new Moscow Party Chief and member of the powerful Politburo, N. S. Khrushchev, who has been "spark-plugging" the move for merging kolkhozy, which is represented—in conformity with the Soviet custom—as originating with the kolkhozniki themselves.[64]

> A serious defect is the fact that there are many small kolkhozy in the Moscow province. Twenty-six percent of the collective farms have less than 100 hectares [247 acres] of arable land; 40 percent have from 100 to 200 hectares [247 to 494 acres] and 18 percent from 200 to 300 hectares [494 to 741 acres]. As is known, our kolkhozy at the beginning of collectivization were organized by simply combining all the means of production within the bounds of existing villages. But even these small kolkhozy had enormous advantages over the individual peasant farms. However, small collective farms, particularly under present conditions of the development of mechanization, cannot make use of all the advantages enjoyed by the large kolkhozy.
>
> Indeed, how can a kolkhoz . . . which consists of five households and has only 92 hectares [227 acres] of plough-land to develop, expand and provide much commercial production? Small collective farms cannot achieve the powerful expansion and development of all branches of agriculture. Is it possible to introduce systematic rotation of crops on an area of 90 to 100 hectares [222 to 247 acres]? Dividing the land into 8 or 9 fields, you get a field of approximately 10 hectares [25 acres]. What machines can be used on such fields? The tractor and the combine cannot be utilized on such a field as they should be. The threshing machine "MK-1100" requires 26 to 30 men to work it, but in a small collective farm there are only 10 to 15 available collective farmers in all. It is clear that in small collective farms the use of complex machinery is very restricted, and without such machines it is impossible to carry on agriculture as it should be carried on. . . .
>
> Many collective farms in Moscow province have found the correct solution—they have embarked on the path of uniting and enlarging the kolkhozy. The advantages and profits gained by this may be demonstrated by the example of the "Trud" kolkhoz in Zagorsk raion, which united 14 small collective farms containing an over-all land area of 2,575 hectares [6,363 acres]. Before this amalgamation the majority of these small kolkhozy lagged behind in fulfillment of goals every year, but now the "Trud" collective farm has become a large diversified farm and is one of the best in our province. . . .
>
> . . . The merging of small kolkhozy is a correct and progressive measure. The task of Party and Soviet organizations is to assist collective farmers in carrying out this important task. . . .

Among other supposed benefits of large kolkhozy compared with smaller units, Khrushchev mentions a substantial reduction in administrative expenses and greater possibility of employing specialists and of obtaining qualified and experienced managers. Increased production, higher incomes for the kolkhoz members, and larger marketable or commercial output (and implicitly, therefore, more of the product going to the state)—such are the purported ultimate advantages of larger kolkhozy, which may be achieved by merging of small units, according to Khrushchev. He returned to elaborate the theme of kolkhoz consolidation in two subsequent pronouncements,[65] and par-

[63] FRAER, L. [THE SIZE OF THE KOLKHOZY AND THE UTILIZATION OF MEANS OF PRODUCTION IN THE M.T.S. OF THE NON-BLACK-SOIL ZONE.] Sotsialisticheskoe Sel'skoe Khozyaistvo 1950 (5): 16. 1950.
Izvestiya, Dec. 20, 1935.

[64] Pravda, Mar. 8, 1950.

[65] Pravda, Apr. 25 and June 28, 1950.

ticularly in his *Pravda* article of June 28, greatly stressed the key role of managers in the consolidated kolkhozy and the necessity of paying higher salaries to them. It would seem from this that effective supervision of kolkhozy, which has always posed a serious problem to the Kremlin, has been a potent motive behind the new move. The smaller the number of kolkhoz managers the easier it is to find persons who are not only efficient but also politically reliable from the Soviet standpoint, and who will zealously deliver to the state the officially set quotas of farm products. Again, as in the early days of collectivization, no recognition seems to have been given to economic limitations on the size of the farm unit or to the fact that in the United States and other countries efficiency and advantages of modern technology are achieved with farm units much smaller in size then the kolkhozy in the Soviet Union.

There were reports early in 1950 of mergers of kolkhozy, even before Khrushchev's first statement on the subject, which apparently was intended to be the official "opening gun" in a new major Soviet campaign.[66] The merger campaign has gained in momentum since the spring of 1950. It was stated by the Minister of Agriculture of the USSR, I. A. Benediktov, that, as a result of mergers, the number of kolkhozy during 1950 decreased from 252,000 to 123,000. More than two-thirds of all kolkhozy were merged into 60,000 large farms.[67] However, as Khrushchev pointed out in the above-mentioned *Pravda* article of June 28, many of the mergers so far were effected only "legally" and unification is still to be actually carried out. In other words, farm operations in many of the consolidated kolkhozy were proceeding in 1950 as they had before the merger. The consolidation of the relatively small fields in a number of collective farms, which is apparently an important aim of the mergers, will be difficult to carry out in many of the Northern and North Central regions where small tracts of arable land are criss-crossed with forests, lakes, marshes, etc. The merger campaign, though it apparently began in the north, was not confined to any particular locality, but spread far and wide over the whole Soviet Union, including the regions incorporated since World War II. Nor was it a matter of consolidating merely small kolkhozy, of which there are many in the Northern and North Central regions of the Soviet Union, where the character of the terrain favors small fields. For instance, in the Dnepropetrovsk Province of the Ukraine, where the kolkhozy have always been large, unification of 866 kolkhozy resulted in 342 consolidated collective farms, with an average land area of 7,400 acres each.[68] Much was also made in the above report and other articles in the Soviet press of the consolidated Communist Party organizations in the merged kolkhozy, obviously enhancing the relative importance of the Communists in the new collective farm units and strengthening the Communist control mechanism.[69] Communist groups are even organized in brigades. This

[66] The Moscow Bolshevik, Feb. 14, 1950. *Also* The Moscow Pravda, Feb. 24, 1950.

[67] Sotsialisticheskoe Zemledelie, Mar. 3, 1951.

[68] Pravda Ukrainy, Aug. 24, 1950.

[69] YABLOKOV, V. [CONCERNING THE STRENGTHENING OF KOLKHOZ PARTY ORGANIZATIONS.] Bol'shevik 16: 54. 1950. *Also* LUK'YANOV, P. *In* Sotsialisticheskoe Zemledelie, Sept. 20, 1950. *Also* SANKEVSKII, E. *In* Sotsialisticheskoe Zemledelie, Feb. 7, 1951.

doubtless has spurred the Soviet interest in the merger of kolkhozy. The self-government of the kolkhoz, it is true, becomes even less realistic when members are scattered over a number of different villages as a result of the mergers. Khrushchev, to be sure, advocated a speedy resettlement of the peasants of the consolidated kolkhozy by moving their dwellings into single enlarged villages. But this, at best, is likely to be a lengthy process. On the whole, the gap between the rank and file and the management is likely to grow in the consolidated kolkhozy, with a consequent increase in the driving power of the administrators. That would certainly constitute a welcome gain from the Soviet point of view.

Judging from various critical comments in the Soviet press and from speeches of Khrushchev, made in December 1950 and published in *Sotsialisticheskoe Zemledelie* on February 8, 1951, collective farm consolidation has not been as smooth a process in practice as would appear from the impressive statistics of the number of kolkhozy merged and the examples of successful, newly merged farms paraded in the Soviet press. Administrative expenses, for instance, in many merged collective farms have not decreased as was expected, but have increased in some kolkhozy according to *Sotsialisticheskoe Zemledelie* of January 27, 1951. On the following day in that publication, the qualifications of some of the managers of the merged farms were questioned; and, earlier (on January 16, 1951), defects in land utilization in certain of the merged kolkhozy, which interfered with productive efficiency, were indicated. This was also the theme of a special decree of the Central Committee of the Communist Party of White Russia (Belorussia) published in *Sovetskaya Belorussia* on November 19, 1950. The poor qualifications of many kolkhoz managers were also attacked by Khrushchev in the above speech, dealing with the situation in the Moscow Province. In another speech, reported in *Pravda* of March 4, 1951, Khrushchev stated in connection with the construction of new kolkhoz settlements into which the members of the merged kolkhozy are to be eventually resettled:

> The production of building materials is now one of the most important problems, but insufficient attention is being devoted to it. Existing brick and tile works are working unsatisfactorily and with interruptions, while the building of new such works is progressing only slowly. . . . Some collective farms now lack building workers, and it is essential to organize their training.

It is well to remember, however, that criticisms of details of execution and of various bottlenecks, such as those mentioned above, are commonly mingled with reports of successful achievements in every Soviet campaign and drive. They do not necessarily imply the disillusionment on the part of the Kremlin with the main objectives of such campaigns or drives and this probably holds true, in the spring of 1951, of collective farm mergers. Still, judging from past experience, a reversal or retreat in this matter is within the realm of possibility. For it is difficult to see how the further enlargement of many existing large farms, reviving the "gigantomania" of the early 1930's, could lead to increased efficiency.

The ruthless driving of collective farm labor by the new management may conceivably increase productivity. But, by the same token, it may bring the smoldering peasant discontent to what the Kremlin might consider a danger point. It would probably be even

more likely to do so if, in the costly process of resettlement, the peasants were to lose their family kitchen gardens. However, there is reason to believe that some official opposition has developed to resettlement. Those who do champion resettlement justify it on the ground that it would make possible better provision of various cultural and welfare facilities in the countryside, such as schools, hospitals, and clubs; but it is still a moot question, in the spring of 1951, how far this phase of the kolkhoz merger campaign will be implemented.

It is clear, however, that the merger campaign, coupled with the official stress laid on the larger brigade subdivision of the kolkhoz as against the smaller zveno and the tendency to limit the kitchen garden plots of the members, represents yet another step in making the kolkhoz more collectivist, and thus solidifying further Soviet authority over collective peasant agriculture.

A question arises as to the extent that the kolkhozy, represented by Soviet spokesmen as typifying large-scale agriculture, really conform to a large-scale farm pattern. The generally accepted economic concept of a large-scale farm unit is one that combines a large quantity of land and/or of capital with a relatively small quantity of labor. The significant fact about the kolkhoz is not its aggregate land or crop area, which alone would indicate a large farm unit, but the relative area per family or worker. The average crop acreage per kolkhoz household in 1938 was 16.5 acres of collective and personally farmed land,[70] in contrast to approximately 10 acres per farm family in 1927, according to a sample survey.[71] Thus the average peasant family apparently had substantially more land in the kolkhozy than it had in the precollective period. The crop acreage per capita of the population of working age increased, according to an estimate by a Soviet scholar, from 4.4 acres in 1927 to 7.9 acres in 1937, or nearly 80 percent.[72] Still, when Russian figures are compared with those for the United States, where the average cropland harvested per worker in agriculture amounted to 27 acres in 1939,[73] the gap between the kolkhoz and even an average American farm, let alone a truly large-scale farm unit, becomes evident.

By 1944 the average area per worker reached 32 acres in the United States. No Soviet data of this nature are available for the period since World War II, when both the manpower engaged in agriculture and the crop area declined. It is likely, however, that since the war the acreage per worker has increased in the Soviet Union. But, despite this, the view of a distinguished Russian émigré economist, Professor S. N. Prokopovich, expressed in 1933, is still of considerable significance: "The Soviet Government attained by compulsion a mechanical union of small peasant holdings into large farm units, but the supply of labor and of land remained the same as in the former small peasant farming. At the same time, collectivization destroyed

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[70] SAUTIN. KOLKHOZY VO VTOROI STALINSKOI PYATILETKE, pp. 4, 11.

[71] STATISTICHESKII SPRAVOCHNIK SSSR ZA 1928, p. 145.

[72] LIBKIND, A. [PROBLEMS OF RATIONAL UTILIZATION OF LABOR RESOURCES IN KOLKHOZY.] Problemy Ekonomiki 1939 (2): 80. 1939.

[73] Calculated from the 1940 census data. Quantitative comparisons of this kind between different countries cannot claim great precision, but they nevertheless reveal the general order of magnitude of the differences between them.

the economic incentives of the peasants to work and, as a result, the intensivity of agriculture naturally had to decline, which is what we actually observe in Soviet agriculture. . . .[74]

MECHANIZATION AND MACHINE-TRACTOR STATIONS

The development of power farming largely accompanied the collectivization of Russian agriculture. Inasmuch as forced rural collectivization also brought about a severe shortage of animal draft power, the introduction of the tractor on new collective farms became more urgent. Unlike the United States, therefore, the Soviet Union did not so much displace the horse with the tractor as replace it; but it did not replace it sufficiently or fast enough to eliminate the adverse effect of the reduction in the number of horses. Whatever tractor enthusiasts, such as the Commissar of Agriculture Yakovlev, thought and wrote about the discarding of horse power,[75] the Soviet Govern-

TABLE 5.—*Domestic production and imports of tractors in the USSR, 1921–38*

Year	Domestic production		Imports		Total	
	Number	Power	Number	Power	Number	Power
	Thousands	*1,000 hp.*	*Thousands*	*1,000 hp.*	*Thousands*	*1,000 hp.*
1921 to 1927–28	2.7	27.1	28.7	300.5	31.4	327.6
1928–29 to 1932	94.3	1,247.7	59.6	1,156.5	153.9	2,404.2
1933 to 1938	442.8	8,634.8	(1)	(1)	442.8	8,634.8

[1] Imports ceased in 1932.

SOTSIALISTICHESKOE SEL'SKOE KHOZYAISTVO SSSR, STATISTICHESKII SBORNIK, p. 12. Moscow. 1939.

ment learned, as a result of bitter experience, that the horse could not be dispensed with. Hence the repeated official emphasis on the importance of horses, as well as of tractors, in agriculture.

Until the 1930's most of the few tractors used in Russian agriculture were imported from the United States. In the early 30's, however, three new tractor plants were built with American technical assistance in Stalingrad, Kharkov (in the Ukraine), and Chelyabinsk (in the Urals), and after 1932 imports ceased (table 5). During World War II tractors for military purposes were imported under the lend-lease arrangement, and after the war tractors were supplied for Soviet agriculture by UNRRA. Nearly 13,000 tractors were shipped from the United States to the Soviet Union during the years 1940 to 1947.

In 1924 the Soviet Union had 2,560 tractors.[76] Three years later

[74] PROKOPOVICH, S. N. [COLLECTIVE FARMS IN THE USSR.] Byulleten Ekonomicheskogo Kabineta, No. 104, p. 3. Prague. 1933.

[75] Pravda, Jan. 24, 1930.

[76] STATISTICHESKII SPRAVOCHNIK SSSR ZA 1928, p. 292.

the number increased to 24,504, of which kolkhozy and associations of kolkhozy owned 9,122, state farms 4,651, farm cooperatives 4,422, and the remaining 6,309, or 25.7 percent, belonged to individual peasant farmers.[77] By 1932, the number of tractors increased to 125,344, but none remained in the possession of individual peasant farmers or farm cooperatives; all were concentrated in the socialist sector of Russian agriculture (tables 6, 7).

Since agricultural collectivization, the Government has owned and operated practically all tractors, combines, and other important farm implements. A small proportion of this mechanical equipment is on state-owned farms, so-called sovkhozy, but most of it is concentrated

TABLE 6.—*Soviet tractor inventory, by types, 1932 and 1938*[1]

Type	Number		Power	
	1932	1938	1932	1938
	Thousands	*Thousands*	*1,000 hp.*	*1,000 hp.*
Wheel tractors in—				
MTS	74.4	271.5	1,069.8	4,065.9
Sovkhozy	58.4	64.1	847.5	960.6
Others	9.7	4.2	104.4	63.4
Total	142.5	339.8	2,021.7	5,089.9
Track-laying tractors in—				
MTS	.1	61.3	4.4	2,758.4
Sovkhozy	4.6	15.6	183.5	738.0
Others		0.1	0.6	2.4
Total	4.7	77.0	188.5	3,498.8
Row-crop tractors in—				
MTS	.3	61.2	2.8	612.7
Sovkhozy	1.0	5.3	12.0	53.2
Others		.2		1.6
Total	1.3	66.7	14.8	667.5
Grand total	148.5	483.5	2,225.0	9,256.2

[1] As of the end of each year.

SOTSIALISTICHESKOE SEL'SKOE KHOZYAISTVO SSSR, STATISTICHESKII SBORNIK, p. 18. Moscow and Leningrad. 1939.

in special units called machine-tractor stations (MTS), which supply mechanical power and machinery to the kolkhozy. In 1940, for instance, of a total of 523,000 tractors on farms, 435,300 belonged to MTS.[78]

As a rule kolkhozy do not own tractors and combines, but during the war and early postwar years this rule, like other rules, was not strictly adhered to. Some tractors evacuated from the war zone or "liberated" from the occupied regions apparently found their way into

[77] NARODNOE KHOZYAISTVO SSSR, STATISTICHESKII SPRAVOCHNIK 1932, p. 145. Moscow and Leningrad. 1932.

[78] MIKHEEV, I. [DEVELOPMENT OF THE MATERIAL-TECHNICAL BASE OF SOCIALIST AGRICULTURE.] Sotsialisticheskoe Sel'skoe Khozyaistvo 1947 (8): 11. 1947.

individual kolkhozy. However, by a decree of the Council of Ministers of the USSR, No. 677, March 6, 1948, it was prohibited to sell or transfer tractors and tractor implements to the kolkhozy. Kolkhozy that had tractors were to sell them to machine-tractor stations.[79]

Organizational Structure

A Soviet MTS is not just a farm-machinery, custom-work agency but is a powerful arm of Soviet technical assistance, management, and control of collective agriculture, as well as a highly important fiscal instrument. Its role, therefore, in present-day Soviet agricultural economy can hardly be exaggerated.

The prototype of the modern MTS made its appearance in 1927. In that year, the Shevchenko state farm (named after a famous Ukrainian poet), located in the Odessa district of southern Ukraine and headed by an agronomist, A. M. Markevich, assigned 10 tractors, with the necessary agricultural implements and operators, to work, on a con-

TABLE 7.—*Soviet tractor inventory, 1930–39*

Year [1]	Number	Total horsepower
1930	66,332	989,926
1931	72,078	1,003,500
1932	125,344	1,850,000
1933	148,448	2,225,000
1934	210,900	3,209,200
1935	276,427	4,462,800
1936	380,019	6,527,000
1937	422,700	8,000,000
1938	454,500	8,400,000
1939	483,500	9,256,000

[1] As of the first of the year.

HERMAN, L. M. REVIVAL OF RUSSIA'S TRACTOR INDUSTRY. Foreign Com. Weekly 21 (2): 11. 1945.

tractual basis, the land belonging to peasants of four neighboring villages. One of the requirements of the contract was the voluntary pooling of the small, scattered peasant holdings into large fields suitable for tractor operations. Markevich, who was "purged" a few years later by the Kremlin, was the real pioneer of this important Soviet agricultural institution, both as an organizer of the first machine-tractor station and as an expounder and propagandist of the idea in a little book, published in 1929, which became a classic on the subject.[80]

In 1928, this "intervillage" station, which began to be called a machine-tractor station, had 68 tractors and serviced 1,163 peasant holdings with a total area of close to 40,000 acres. By 1929 the number of tractors had increased to 140, and the station serviced 25

[79] [LEGAL CONSULTATION ON KOLKHOZ PROBLEMS.] Sotsialisticheskoe Zemledelie, Mar. 27, 1948.

[80] MARKEVICH, A. M. MEZHSELENNYE MASHINNO-TRAKTORNYE STANTSII. Moscow. 1929.

villages with a total area of about 125,000 acres.[81] This station served as a pattern for the organization of other MTS, and they became an integral feature of Soviet collective agriculture. The Government, which in the late 1920's was bent increasingly on collectivization of Russian agriculture, was quick to see that the MTS would be a powerful lever for accomplishing this objective. The MTS appealed especially to the Government, because the pooling of tractors and other equipment provided for greater utilization of them at a time when Russian agriculture was severely handicapped by a critical shortage of draft power, resulting from the wholesale slaughter of horses and other livestock by the peasants during the forced collectivization campaign.

In general, pooling of farm equipment with a view to maximizing its use is theoretically the principal technical advantage of the MTS.

TABLE 8.—*Number of machine-tractor stations, principal equipment, and work done, 1932, 1938, and 1940*[1]

Item	1932	1938[2]	1940
Machine-tractor stations, number	2,416	6,358.0	7,069.0
Total tractors, thousand	74.8	394.0	435.3
Total tractor power, 1,000 hp.	1,077.0	7,437.0	8,360.0
Total combines, thousand	2.2	127.2	153.4
Total trucks, do	6.0	74.6	40.0
Ratio of kolkhoz sown area serviced by MTS to total kolkhoz sown area, percent	49.3	93.3	94.0
Total work performed by tractors, converted to plowing[3], million hectares	20.5	206.2	----
million acres	50.7	509.5	----
Grain and sunflower acreage harvested by combines, million hectares	.08	39.9	----
million acres	.20	98.6	----

[1] Data as of December 31.
[2] Preliminary estimates, except for the number of MTS.
[3] Exclusive of threshing.

MALYSHEV, I.S., ed., M.T.S. VO VTOROI PYATILETKE, p. 11. Moscow and Leningrad. 1939. *And* KHALTURIN, V., [CONCERNING THE ORGANIZATION AND MANAGEMENT OF M.T.S.], Mashinno-Traktornaya Stantsiya 1946 (3): 14–18. 1946.

Establishment of MTS, both state-owned and cooperative, was encouraged by the Government, and in 1930 there were already 158 such units with more than 7,000 tractors. On September 10, 1930, the Central Committee of the Communist Party decided that all the cooperative MTS should be transferred to the state MTS system. This system was originally made up of joint stock companies or corporations, with farmers contributing at least 20 percent of the investment. But that feature was soon eliminated. (For data on the number of MTS and their principal equipment, see table 8.)

Each station possesses a certain number of tractors, combines, and other machinery and has a central headquarters with officers, repair shops, etc. An MTS services several kolkhozy, the number varying

[80] VENZHER, V. [THE DEVELOPMENT OF MACHINE-TRACTOR STATIONS.] Sotsialisticheskoe Sel'skoe Khozyaistvo 1947 (11): 16–17. 1947.

from station to station and region to region. In 1937, an average machine-tractor station serviced 33 kolkhozy with a sown area of more than 45,000 acres. But the extent of variation in the number of kolkhozy serviced can be seen from the following figures:[81]

Number of kolkhozy serviced per MTS:	*Percentage of total number of MTS*
10 and under	10.4
11 to 20	26.8
21 to 40	36.7
41 to 60	13.0
61 to 100	9.9
101 and over	3.2
	100.0

When measured by the number of tractors and total tractor power, the size of the MTS more than doubled between 1932 and 1938, and the work done per station nearly quadrupled during this period. But variations in these respects were also marked. For example, in 1937 about 10 percent of the MTS had tractor power up to 600 horsepower each, whereas 44 percent had more than 1,200. In general, the problem of the effective size of the MTS was not approached scientifically before the war.[82] An example of irrational distribution of MTS is cited by a correspondent of *Pravda*, where a district in the Tartar Republic had only one MTS that could service 24 kolkhozy; the remaining 40 kolkhozy had to rely entirely on horses. When another MTS was established, it was placed in a district that not only had a smaller acreage and fewer kolkhozy, but also already had two MTS.[83]

Management and Personnel

An MTS is headed by a director, appointed by the Minister of Agriculture of the Soviet Union, who alone has the legal power to dismiss him. This does not preclude, however, frequent dismissals by lesser authorities. There is a political vice director, whose functions are the same as those of the political commissars in the Red Army. The staff of an MTS is made up of mechanics, bookkeepers, and agronomists, as well as tractor drivers and combine operators, both of whom are recruited from members of the kolkhozy and trained for their work in special schools. The kolkhozy also provide all other labor necessary to assist with the field work of the tractors and combines, such as workers delivering fuel, water, etc.

The MTS are usually divided into several so-called tractor brigades, each consisting of three to five, or more, tractors with necessary implements and personnel. The brigade is headed by a brigadier or foreman. A tractor brigade is usually assigned work in one or several adjoining kolkhozy.

The personnel of MTS are paid wages by the state, with the exception of tractor drivers, who are paid partly by the state and partly by the kolkhozy. Tractor drivers are credited with workdays as are

[81] MALYSHEV, I. S., ed. M.T.S. VO VTOROI PYATILETKE, p. 23. Moscow-Leningrad. 1939.

[82] BASYUK, T. [CONCERNING THE SIZE OF MACHINE-TRACTOR STATIONS.] Problemy Ekonomiki 1940 (5–6): 92. 1940.

[83] Pravda, June 22, 1939.

other members of the kolkhozy, but at a higher rate for fulfilling their daily tasks. They receive liberal bonuses for exceeding them. Unlike other members of the kolkhozy, however, tractor drivers are guaranteed a certain minimum of bread grain and a cash minimum of 2.5 rubles per workday. The cash is paid by the state. Tractor drivers working in kolkhozy that specialize in production of fruits, vegetables, and certain industrial crops are paid a higher cash minimum in lieu of bread grains.

The grain minimum paid by the kolkhozy was first set at 3 kilograms (6.6 pounds) per workday. Since 1947, however, this amount has been distributed only if the planned goal for the yield per acre on the plots worked by tractor brigades is achieved and the work of preparation for the next harvest is done on time; otherwise, the minimum is 2 kilograms (4.4 pounds) per workday. The kolkhozy are supposed to make up the difference between the guaranteed minimum and the amount of cash and produce that they distribute per workday to their members.

TABLE 9.—*Number of persons engaged in machine-tractor stations, 1937*

Type of worker	Number	Percent of total
	Thousands	
Tractor drivers	685	48.8
Tractor brigadiers	96	6.8
Combine operators	82	5.8
Chauffeurs	56	4.0
Permanent repair-shop workers	99	7.1
Other workers	214	15.3
Agronomists	33	2.4
Engineering personnel	40	2.8
Administrative personnel	98	7.0
Total	1,403	100.0

MALYSHEV, I. S., ed. M.T.S. VO VTOROI PYATILETKE, p. 90. Moscow and Leningrad. 1939.

The number and type of personnel engaged in MTS at the end of 1937 is shown in table 9. Frequent turn-over of personnel in the MTS was a problem that constantly bedeviled the administration during the prewar period. Arrears in payment of wages and poor living conditions were often mentioned in the Soviet press as causes of dissatisfaction and turn-over.

Indiscriminate fining of tractor drivers also caused turn-over. There were many cases in which trained tractor drivers worked at other trades in the kolkhozy, despite shortages of such personnel in the MTS. Shortage of tractor drivers and combine operators, especially in such eastern regions as Siberia, was chronic before the war. It necessitated each year the transfer of personnel from the south, where the harvest was completed early, to regions of later harvest. In the summer of 1940 the Government issued a decree prohibiting workers in the MTS from leaving their posts without permission of the authorities, on penalty of imprisonment of from 2 to 4 months on

conviction by a court. Similarly, absenteeism and tardiness are punished by so-called corrective or forced labor, up to 6 months in the unit in which the person is working, with a deduction of 25 percent in wages.

Special schools and courses have been established for training MTS personnel. However, as an editorial in the organ of the Soviet Ministry of Agriculture, *Socialist Agriculture*, for June 26, 1939, stated: "It is not a secret that in many schools and courses, the training of personnel is organized in an entirely unsatisfactory manner."

A tendency often acknowledged by Soviet spokesmen as harmful has been the encouragement and opportunity given by authorities to some individual tractor and combine operators to make high records of performance, while little attention is paid to other workers. The result is that the so-called Stakhanovists, or shock workers, greatly exceed the performance of their fellow workers and, consequently, obtain much larger earnings. At the same time, however, the average productivity per worker remains low. As one writer puts it:[84]

> What is, then, the explanation of the abnormal situation in which the average daily amount of work per combine of many MTS and state farms is three to four times lower than that of the stakhanovists working in the same units? One of the basic reasons for this is that the managers of the MTS did not observe the most important directive of the Communist Party and the Government—that the strength of the stakhanovist movement lies in its mass character. Often the managers, in striving to encourage high records of individual workers, poorly direct the rank and file of combine operators, do not create the necessary organizational and technical conditions for efficient work with combines, do not provide the necessary assistance for the adoption of the stakhanovist methods of increased productivity of labor, even though large numbers of combine operators are anxious to work in the stakhanovist manner.

The great disparity in the amount of work done per year may be gathered from the fact that, although nearly two-thirds of the combine operators harvested up to 865 acres each in 1937, about 6 percent harvested more than 1,500 acres each with earnings increasing more than proportionately under the bonus system adopted. A similar situation prevails more or less with respect to other types of work.

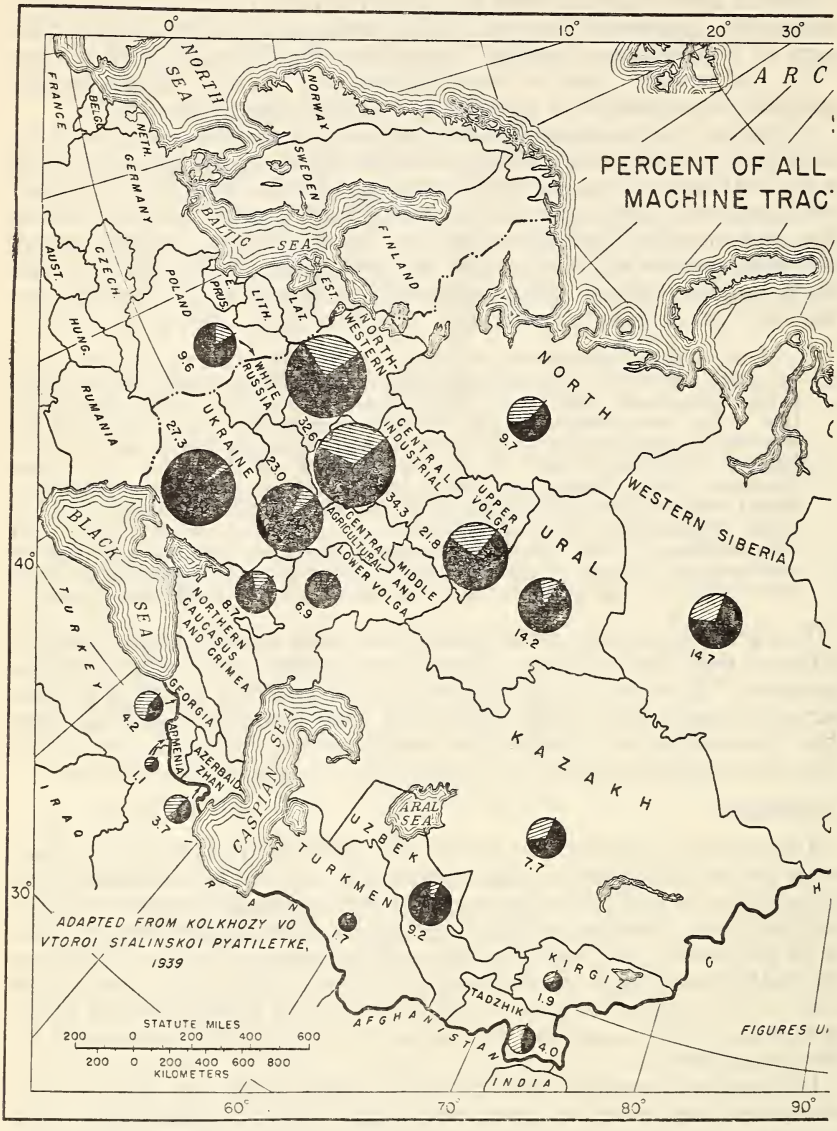
Operation

The amount of work to be done by the MTS each year is determined, as in the case of all other state enterprises, by the Government plan. In addition, an MTS is supposed to conclude agreements with the kolkhozy each year, specifying in detail the kind and amount of work to be performed and the time required for its completion. Likewise, the contribution that the kolkhoz is to make, such as the amount of labor to be assigned to help the MTS in its field work, is stated in the agreement. These agreements follow a standard form approved by the Government.

In practice, however, the agreements were often not lived up to; sometimes they were not even concluded. As A. A. Andreev stated, in 1947, in an important speech referred to above, "Some MTS have stopped entirely making agreements with the kolkhozy and others conclude such agreements with much delay and only as a formality,

[84] GORSHKOV, M. [THE ECONOMIC EFFECTIVENESS OF HARVESTING WITH COMBINES AND THE UTILIZATION OF COMBINES IN M.T.S.] Sotsialisticheskoe Sel'skoe Khozyaistvo 1947 (5): 26. 1947.

the agreements made not being observed."[85] Official criticism of this sort has been repeated year in and year out. For instance, Minister of Agriculture Benediktov complained in *Sotsialisticheskoe Zemledelie*



of January 1, 1950, that the MTS frequently violated the terms of the agreements regarding the very important matter of timing field work.

[85] Izvestiya, Mar. 7, 1947.

The MTS service most of the kolkhozy. In 1937, 78 percent of the total number of kolkhozy, representing 91 percent of the total kolkhoz sown area, were serviced by MTS, but it varied from region to region

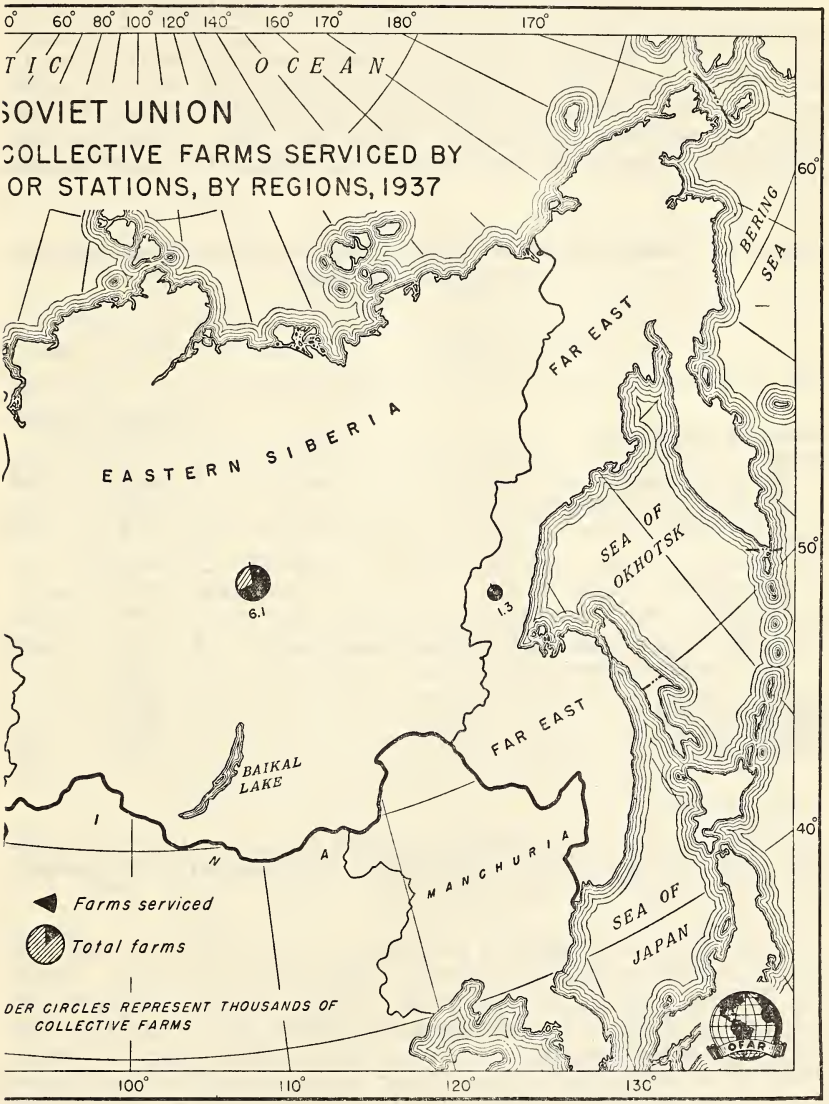


FIGURE 4 —Collective farms serviced by machine-tractor stations.

(fig. 4). The proportion of sown area was as high as 98 percent in the Ukraine and Middle and Lower Volga areas, and as low as 42 percent in the Georgian Republic in Transcausia. By 1940 the proportion of the sown area of the kolkhozy serviced by MTS increased

to 94 percent of all the collective area sown. No such data are available since World War II, but it is well-known that shortage of tractors and personnel greatly curtailed the sphere of operation of MTS during the war and early postwar years.

The extent of mechanization of farm work varies among different operations (table 10) and different regions. The greatest mechanization before the war was achieved in plowing and other heavy types of farm work. Very little mechanized equipment was used for some important farm operations, such as haying, notwithstanding the usefulness of machines in avoiding delays and other difficulties that usually beset the Soviet hay harvest and reduce the much-needed forage supply.

TABLE 10.—*Percentage of work done by tractor power on Soviet collective farms, 1938 and 1940*

Type of work	1938	1940
	Percent	*Percent*
Plowing for spring crops	74.7	--------
Sowing:		
All spring crops	43.9	52.0
Spring grains and legumes	[1] 46.4	--------
Winter crops	50.3	53.0
Planting:		
Cotton	65.5	--------
Sugar beets	95.0	--------
Potatoes	4.1	--------
Harvesting:		
All grains and legumes, with all types of machinery	45.0	46.0
Small grains, with combines	45.9	--------
Flax for fiber	19.8	--------
Digging sugar beets	79.5	--------
Preparing fallow	82.5	84.0
Fall plowing	71.9	71.0

[1] Data for 1937.

MALYSHEV, I. S., ed., M.T.S. VO VTOROI PYATILETKE, pp. 83, 85. Moscow and Leningrad. 1939. *And* KHALTURIN, V., [CONCERNING THE ORGANIZATION AND MANAGEMENT OF M.T.S.] Mashinno-Traktornaya Stantsiya 1946 (3): 14–18. 1946.

Among the farm operations performed by the MTS, harvesting of grain by combine has held a special place in official interest. Stalin even devoted one of his infrequent speeches to the subject at the conference of the best combine operators, held in Moscow in December 1935. Combine operators, even more than tractor drivers, came to represent the aristocracy of farm labor, and the steeply differentiated system of payment, with liberal bonuses for exceeding the standard task, made it possible for some of the best operators to earn during the relatively short season several times more than the average annual wage in the MTS. The attention focused on the combine is explained, in the first place, by the fact that delayed, inefficient harvesting with resulting large crop losses constituted one of the weakest links in Soviet collective agriculture. Complete mechanization of the harvest

was, therefore, looked upon as the way out of such difficulties, though the results have often been disappointing because of the inefficient operation of combines. In the second place, harvesting of grain by state-owned combines, eliminating the intermediate threshing center and extra transportation and handling, facilitated and speeded up Government collections of grain. From the combine, grain can be shipped directly to the Government procuring center. This may not only result in economies but also make for a more certain supply. For, it must be remembered, that the "struggle over grain" and other farm products between the Soviet Government and the peasants, though it changes its form, has never really ceased since the beginning of the Soviet regime.

In addition to field work, the machine-tractor stations are also helping at present with a number of other operations, such as planting tree shelterbelts, constructing water reservoirs and irrigation canals, improving pastures and meadows. Mechanization in animal husbandry and poultry raising, however, is still in its infancy in the Soviet Union. In these branches of agriculture, mechanization depends principally on rural electrification, which began to develop significantly only after World War II.

Mechanization is more advanced in the southern and eastern steppe regions than in the north and west. For example, in southern Ukraine, North Caucasus, and Lower Volga areas, from 90 to 100 percent of the spring plowing in the kolkhozy was done by tractor power in 1937. But farther north, in Gorki Province, the proportion was only a little more than half, in Smolensk a little more than 40 percent, and in Vologda Province less than 40 percent. In the sowing of spring grains, variations in the use of tractor power were more marked even between nearby regions of the same geographic zone. Thus, in Voroshilovgrad Province of southern Ukraine, in 1937, 88 percent of the kolkhoz spring-grain area was seeded by tractors and only 58 percent in the neighboring Province of Dnepropetrovsk. In the north the percentage was much lower. In Gorki Province, for example, it was less than 3 percent, in Smolensk 8 percent, and in Vologda 4.5 percent.

The lack of proper proportion between the number of tractors and other machinery was given by an official of the Soviet Ministry of Agriculture as an important cause for the lag in the mechanization of a number of farm operations. For example, on January 1, 1938, there were only 32 grain drills, 27 cultivators, and 27 combines per 100 tractors of 15 horsepower.[86] The same authority attributed the disparity between the mechanization of the south and the north partly to the lack of sufficient tractors and combines adapted for operation on the small scattered fields of the northern regions, for which the large machines, found advantageous in the southern steppes, are not suitable.[87] The merger of kolkhozy in these regions is ostensibly connected with the attempt to speed up mechanization.

A stock claim of Soviet spokesmen has been that tractors are more effectively utilized in their country than in the United States and other countries because of longer use during the year. The average tractor use in the Soviet Union in 1938 varied regionally from 800

[86] A 15-horsepower tractor is employed in the Soviet Union as a standard statistical unit for measuring tractor power.

[87] Pravda, Feb. 21, 1939.

to more than 1,600 hours. In the United States, average tractor use in 1940 varied from 372 hours in the South Atlantic States to 653 hours in Texas and Oklahoma and averaged 493 hours for the country as a whole.[88] [89] Much of this advantage in the Soviet Union is offset, however, by the use of several workers where one would do the job in the United States and by frequent break-downs of tractors and combines as a result of poor care, inexperienced or inefficient operators, poor repair work, shortages of spare parts and fuel, and other factors. Inadequate care of tractors and other machinery and in many cases lack of MTS storage facilities, which means that the machines remain in the open all year round, have contributed to excessive wear and tear on machinery. Every winter, repairing and overhauling tractors and combines has been a campaign that required major official concern. Still, in 1940, 15 percent of all MTS had no workshops for current repairs.[90] In addition to shops for current repair attached to individual MTS, there are also larger shops (so-called MTM), for more serious overhauling, which serve a number of MTS. It was decreed in February 1947, that there should be one such shop serving 15 to 20 MTS. In addition, each Province is to have one to two factories for overhauling and manufacturing equipment needed by the various repair shops.

The MTS have contributed materially to the expansion of the Russian crop acreage. In their desire to service more and more acres, however, they have neglected the quality of the field work and the improvement of yields per acre, so much stressed by the Soviet Government. As its spokesman, A. A. Andreev, expressed it:

> Our machine tractor stations are little interested in improvement of yields, in good soil management, in timely seeding and harvesting. The existing system of evaluation of the work of MTS in terms of hectares converted to plowing equivalent, and the system of incentives for the MTS personnel, results in the MTS striving to complete as many light operations as possible instead of the difficult plowing work. . . . One must ask what good do the state and kolkhozy derive from such a fulfillment of their plan by MTS if it results in low yields? The objective, after all, is not just to dig the soil a little but to create actual conditions for growing a good crop and to harvest it in good time with combines.[91]

The significance of these problems to the kolkhozy will become clearer when their great dependence on the MTS is remembered. Good and timely or poor and delayed cultivation of the kolkhoz fields by an MTS may spell the difference between good and poor crop yields, between success or failure of the collective farm to meet its production and distribution goals.

Next to the frequently poor work of MTS, the high cost of operation has been a constant source of preoccupation for the authorities concerned. Among factors contributing to high cost, considerable prominence has been given to wasteful use of fuel by tractors. This is caused by unsatisfactory adjustment of machines, wasted motion of

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[88] MATSKEVICH, S. [THE POWER BALANCE OF SOCIALIST AGRICULTURE.] Planovoe Khozyaistvo 1940 (12): 50–55. 1940.

[89] BRODELL, A. P., and COOPER, M. R. FUEL CONSUMED AND WORK PERFORMED BY FARM TRACTORS. U. S. Bur. of Agr. Econ., F.M. 32. 1942.

[90] KHALTURIN, V. [CONCERNING THE ORGANIZATION AND MANAGEMENT OF M.T.S.] Mashinno-Traktornaya Stantsiya 1946 (3): 15. 1946.

[91] Izvestiya, Mar. 7, 1947.

tractors, lack of proper fueling equipment, and inadequate storage and transportation facilities. The importance attached to this problem stems from the fact that fuel has been the largest element in the cost of tractor work. In 1937, the last year for which such data are available, it accounted, together with lubricants, for 55.9 percent of the total expenditures of MTS, as against 7.3 percent for wages, 9.9 percent for repair and overhauling of tractors and combines, 2.3 for repair of other machinery, 14.4 for administrative expenses, and 0.9 percent for other expenses.[92] Moreover, agriculture, and this means principally MTS, was the most important consumer of petroleum products, accounting, according to a statement made early in 1939, for more than 60 percent of the kerosene produced, and 80 percent of the distillate.[93]

MTS workers who economized in fuel were given special bonuses, but the result was that lighter work in which less fuel was consumed was often performed at the expense of more important, heavier fuel-consuming work.

The MTS, state-financed both with respect to capital investment and current expenditures, as a rule are paid in kind for their services to the kolkhozy. They receive cash for only certain minor operations. The grain, cotton, flax, etc. received in payment go into the state-held supplies together with tax-in-kind deliveries made by farmers. Each MTS operation is paid at a specified rate, which varies with the officially estimated yields of crops per hectare and increases with higher yields. Beginning in the 1947 season, the rate of payment was reduced where the MTS delayed work—a means of penalizing tardy MTS. Such delays have often characterized the operations of the MTS and been responsible for decreased crop yields. For harvesting grain by combines there is charged a certain percent of the outturn.

For purposes of determining the variation in the rate of payment to MTS, kolkhozy are divided into groups, according to yield per hectare and region. Assignment to the various yield groups is not by individual collective farms but by whole districts (raions, corresponding roughly to counties in the United States), so that all kolkhozy in a particular district are in one group as far as payments to MTS are concerned, even though there are actual differences in yields among them. Only when these differences are considerable is an exception permitted in favor of individual collective farms.

An important fact to remember is that the officially estimated, published Soviet figures of yields per hectare of crops since 1933 are preharvest figures, based on the standing crop, and do not take into account the heavy harvest losses common in the Soviet Union. Thus, official estimates of crop yields (on the basis of which the kolkhozy pay in kind to the MTS) are invariably higher than actual harvested outturn, even when there is no exaggeration for propaganda or fiscal purposes, from which the figures cannot be considered free. Under such conditions, payments to MTS are especially burdensome in years of poor crops. Kolkhozy that are serviced by MTS, however, deliver 20 percent less grain as compulsory procurements or tax in kind.

The payments in kind to MTS make up an important part of the grain and other farm products acquired by the Government. Grain

[92] MALYSHEV, op. cit., p. 117.

[93] CHEBOTAREV, K. [TOWARD THE ECONOMY OF PETROLEUM PRODUCTS IN AGRICULTURE.] Planovoe Khozyaistvo 1939 (2): 142. 1939.

collections of MTS constituted, on the average, more than a third of all grain procurements from the kolkhozy during 1935–37. The ratio of payments to MTS to the total grain crop of the kolkhozy increased from 13.9 percent in 1937 to 16 percent in 1938 and 19.2 percent in 1939, exceeding in all those years the compulsory procurements of grain (tax in kind). See table on page 188.

On the whole, it appears, both from statistical evidence and from firsthand observation, that physically and technically the tractor and, later, the combine, though often not efficiently or economically used by western standards, had nevertheless become acclimated in the Soviet Union. The economic criteria, however, by which relative advantages of the mechanical and animal power in farming may be measured, are extremely difficult to apply under Soviet conditions. This is true, not only because of scanty and inadequate data, but also because the tractor and combine have been crisis phenomena in the Soviet Union, even though in a diametrically opposite sense from that in which mechanization is considered to have contributed to agricultural overproduction and depression in the 1930's in some of the capitalistic countries. On the contrary, in the Soviet Union, as the preceding discussion has aimed to make clear, the tractor and the combine were enlisted to fight the crisis of underproduction and of shortage of draft power, which collectivization made acute. What strengthens immeasurably the position of the tractor and combine in the Soviet agricultural scheme is that, by making agriculture so thoroughly dependent on the nationalized industry and Government for draft power, machines, fuel, specialists, etc., they have become powerful instruments of Communist control of agricultural production.

Wartime Damage

The war caused heavy damage and destruction to the MTS in the invaded zone, where more than 40 percent of these units were located. MTS in the uninvaded zone were also adversely affected by war mobilization of tractors and experienced personnel and by the lack of replacements for worn-out machinery. Two of the three Soviet tractor plants in Stalingrad and Kharkov were destroyed, and the factory in Chelyabinsk shifted to production of tanks.[94] Tractor power in the MTS decreased from 8.4 million horsepower in 1940 to 6 million horsepower at the beginning of 1947.[95] The combined draft power, tractor and animal, in MTS and kolkhozy decreased from 14 million horsepower in 1937 to 10.2 million at the beginning of 1947. The number of tractors decreased from 435,000 in 7,069 MTS in 1940 to about 300,000 in 7,577 MTS in 1946.[96] As for animal draft power, the number of horses in the whole present territory of the Soviet Union, including the newly acquired regions, on January 1, 1947, was only a little more than half that in 1938. On January 1, 1951, it was somewhat more than two-thirds of the 1938 figure.

The postwar 5-year plan, announced in the spring of 1946, called

[94] HERMAN, L. M. REVIVAL OF RUSSIA'S TRACTOR INDUSTRY. Foreign Commerce Weekly 21 (2): 10. 1945.

[95] ANDREEV, A. A. *In* Izvestiya, Mar. 7, 1947.

[96] 1940, see table 8; 1946, SHRABSHTEIN, G. [MASHINNO-TRAKTORNYE STANTSII V POSLEVOENNYI PERIOD.] Mashinno-Traktornaya Stantsiya 1947 (11): 15. 1947. The number of tractors is calculated from percentage figures.

for the establishment by 1950 of 950 new MTS in addition to restoration of those that were destroyed or damaged and for supplying agriculture with 325,000 tractors, 174,000 combines, and other farm machinery, most of which is destined for MTS. But new tractors and farm machinery were slow in reaching the farms. It is estimated that only about 90,000 tractors were produced during the 3-year period 1946–48. The situation improved considerably in 1949 and 1950, when it was reported officially that an equivalent of 330,000 new tractors in terms of 15 horsepower were received by agriculture.[97] This would actually amount to probably fewer than 200,000 tractors. Thus, fewer than 300,000 tractors were added during the 5-year period 1946–50. When the worn-out condition of the prewar tractors, which constitute the great bulk of the inventory, is considered, it becomes evident that a shortage of draft power still exists in Soviet agriculture. This enhances the role of the MTS as an agency for pooling and economizing power and equipment in the USSR.

Rural Electrification

Rural electrification in the Soviet Union is essentially a postwar phenomenon, as little was actually done in this field before World War II. Despite marked progress during the years 1946–49, when a number of small rural plants were constructed, only 30,000 kolkhozy of more than 250,000 had electric power at the beginning of 1950. Geographically, the development of rural electrification was very uneven. In a few districts, such as those of Moscow and Leningrad, most of the kolkhozy had electric power, and in the Sverdlovsk Province in the Ural all kolkhozy have been electrified; but in many other regions electrification made little progress. It was planned to electrify more than 15 percent of all kolkhozy and almost all MTS by the end of 1950.[98] The use of electric power on farms for production purposes apparently is being stepped up. It was planned during the year 1950 to electrify fodder preparation in 6,000 kolkhozy, milking of cows in 5,000, and clipping of sheep in 3,000.[99] Increased use of electric power for other farm operations, such as threshing, was also reported.[100] There were also claims of successful experiments with 30 electric tractors.[1]

STATE FARMS (SOVKHOZY)

Collectivization of Soviet agriculture was accomplished not only by pooling peasant holdings in a kolkhoz but also by creating state farms or sovkhozy, which are entirely owned and operated by the state with the aid of hired labor. The origin of the sovkhozy dates back to the agrarian revolution of 1917–18, when an effort was made to salvage some of the valuable assets of the private estates, such as purebred livestock and improved plant varieties, despite the peasants'

[97] Izvestiya, Jan. 18, 1950, and Jan. 27, 1951.

[98] MATSKEVICH, S. [THE ROLE OF ELECTRIFICATION IN AGRICULTURE.] Izvestiya Akademii Nauk SSSR, Otdelenie Ekonomiki i Prava 1950 (3): 156. 1950. *See also* NAUMOV, N. [ELECTRIFICATION OF THE AGRICULTURE OF THE USSR.] Planovoe Khozyaistvo 1944 (4): 21–35. 1949.

[99] Sotsialisticheskoe Zemledelie, Sept. 5, 1950.

[100] Pravda, July 26, 1950.

[1] MATSKEVICH. THE ROLE OF ELECTRIFICATION. . . , p. 158.

pressure for complete division of property. The severe food shortage in 1918–21 gave impetus to this movement, and sovkhozy officially attached to various factories began to be established to produce foodstuffs for the workers. (For material on the early history of state farms, *see* STOLYAROV, I. YA. *In* Trudy Gosudarstvennogo Nauchno-Issledovatel'skogo Instituta Zemleustroistva I Pereseleniya v. V. Gosudarstvennye Zemel'nye Imushchestva I Ikh Ispol'zovanie, pp. 53–212. Moscow. 1928.)

During the subsequent NEP period, the sovkhozy, like the kolkhozy, played an insignificant role in Russian agricultural economy, except in growing sugar beets for the Soviet sugar industry, for which the sovkhozy continued the tradition of the former private estates in the sugar-beet zone. As a matter of fact, in 1925, at the height of the period of liberal policy on individual peasant farming, the Government decreed that land was to be taken from some small sovkhozy and distributed among peasants in regions where allotments to them were inadequate.

In 1928, however, a sweeping change took place in the Government's attitude toward the sovkhozy. The grain-procuring crisis that had developed during the winter and spring of 1928 and resulted in a strong anti-kulak campaign also brought to the fore the problem of speedily finding an effective substitute for the kulaks, who played an important part in grain production for the market. Collectivization of peasant agriculture, which became an accomplished fact a few years later, still seemed to be in the distant future. There existed a considerable area of uncultivated land in the eastern and southeastern regions, which, it was thought, should be utilized to combat the grain crisis. At the same time the tractor was beginning to appear in larger numbers in the Soviet Union, heralded by stories of its accomplishment in the development of large-scale farming overseas.

This combination of factors fitted in well with the Marxian thesis of the advantages of large-scale production in agriculture and with the new veering of Soviet agrarian policy toward collectivism in the late 1920's. Thus, the Government decided in the spring of 1928 to organize large mechanized farms for producing grain on uncultivated land. These were the so-called grain factories, a concept that some people had played with 10 years earlier, during the food crisis of 1918. Now, in another crisis, this dream was to be realized with the aid, first, of imported American and, later, of domestically manufactured tractors and combines. State farms were considered "truly socialist" enterprises, which were to serve as "models of large-scale farming" and "schools of new technique" to the peasants. Moreover, unlike the kolkhozy, the new sovkhozy were to be fully mechanized from the beginning.

Organization of the new large grain farms, the so-called zerno-sovkhozy, was pushed with the utmost vigor with a view to obtaining in 4 or 5 years 100 million poods, or 1.8 million short tons, of grain. Although there was considerable official optimism about the new venture, certain difficulties were apparent at the outset. The free land on which such farms were to be organized existed primarily in the eastern, southeastern, and southern regions of the USSR. As was pointed out earlier, this is the semiarid zone of light and unstable precipitation (16 inches and less per year) comparable to the drier

agricultural regions of the western part of the United States. Farming is hazardous in these areas because of frequent devastating droughts. The new state farms, therefore, had to operate for the most part under unfavorable climatic conditions. The land allotted to these farms was described as "spoiled," "weedy," and requiring considerable effort to bring it into cultivation.[2] Moreover, the territory in which a number of these farms were organized was sparsely settled, making it necessary to recruit the labor force at a considerable distance. And, since these units were started from scratch, it was necessary to build roads, provide water facilities, housing, and so forth. In general, conditions were difficult enough to tax the capacity of the most efficient management.

In fact, there is a serious doubt as to whether, under the climatic and soil conditions prevailing in many of the grain farms, the land should have been broken for crop production. It is true that the risk of frequent crop failures was recognized as unavoidable; but this hazard was discounted since the farms were supposed to be operated with a minimum of labor force and a maximum of mechanization, thus obviating the danger of widespread famine to man and animals.[3] The basic principles of the early state-grain-farm policy were therefore large expansion of acreage, large (perhaps *grandiose* would be a better word) size of the farm unit, and mechanization to the limit. These, it was confidently expected, would offset, if not overcome, the obstacles of climate and soil.

There were needed, according to Commissar Yakovlev, sovkhozy not of tens of thousands of acres but of hundreds of thousands. "The lowering of the quality of farming would be compensated by the increased sown area." Thus, in the race for more acres, soil management and other aspects of scientific or even simply good farming were, for the most part, completely disregarded, though, perhaps, nowhere were they more imperative. Consequently, instead of showing an example of efficient management to the kolkhozy, the grain farms manifested the same evils, but often in an exaggerated form, that were characteristic of the early period of collective farming—delayed and protracted sowing and harvesting and enormous crop losses. And the weeds found a new empire for their growth on the fallows that usually remained long uncultivated, contrary to all rules of good farming. Perhaps no greater incongruity could be found anywhere than the spectacle of a machine so up-to-date and complicated as a combine being clogged by weeds and put out of commission.

Not only was ordinary farm management neglected, but the modern machine technique, represented by the tractors and combines so generously supplied by the Government and on which so much was staked, was not utilized efficiently. Tractors, for instance, worked a smaller number of acres on the average in these grain farms than in the MTS: In the MTS the average amount of all work per 15-horsepower tractor expressed in plowing equivalents was 897, 1,000,

[2] CHESUNOV, M. V. *In* STROITEL'STVO SOTSIALISTICHESKIKH KRUPNYKH ZERNOVYKH KHOZYAISTV, p. 69. Published by Vsesoyuznoe Ob'edinenie Sovetskikh Zernovykh Khozyaistv ("Zernotrest"). 1931. (Proceedings of the First Conference of Managers of State Farms.)

[3] See the report of the former Commissar of Agriculture, Ya. A. Yakovlev, at the Sixteenth Communist Party Congress, *in* Ekonomicheskaya Zhizn', July 12, 1930.

and 1,013 acres for the years 1933, 1934, and 1935, respectively; in the grain farms corresponding figures were 477, 586, and 786 acres.[4]

Even of greater importance were the difficulties experienced with the combine, without which grain farming on so large a scale would be hardly feasible. If efficiently used, the combine can save an enormous amount of labor at the seasonal peak, that is, at harvesting time—and it will be recalled that the use of a minimum of labor is one of the fundamental principles on which the organization of these farms is based. Poor utilization of combines, however, contributed greatly to the necessity of employing many seasonal workers, who over a period of years constituted from one-half to one-third of the total labor force on these farms. Obviously, this employment involved a swelling of the labor force, contrary to the program of the Government.

The exceedingly heavy turn-over of even the skilled personnel on the grain farms, such as tractor drivers, because of unsatisfactory living and working conditions, further aggravated the situation. It meant a poorly trained labor force and inefficient work, and this often made it necessary to employ even more labor—to weed poorly cultivated fields, for instance. Here was a vicious circle. Soviet spokesmen have admitted that the unsatisfactory work of the grain farms was reflected in unduly low yields and high cost of production, though, like the kolkhozy, these farms varied in their efficiency.[5]

Stalin, in his speech at the Seventeenth Communist Party Congress in January 1934, pointed out "the great discrepancy" between the "enormous investments of the state" in the grain farms and the actual results of their operations. He attributed this to the fact that the grain farms "are too unwieldy; the managers are not able to cope with the enormous sovkhozy; the farms themselves are too specialized, and they lack crop rotation, fallows, and livestock. Obviously, it is necessary to divide the sovkhozy and liquidate their excessive specialization."[6] As a matter of fact, the need for subdivision and diversification, which was just the reverse of the original stress on concentration and specialization, was officially declared as early as 1931. Moreover, acreage expansion came to an end in 1932, and in 1933 the total acreage of grain farms was drastically reduced, especially in the drier regions. At the same time, the number of grain farms increased, from 182 at the end of 1931 to 340 in 1937. Although in 1931 the average sown area per farm was nearly 60,000 acres, in 1937 it was 25,000 acres.[7]

Not only were the large farms divided into smaller units, but each farm was also in turn subdivided into several semi-independent branches, each with its own manager and other personnel and equipment. These branches are actually farms in themselves. One grain

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[4] Figures for MTS are from SEL'SKOE KHOZYAISTVO SSSR, EZHEGODNIK 1935, p. 202. Moscow. 1936. For the grain state farms, from KARAVAEV, A. [THE LIQUIDATION OF SEASONAL LABOR IN THE ZERNO-SOVKHOZY.] Sotsialisticheskaya Rekonstruktsiya Sel'skogo Khozyaistva 1936 (3): 199. 1936.

[5] KUZNETSOVA, T. [COST OF PRODUCTION IN GRAIN STATE FARMS.] Planovoe Khozyaistvo 1937 (2): 70–90. 1937. *Also* LADEJINSKY, W. SOVIET STATE FARMS. Political Science Quarterly 53: 60–62, 207–232. 1938.

[6] Sotsialisticheskoe Zemledelie, Jan. 28, 1934.

[7] SEL'SKOE KHOZYAISTVO SSSR, EZHEGODNIK 1935, p. 728; SOTSIALISTICHESKOE SEL'SKOE KHOZYAISTVO SSSR, STATISTICHESKII SBORNIK, p. 30. Moscow. 1939.

farm near Omsk, Siberia, with a crop area of nearly 75,000 acres, visited by the writer in 1935, had eight branches. Another farm near Novosibirsk, Siberia, with an area of more than 42,000 acres, had six branches. In fact, the impression a visitor to a typical grain sovkhoz gets is that of a combination of farm units under central supervision with certain unified services such as repair shops, for example. (See table 11 for statistical data on state grain farms.)

In addition to organizing grain farms, the Soviet Government developed various other types of specialized state farms, among which livestock farms are noteworthy. The Government applied the same

TABLE 11.—*Statistics on state grain farms in the USSR, 1933 and 1937*

Item	1933	1937
Farms—number	234.0	340.0
Sown area:		
Total—1,000 hectares	3,228.3	3,518.3
Total—1,000 acres	7,977.1	8,693.7
Per farm—1,000 hectares	13.8	10.3
Per farm—1,000 acres	34.1	25.6
Grain area:		
Total—1,000 hectares	3,174.0	3,264.6
Total—1,000 acres	7,843.0	8,066.8
Per farm—1,000 hectares	13.6	9.6
Per farm—1,000 acres	33.5	23.7
Grain delivered to state—1,000 metric tons	991.9	2,710.3
Grain delivered to state—1,000 short tons	1,093.4	2,987.6
Tractors:		
Total:		
Number—thousands	27.9	15.0
Power—1,000 hp.	598.3	500.4
Per farm—number	119.0	44.0
Combines—thousands	12.3	13.6
Trucks—do	6.9	7.7
Cattle—do	46.3	218.4
Sheep and goats—do	26.2	448.1

1933: SEL'SKOE KHOZYAISTVO SSSR, EZHEGODNIK 1935, pp. 728–729. Moscow. 1936.

1937: SOTSIALISTICHESKOE SEL'SKOE KHOZYAISTVO SSSR, STATISTICHESKII SBORNIK, p. 30. Moscow. 1939.

principle of large-scale farming it had used in dealing with the grain shortage to meet the acute livestock crisis that developed with collectivization. By the end of 1931, there were more than 1,000 state livestock farms, stocked with animals confiscated or procured from the peasants. But it was not long before these units, too, were bitterly denounced. A Government decree of March 31, 1932, censured these farms for "inefficiency and complete lack of organization of the process of production, entirely unsatisfactory care of the animals, excessive mortality of young animals, large percentage of barrenness and entirely insufficient breeding, and poor condition of the livestock." As in the grain farms, subdivision and abandonment of excessive specialization (many of the livestock farms did not grow an adequate supply of their own feedstuffs) has been the policy pursued

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since 1932 by the Soviet Government regarding the state livestock farms (tables 12, 13, 14).

Another type of Soviet farms is the so-called orsy,[8] or farms organized during the food crisis of the early thirties by factories, railroads, and other industries, to grow foodstuffs for their employees. Thus, the experience of the previous food crisis of the period of war communism (1918–21), when such farms were first established, was recapitulated. Just as the idea of such special factory farms was abandoned with the passing of the food crisis when the NEP replaced the regime of war communism, so were the orsy liquidated in the later thirties, with the improvement of the food situation, and their land distributed among the kolkhozy. During World War II, however,

TABLE 12.—*Statistics on state dairy and meat farms in the USSR, 1933 and 1937*

Item	1933	1937
Farms—number	909.0	718.0
Sown area:		
Total—1,000 hectares	1,650.0	1,866.7
Total—1,000 acres	4,077.2	4,612.6
For fodder crops—1,000 hectares	———	534.1
For fodder crops—1,000 acres	———	1,319.8
Cattle:		
Total—1,000 head	2,311.1	1,522.1
Per farm—do	2.5	2.1
Cows and heifers:		
Total—do	1,178.6	677.2
Per farm—do	1.3	.9
Sheep and goats—do	77.1	460.3
Tractors:		
Number—thousands	9.3	13.6
Power—1,000 hp.	137.9	236.7
Combines—thousands	.7	3.2
Trucks—do	1.8	4.3

1933: SEL'SKOE KHOZYAISTVO SSSR, EZHEGODNIK 1935, pp. 782–783. Moscow. 1936.

1937: SOTSIALISTICHESKOE SEL'SKOE KHOZYAISTVO SSSR, STATISTICHESKII SBORNIK, p. 30. Moscow. 1939.

some of the state farms were again turned over to factories and other establishments and institutions to grow food, especially for their employees.

Improvement in the work of the state farms, particularly of the grain farms, has been recorded since 1935; nevertheless, official criticism of the sovkhozy has continued, sounding a new keynote—the unprofitableness of such farms. On that note the Commissar of State Grain and Livestock Farms concluded his report to the Council of People's Commissars on September 8, 1936, in which he enumerated various defects in the work of these farms, by saying, "State farms show considerable losses."[9]

[8] Plural of *ors*.

[9] Izvestiya, Sept. 10, 1936.

It is true that the idea of pecuniary loss under Soviet conditions (with prices fixed by the Government for cost factors and final products alike) does not have the same meaning as under conditions of a

TABLE 13.—*Statistics on state hog farms in the USSR, 1933 and 1937*

Item	1933	1937
Farms—number	840.0	424.0
Sown area:		
Total—1,000 hectares	1,307.6	1,140.5
Total—1,000 acres	3,231.1	2,818.2
For fodder crops—1,000 hectares	----------	282.1
For fodder crops—1,000 acres	----------	697.1
Hogs:		
Total—1,000 head	1,259.3	890.0
Per farm—do	1.5	2.1
Cattle—do	151.4	114.7
Tractors:		
Number—thousands	8.8	11.5
Power—1,000 hp.	125.4	183.1
Combines—thousands	----------	2.0
Trucks—do	.9	2.9

1933: SEL'SKOE KHOZYAISTVO SSSR, EZHEGODNIK 1935, pp. 890–891. Moscow. 1936.
1937: SOTSIALISTICHESKOE SEL'SKOE KHOZYAISTVO SSSR, STATISTICHESKII SBORNIK, p. 31. Moscow. 1939.

TABLE 14.—*Statistics on state sheep farms in the USSR, 1933 and 1937*

Item	1933	1937
Farms—number	197.0	188.0
Sown area:		
Total—1,000 hectares	504.0	634.8
Total—1,000 acres	1,245.4	1,568.6
For fodder crops—1,000 hectares	----------	252.4
For fodder crops—1,000 acres	----------	623.7
Sheep:		
Total—1,000 head	4,207.9	4,003.8
Per farm—do	21.4	21.3
Cattle—do	50.5	137.5
Tractors:		
Number—thousands	3.4	5.1
Power—1,000 hp.	54.4	84.7
Combines—thousands	----------	1.0
Trucks—do	.7	1.9

1933: SEL'SKOE KHOZYAISTVO SSSR, EZHEGODNIK 1935, pp. 966–967. Moscow. 1936.
1937: SOTSIALISTICHESKOE SEL'SKOE KHOZYAISTVO SSSR, STATISTICHESKII SBORNIK, p. 31. Moscow. 1939.

relatively free-market economy. But what is undoubtedly the root cause of the chagrin of Soviet officials is the inefficient utilization of resources and the low productivity of state farms. Furthermore, with

the development of collective farming and the perfecting of the Soviet system of control over the kolkhozy, state farming, the rapid growth

TABLE 15.—*Statistics on state farms, 1933 and 1938*

Item	1933	1938
Farms—number	4,742.0	3,961.0
Employees—thousands	2,422.2	1,517.8
Tractors:		
Total:		
Number—do	82.7	85.0
Power—1,000 hp.	1,394.5	1,751.8
Per farm—number	17.0	21.0
Trucks—thousands	----------	30.6
Combines—do	----------	26.6
Sown area:		
Total—1,000 hectares	14,138.8	12,410.8
Total—1,000 acres	34,937.0	30,667.1
Per farm—1,000 hectares	3.0	3.1
Per farm—1,000 acres	7.4	7.7
Ratio of state-farm sown area to total USSR sown area—percent	10.9	9.1
Total state-farm sown area in—		
Wheat—1,000 hectares	4,042.1	3,687.9
Wheat—1,000 acres	9,988.0	9,112.8
All grains (incl. wheat)—1,000 hectares	10,844.9	8,495.6
All grains (incl. wheat)—1,000 acres	26,797.7	20,992.6
Cotton—1,000 hectares	128.1	83.5
Cotton—1,000 acres	316.5	206.3
Sugar beets—1,000 hectares	100.5	53.0
Sugar beets—1,000 acres	248.3	131.0
Flax—1,000 hectares	19.1	10.9
Flax—1,000 acres	47.2	26.9
Ratio of state farm area in each crop to total USSR area in the crop:		
Wheat—percent	12.2	8.9
All grains (incl. wheat)—do	10.7	8.3
Cotton—do	6.2	4.0
Sugar beets—do	8.3	4.5
Flax—do	.7	.5
Livestock, total:		
Cattle—1,000 head	4,108.8	3,718.3
Hogs—do	2,964.4	2,808.6
Sheep and goats—do	8,140.6	7,025.4
Horses—do	1,445.7	2,020.8
Ratio of livestock on state farms to USSR total of each kind:		
Cattle—percent	10.7	7.3
Hogs—do	24.6	10.9
Sheep and goats—do	16.2	10.5
Horses—do	8.7	12.5

1933: SEL'SKOE KHOZYAISTVO SSSR, EZHEGODNIK 1935, pp. 715–716. Moscow. 1936.

1938: SOTSIALISTICHESKOE SEL'SKOE KHOZYAISTVO SSSR, STATISTICHESKII SBORNIK, p. 29. Moscow. 1939. *Also* POSEVNYE PLOSHCHADI SSSR V 1938 G., STATISTICHESKII SPRAVOCHNIK, p. 21. Moscow and Leningrad. 1939.

of which was primarily a crisis phenomenon, tends to lose its importance from the Soviet standpoint, except in some special branches

of agriculture. Farm products can be obtained by the state more cheaply, with less capital expenditure, from the kolkhozy. Capital investments by the Soviet Government in state farms during the years 1928–34 were reported at 10 billion rubles, and in MTS (the principal form of state investment in collective farming) at 3 billion rubles. Hence the criticism of the sovkhozy for unprofitableness. But the matter did not stop there. Since 1935 the Soviet Government has taken a more drastic step, liquidating the less efficient sovkhozy and turning state farm land over to the kolkhozy.

In 1938, the last year for which detailed statistics are available, there were altogether a little less than 4,000 state farms. Their distribution by types is shown in table 16. Apart from the so-called suburban state farms, which serve the various cities in the vicinity of which they are located, the dairy and meat farms rank first in number, followed by hog, grain, and seed farms. As table 15 indicates, the total number of state farms, the sown area, and the number

TABLE 16.—*Number of state farms, by types, 1938*

Type of farm	Number	Type of farm	Number
Grain and seed	478	Hog	659
Sugarbeet	180	Sheep	204
Cotton	38	Horse and camel	119
Fruit and vegetable	474	Reindeer	36
Tobacco	29	Poultry	102
Tea	22	Wild game	14
Essential oils and medicinal plants	16	Silk	12
Rubber plants	17	Suburban	723
Hops	10	Miscellaneous and other	59
Meat and dairy	769	Total	3,961

SOTSIALISTICHESKOE SEL'SKOE KHOZYAISTVO SSSR, STATISTICHESKII SBORNIK, p. 28. Moscow. 1939.

of cattle, hogs, and sheep, decreased between 1933 and 1938. The number of tractors, however, increased, as did the number of horses. In fact, the state farms in 1938 had a higher proportion of the horses in the USSR than they had of cattle, hogs, sheep, and goats.

In 1938, state farms accounted for less than one-tenth of the total seeded crop area and of the total wheat area in the USSR. The corresponding figures were much smaller for the so-called industrial crops, such as cotton, sugar beets, and flax. The state farms had between 10 and 11 percent of all sheep, goats, and hogs but only 7 percent of all cattle. In 1937, state farms accounted for about 13 percent of all grain deliveries to the Government, 7 percent of sugar beets, 5 percent of cotton, 30 percent of milk, 25.5 percent of wool, and 24 percent of meat. Thus, from the Government's standpoint, the state farms before World War II were particularly important as suppliers of animal and dairy products.

The importance of state farms in the agricultural economy, however, varies from region to region, increasing in the south and east

and diminishing in the north and west (table 17). In the Far East, state farms accounted, in 1938, for nearly one-fifth of the total sown area—the highest proportion for any region. Two-thirds of the state-farm sown area is concentrated in five regions—South Ukraine and Crimea, North Caucasus, Middle and Lower Volga, Urals, and West Siberia.

TABLE 17.—*Sown area on state farms and ratio to total sown area and to total state-farm sown area, by regions, 1938 (prewar boundaries)*

Region	State-farm sown area		Ratio of state-farm sown area to—	
			Total sown area	Total state-farm sown area
	1,000 hectares	*1,000 acres*	*Percent*	*Percent*
North	45.0	111.2	2.7	0.4
Northwest	166.3	410.9	2.8	1.3
White Russia (Belorussia)	60.7	150.0	1.8	.5
Central Industrial	528.8	1,306.7	5.4	4.3
Central Agricultural	897.1	2,216.7	6.1	7.2
Upper Volga	220.6	545.1	2.8	1.8
Middle and Lower Volga	1,504.0	3,716.4	11.8	12.1
North Ukraine	674.2	1,665.9	5.1	5.4
South Ukraine and Crimea	1,874.1	4,630.9	14.0	15.1
North Caucasus	1,868.2	4,616.3	14.7	15.0
Transcaucasia	62.6	154.7	2.5	.5
Ural	1,597.0	3,946.2	12.3	12.9
West Siberia	1,217.2	3,007.7	11.8	9.8
East Siberia	398.2	984.0	10.8	3.2
Far East	170.2	420.6	18.9	1.4
Kazakh	842.0	2,080.6	13.8	6.8
Central Asia	284.6	703.2	5.6	2.3
All USSR	12,410.8	30,667.1	9.1	100.0

POSEVNYE PLOSHCHADI SSSR (DINAMIKA ZA 1928, 1932–1938 GG, V SOPOSTAVLENII S 1913 G.), STATISTICHESKII SPRAVOCHNIK. Moscow and Leningrad. 1939.

State farms, of course, have not escaped the detrimental effects of the war. That the crop acreage and livestock numbers of these farms decreased during the war period was admitted by Andreev in his 1947 speech, which has been quoted here. In the war zone, the sovkhozy were reported by the Special Soviet Investigating Commission to have suffered severely.[10] In this category, for instance, was the well-known show state farm, *Gigant*, with an area of close to 70,000 acres, which was visited in prewar years by a number of foreigners. One important lesson that wartime experience taught was that smaller-size state farms functioned more effectively in every respect and ad-

[10] Sotsialisticheskoe Zemledelie, Sept. 14, 1945.

justed more readily to difficult wartime conditions than did the larger farms.[11]

The postwar 5-year plan acreage goal for state farms of 25 million acres in 1950 was lower than the 1938 seeded area of more than 30 million acres.[12] The number of state farms, however, increased from 3,961 in 1938 to 4,540 in 1950.[13] The stress laid on diversification of farming in sovkhozy by the Soviet leadership has been accentuated since the war.[14] It was pointed out that, because of the small number of livestock on farms specializing in growing grain and other crops, large areas of pasture land remain unused and considerable amounts of straw and other fodder are wasted. Similarly, on livestock farms much manure is wasted and land that could be used to grow feed is not utilized. Lack of diversification, it was charged, also made for high seasonal labor peaks and hindered the building up of an adequate, stable labor force. To attract permanent workers on state farms it was decreed that the personally used plots of workers were to be increased from 0.15 to 0.5 hectare (0.4 to 1.2 acres). Long-term credit was to be granted to workers for constructing homes that were to become their property after the loans were paid up.

The postwar picture as regards state farms has been a mixed one. Although considerable improvement in many respects was reported for 1948, and especially for 1949, the Minister of State Farms stated that, "as a result of serious faults, a large number of the sovkhozy ended the 1949 fiscal year with a loss."[15] But, in the same breath he declared that "a large number of the well-functioning sovkhozy ended the fiscal year with a large profit." It should be borne in mind, however, that the Soviet policy with regard to state farms, just as in the case of the MTS, is not guided solely by ordinary economic criteria. Political and ideological considerations are equally or more important. The sovkhozy, according to the teachings of Lenin and Stalin, must serve as an example "of the organization of large socialist agricultural enterprises and must assist the socialist reconstruction of agriculture by the whole experience of their work as well as by direct aid."[16] This attitude goes far to explain the continued existence, with frequent readjustments, it is true, of the sovkhozy, despite the many disappointments that they caused their creators.

State farms have given some assistance to the kolkhozy,[17] particularly in the use of tractors, but the sum total of it does not appear to be considerable. It goes without saying that because of the inefficiency of many of the state farms, they could not, with some exceptions, serve as examples of progressive farming on which the kolkhozy could model themselves. However, there are indications of a closer relationship between the state farms and the kolkhozy, which springs from the collective farm mergers discussed above. Thus, according

[11] GINSBURG, M. *In* Sovkhoznaya Gazeta, Nov. 3, 1945.

[12] ANDREEV, A. A. *In* Izvestiya, Mar. 7, 1947. *Also* POSEVNYE PLOSHCHADI SSSR (DINAMIKA ZA 1928, 1932–1938 GG, V SOPOSTAVLENII S 1913 G.), STATISTICHESKII SPRAVOCHNIK, p. 6. Moscow and Leningrad. 1939.

[13] See table 16 and editorial *in* Sotsialisticheskoe Zemledelie, Jan. 1, 1950.

[14] ANDREEV, A. A. *In* Izvestiya, Mar. 7, 1947. *Also* the Decree of the Cent al Committee of the Communist Party, published in the Soviet press on Feb. 28, 1947.

[15] SKVORTSOV, N. A. *In* Izvestiya, June 18, 1950.

[16] Ibid.

[17] BYKOV, S. *In* Sovkhoznaya Gazeta, May 1, 1950.

to a report in the official newspaper of the Ministry of State Farms of the USSR, *Sovkhoznaya Gazeta*, December 28, 1950, a large state farm in the Ukraine has taken on the patronage of a nearby consolidated collective farm. The state farm personnel is aiding the kolkhoz in working out a new land use program and a new 5-year plan as well as helping with the repair of implements. It is significant that an appeal was made to the workers of other state farms in the Province to follow the example and to take over patronage of the consolidated collective farms. The merger of collective farms doubtless offers to state farms new opportunities for service, but experience does not lend any encouragement that it will be effectively performed.

A pertinent question arises whether the two systems of collective and state farms will continue to coexist or whether they will be integrated into a single "socialist" type, patterned essentially on the sovkhozy. It would seem that the trend toward growing operational control of the kolkhozy by the Government and the increase in their size as a result of the mergers point in the direction of their eventual "assimilation" in a unified system of "socialist" farming. It is questionable, however, whether the Kremlin would be willing to substitute the regular wage method of payment for farm labor, characteristic of the sovkhozy, for the workday method under which members of the kolkhozy are merely residual claimants to the kolkhoz income. And so long as the workday method of payment is retained, it is probable that the fiction of self-government and of separate existence of the collective farms, legally independent from the state farms, is also likely to be maintained.

INDIVIDUAL FARMS

The rapid development of collective farming in the 1930's took place, as we saw earlier, at the expense of individual peasant farming. Nevertheless, small individual farming has not disappeared altogether in Soviet Russia and is legal according to Articles 7 and 9 of the 1936 Constitution of the USSR provided it does not involve the use of hired labor. It has already been pointed out that the members of the kolkhozy are permitted to cultivate small plots of land as kitchen gardens and to own a few animals—in other words, to carry on a sort of a-cow-and-an-acre type of farming. Similar rights have been accorded to workers on state farms and other state enterprises in the rural areas.

In addition, there still were 1.3 million individual peasant families in 1938 that had not joined the kolkhozy despite the discriminatory taxation and other pressures that had been applied since the beginning of mass collectivization. Most of these farmers were located in some of the more northern regions of the USSR or in regions inhabited by national minorities, so-called national Republics, such as Georgia and Chuvash. In the really important agricultural regions, more than 90 percent of the peasant families were in the kolkhozy by 1938.

In that year, individual peasant farmers cultivated only 2.1 million acres, on the average 1.63 acres per household. Members of the kolkhozy individually cultivated 13.2 million acres; and the workers in state enterprises 2.7 million acres. Altogether, these three categories of individual cultivators had, in 1938, a sown area of more

than 18 million acres, as against almost 290 million acres in the kolkhozy and 30.7 million on state farms. The small size of the area, however, does not fully measure the economic importance of individual agriculture, for cultivation on the individually held small plots is much more intensive than on the large collective fields.

As regards the possession of livestock, the picture was even more favorable to individual farming: Close to two-thirds of the cattle and hogs and more than one-half of the sheep and goats were individually owned in 1938. It is significant that the individualistic sector accounted in 1937 for nearly 28 percent of the farm income, according to Soviet estimates.[18]

Individual peasant farming and personal farming by kolkhoz members play a prominent part in the so-called kolkhoz-bazaar, or private trade, which accounted, in 1940, for nearly one-fifth of the total retail trade turn-over of the country.[19] The corresponding share in the retail food trade alone was doubtless greater.

The last few years before World War II, however, witnessed another Soviet offensive against the individualistic sector of agriculture. The relatively small group of surviving individual peasant farmers was the first to feel the brunt of the new attack. Numerous complaints were voiced in the Soviet press in the spring and summer of 1938 that the individual peasant farmers used their horses for purposes of "speculation," implying excessive and illegitimate gain.

One of the forms of such speculation was the high price charged by peasants who were hired with their horses to work for some of the kolkhozy on which there was a labor shortage during the peak season. This advantage to the individual peasant farmers undoubtedly aroused the resentment of peasants in the kolkhozy, who were not allowed even to own a horse and whose earnings were small. It is true that the number of horses owned by individual farmers was very small, less than half a million in 1938, as against almost 14.5 million owned by the kolkhozy and state farms. Nevertheless, the Government resorted to the familiar tactics of discriminatory taxation. By a decree passed by the Supreme Soviet of the USSR on August 21, 1938, horses of individual peasant farmers were heavily taxed.[20] Even if the peasant sold his horse, he was still liable to the tax, which was remitted only if the peasant joined a kolkhoz and yielded his horse to the latter. The real intention of the decree was, of course, to force the independent peasant farmers who still remained on the land into the kolkhozy.

Not only is the individual peasant farmer subjected from time to time to extraordinary taxation, such as the horse tax in 1938—and there were other instances of this kind—but his ordinary taxes also, both in cash and in kind, are much higher than those imposed on the collectivized peasantry. For instance, his compulsory grain deliveries, which, as was pointed out earlier, constitute a tax in kind, were set by

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[18] SOTSIALISTICHESKOE SEL'SKOE KHOZYAISTVO SSSR, STATISTICHESKII SBORNIK, p. 87. Moscow. 1939.

[19] BOL'SHAYA SOVETSKAYA ENTSIKLOPEDIYA [THE LARGE SOVIET ENCYCLOPEDIA]. Volume devoted to USSR, p. 1024. Moscow. 1947.

[20] *See* SOVIET UNION TAX ON HORSES. Manchester Guardian, Sept. 20, 1938. *Also* PLOTNIKOV, K. N. BYUDGET SOTSIALISTICHESKOGO GOSUDARSTVA, p. 189. Leningrad. 1948.

the 1940 law at 0.6 quintal per hectare (about 54 pounds per acre) of arable land above the rates established for kolkhozy not serviced by the MTS.[21] And the so-called general agricultural tax is for individual farmers double what it is for members of the kolkhozy. This is a tax on peasants' earnings derived from sources other than collective farming and paid in cash.

In addition to various forms of discriminatory taxation of individual peasant farmers, direct action was taken by the Kremlin to limit the land holdings of these farmers to a certain specified maximum. According to Article 8 of a decree of May 27, 1939, entitled "Concerning the Safeguarding of Land of Collective Farms," the holding of an individual peasant family cannot exceed in the irrigated cotton regions one-tenth of a hectare (¼ acre); in the nonirrigated cotton regions and in the fruit, vegetable, and sugar-beet regions, one-half of a hectare (1¼ acres); and in all the other regions, 1 hectare (about 2½ acres). In addition, the plots on which the farm buildings and the kitchen gardens are located must not exceed in the irrigated regions one-tenth of a hectare (¼ acre); and in all the other regions, two-tenths of a hectare (½ acre).

This new Government campaign against individual peasant farming achieved its object of forcing the peasants into the kolkhozy. In 1938, 93.5 percent of the peasant families were in the kolkhozy; by 1940 this figure had increased to nearly 97 percent.

Personal farming by members of the kolkhozy also began to be officially frowned upon during the years immediately preceding the war. Official Soviet data as of January 1, 1938, indicated that only 10.4 percent of the total number of kolkhozy permitted members to have kitchen gardens exceeding the size established by the model charter of 1935. At the same time, 12.5 percent of the kolkhozy allotted kitchen gardens below the legal size. Nevertheless, in 1939 a vigorous campaign began to be waged against the growth of personal farming in the kolkhozy. This was the aim of the special decree of May 27, 1938, on the safeguarding of kolkhoz lands, referred to before.

The new emphasis on the increase of collectivized livestock, which was inaugurated by a decree of July 8, 1939, "Concerning Measures for the Development of Collective Animal Husbandry in the Kolkhozy," had an adverse effect on privately owned livestock. The ratio of cattle privately owned by members of the kolkhozy to the total cattle population of the kolkhozy (member-owned and collectively owned, combined) decreased from 63 percent on January 1, 1938 to 54 percent on January 1, 1940. For hogs, corresponding figures were 67 and 57 percent.[22] During World War II, as we saw earlier, personal farming in the kolkhozy expanded again, but new curbs were applied by the Government once the war was over. Even a tendency to reduce the legal size of the kitchen garden plots became discernible.

A form of individual farming that has been encouraged by the Government since the war is the growing of vegetables and potatoes on small plots by the urban population. It has played a significant part

[21] Kolkhozy not serviced by MTS are obliged to deliver less grain to the state than those having contracts with MTS, which are paid in kind for their services.

[22] DEMIDOV, S. [THE NEW ADVANCE OF COLLECTIVE ANIMAL HUSBANDRY.] Planovoe Khozyaistvo 1940 (4): 19. 1940.

in relieving the severe food shortage during the war and early postwar years. As many as 18 million urban people were engaged in vegetable and potato gardening according to a report in *Pravda* of September 24, 1948.

The Soviet Government was confronted again with the problem of individual farming when it annexed, in 1939–40, Baltic, Polish, and Rumanian territories, a large part of which before World War I belonged to the former Russian Empire. Most of these regions had undergone during the interwar period more or less extensive agrarian reforms, in which some redistribution of land ownership in favor of the peasant farmer took place. As a result, small and medium-sized peasant holdings largely prevailed in this newly incorporated area of the USSR. A further redistribution of land, resulting in smaller holdings, took place with the Soviet occupation or reoccupation of these territories. The Soviet agrarian reforms, however, were not intended to create a viable small-peasant farming but were merely a prelude to agricultural collectivization, which has been carried out especially rapidly since the winter and spring of 1948–49 in all the annexed regions. By 1950, most peasant families were reported to have joined the kolkhozy.

IV

MACHINERY OF GOVERNMENT SUPERVISION

An elaborate administrative machinery is made necessary by the comprehensive character of Government control of Soviet agriculture, to which attention has frequently been called in the preceding pages. The day-to-day supervision and administration of agriculture, as of nearly everything else in the Soviet Union, is exercised by a double set of organs: The official Government agencies and the unofficial but more potent Communist Party bureaucracy, which is actually ruling the country. It is, in practice, difficult to draw a functional line of demarcation between the party and the Government, except that most of the technicians, such as agronomists and livestock specialists, are employed by the Government and not by the party. But no aspect of agriculture, however technical, is immune from party control and intervention.

The principal operating Government agency in charge of agriculture is the Ministry of Agriculture of the USSR, in Moscow, and it has its counterparts in the various federated and autonomous Republics. (Until 1946, all ministries were known as commissariats.) The Ministry has gone through a number of reorganizations, including the splitting into three separate ministries at the end of World War II (Ministry of Agriculture, Ministry of Technical Crops, and Ministry of Animal Husbandry) and, subsequently, a rather speedy recombining of these into a single Ministry of Agriculture. At the time of this writing (spring 1951), the Ministry is organized along regional and functional lines, with separate bureaus or administrations in Moscow in charge of large regions, which may include several Republics and Provinces. In 1947 there was established in the Ministry of Agriculture a Chief Administration of Machine-Tractor Stations to unify the direction of the MTS, which previously devolved on the regional bureaus.[1] Each Province (oblast or krai) and district (raion) also have departments of agriculture, which are branches of the respective Provincial and district governments (the Executive Committees of the Councils of Workers Deputies). But, according to Soviet administrative law, they are also subordinate to the republican and central Ministries of Agriculture.[2]

The Ministry of Agriculture and its various subdivisions have charge of the machine-tractor stations and, largely through the latter, of collective farms, with the exception of those in the cotton-growing regions. A new Ministry of Cotton Growing was organized on April 6, 1950, to administer agriculture in the cotton regions. In addition

[1] RUSKOL, A. A. DOGOVORNYE OTNOSHENIYA MTS S KOLKHOZAMI, p. 12. Moscow. 1948.

[2] EVTIKHIEV, I. I., and VLASOV, V. A. ADMINISTRATIVNOE PRAVO SSSR, p. 34. Moscow. 1946. *Also* STUDENIKIN, S. S. SOVETSKOE ADMINISTRATIVNOE PRAVO, p. 60. Moscow. 1949.

to the Ministry of Agriculture, there was established by a decree of September 19, 1946, a Council on Kolkhoz Affairs, under the Government of the USSR, with broad functions to supervise and deal with various problems of collective farming. The Minister of Agriculture, Benediktov, was one of a number of high party and Government officials appointed to the Council, together with a number of kolkhoz managers (chairmen). According to the statute of the Council, published in the Soviet press on October 22, 1946, it "is to meet once every three months, and in between times its functions are to be carried out by a permanent staff, including a praesidium of 11 members, representatives in the different Republics, regions, and Provinces, and inspectors. These representatives and inspectors are responsible to the council itself and not to any local government or Party office. The representatives are selected by the Council of Kolkhoz Affairs and are then approved by the Council of Ministers of the U.S.S.R. They themselves have very considerable authority."[3]

The Council on Kolkhoz Affairs was brought into being primarily as an enforcement agency for the provisions of the decree of September 19, 1946, which represented a move on the part of the Soviet Government to tighten the postwar collective farm system following the relaxation of the war period. Also, the Council is to supervise the enforcement of all other legislation affecting the kolkhoz.

> Its independent structure emphasizes the importance attached to these enforcement functions. The council can impose punishment itself or institute legal procedures against offenders and "if necessary raise with the Government the question of removing such officials from the posts they occupy."
>
> In addition, the council serves as a complaint office. It "reviews questions connected with the life of the kolkhoz and kolkhozniki raised by the kolkhoz and kolkhozniki, their statements, and complaints and takes the necessary measures to deal with them." Another type of function to be performed by the council is that of initiating and drafting legislation relevant to all problems of collective-farm administration.[4]

The jurisdiction of the Ministry of Agriculture does not extend to the more important type of state farms. Most of the latter are administered by a separate Ministry of State Farms, but some of the more specialized sovkhozy are controlled by other ministries, as, for instance, sugar beet farms by the Ministry of Food Industry, meat and dairy farms by the Ministry of Meat and Dairy Industry, cotton state farms by the Ministry of Cotton Growing.

The compulsory procurements of agricultural products are managed by a separate Ministry of Procurements of the USSR, which operates directly through its agents in the various Republics, Provinces, and districts. The sections of the annual and 5-year national plans dealing with agriculture are formulated by the State Planning Commission, or Gosplan, in cooperation with the Ministry of Agriculture and other interested agencies. The Central Statistical Administration, which is charged with collection and analysis of statistical data, was formerly attached to the Gosplan, but since 1949 it has been an independent agency under the Council of Ministers of the USSR.

Another important department of the Gosplan, which was subse-

[3] MILLS, THEODORA. SOVIET COLLECTIVE-FARM DECREE. Foreign Agr. 11:68. 1947.

[4] Ibid., p. 69.

quently also made an independent agency under the Council of Ministers of the USSR, is the State Crop Estimating Inspection, headed by a Chief Inspector. With its more than 400 field offices this agency has the ultimate responsibility for determining the official crop figures. In this task, the inspectors are assisted by the local agricultural departments, which are supposed to check through their agronomists the crop reports of kolkhoz managers, and by the Central Statistical Administration, which makes spot checks of the crops.[5]

The organization of the formal Government system of supervision and control of agriculture is set forth in considerable detail in Soviet literature, and is well-known. Less is known, however, about the organization of the parallel party system of control. So important, however, is detailed party supervision of agriculture considered, that when, in the spring of 1939, the spokesman of the Politburo at the Eighteenth Communist Party Congress proposed the abolishment of special branches of the Central Executive Committee of the Communist Party and of the Provincial party committees dealing with various sectors of national economy, he made an exception for the agricultural branches, which were retained.[6]

The operating of these agricultural branches is little publicized in the Soviet press. Presumably they act as staff agencies to the party leadership in Moscow and the local party bosses, who wield great powers over agriculture as over all other aspects of administration in their districts. These local bosses—the secretaries of the Provincial and district committees—are, in fact, the real coordinators of the multitude of agencies operating on the agricultural front.[7] It is also assumed, on the basis of indirect evidence, that one of the members of the Politburo, which includes the top leadership of the Communist Party, directs agricultural matters on a national scale. For a long time, A. A. Andreev performed this role, but there is a serious question whether he still does so in 1951 and whether this task has not been assumed by another member of the Politburo, N. Khrushchev, formerly the party boss of the Ukraine. The participation of the Communist Party members in the direction and control of agriculture usually increases in emergencies, such as a collectivization campaign or a lagging drive for deliveries of farm products to the state, when many communists in the cities are mobilized to spur such operations in the villages.

[5] SAVEL'EV, B. (chief state crop estimating inspector.) *In* Sotsialisticheskoe Zemledelie, July 11, 1947. *Also in* Planovoe Khozyaistvo 1947 (2): 37–43. 1947.

[6] See Andrei Zhanov's speech on the subject in Izvestiya, Mar. 20, 1939.

[7] In the report of a conference of the secretaries of the rural district (raion) committees of the Communist Party of the Ukraine, which appeared in *Pravda* of June 10, 1950, it was stated that, "the necessity was stressed of increasing by every means the role of the district committee of the Party as an organ directing, coordinating and controlling all activities (work) in the district (raion)."

V

FARM PRACTICES

Collectivization of agriculture has been accompanied not only by the development of mechanization but also by a strong drive on the part of the Government for adoption of certain farm practices to improve agricultural yields. As has already been pointed out, the Government has a vital interest in increasing agricultural production and, under the system of planned collective and state farming, has assumed a major responsibility for methods and practices used in agriculture.

During the early period of collectivization the Government relied mainly on expansion of acreage to increase production. As the acreage increased, however, the yields per acre declined, partly because of inferior land brought under cultivation, but largely because of inefficient management and the indifference of the peasants on the new collective farms. This deficiency stimulated Government effort to increase the yields by stressing adoption of better farm practices.

When it is recalled what was said earlier about the limitation of land resources in the Soviet Union, it is manifest that without improvement of yields, there can be, in the long run, no substantial increase of agricultural production, such as is required by the rapidly growing population and by the industrialization program, not to speak of any serious effort to raise the wretchedly low standard of living of the people of the USSR. The Soviet Government has been aware of this and in a decree issued on September 9, 1932, entitled "Concerning the Measures for Increasing Crop Yields," prescribed a shift of emphasis on the part of all Government and party organs, "in the direction of increasing yields of all crops without exception as the central objective of agricultural development at the present moment."[1] The necessity of increasing yields has since been a keynote of Soviet policy.

Even before collectivization, crop yields were generally lower in the Soviet Union than in Western Europe and the United States, and the Government was eager to demonstrate the superiority of the new collective farm system by raising the level of yields. Caution should be exercised, however, in comparing crop yields in the USSR with those in the United States and, particularly, Western Europe. The differences in climatic and economic conditions, which are in no small measure responsible for the divergences in yields, should not be overlooked. Light precipitation in many regions of the USSR and a short growing season tend toward low yields of crops in that country. Besides, in Russia a relative abundance of land and a limited industrial and urban development, which until recent years restricted a profitable market for agricultural products, favored extensive farming with low crop yields per unit of land; whereas in the countries of Western

[1] KILOSANIDZE, op. cit., p. 250.

Europe the greater industrialization favors intensive farming with high crop yields.

Nevertheless it remains true that there are wide opportunities for raising the crop yields per acre in the Soviet Union through adoption of improved farm practices. This is attested not only by the records of experiment stations and reports of kolkhozy, but also by the experience of the more progressive farmers during the precollectivization and pre-Soviet periods.[2]

Actually poor farm practices have tended to survive in Russian agriculture, sometimes in exaggerated form, side by side with modern farm techniques. The serious evil of weeds has already been alluded to several times. The problem has been aggravated since the war. Excessive weed infestation makes it necessary to expend a great deal of labor in the actual weeding of the fields. According to one Soviet authority, on some collective and state farms the expenditure of labor for weeding of wheat and flax fields constitutes more than half of the total labor required for the growing of these crops.[3] Furthermore, because of weed infestation, much deeper plowing and, consequently, greater expenditure of draft power have been necessary on Russian farms than would have been needed on weed-free fields.

Another handicap to Soviet agriculture is the untimely field work. Delayed plowing, seeding, harvesting, and so forth were common during the early years of collectivization. Delayed seeding is highly detrimental to yields, especially in the semiarid region, where the crops put in late may not have time to develop sufficiently to withstand the adverse effects of a hot, dry spell. While methods of preparing the soil and seeding had improved considerably in the late 30's, delay in harvesting, with consequent large crop losses, has been a more persistent evil.

CROP ROTATION AND SOIL CONSERVATION

In the Government program of improved farm practices the central place is held by a new system of crop rotation. It was intended to replace the traditional three-field cropping system (winter grain—spring crop—fallow) in the north and central parts of the country and the overcropping prevalent in the southern and eastern parts.

A systematic rotation system takes advantage of the various nutritional and moisture requirements of different crops, their resistance to diseases, pests, and weeds, and their diverse effects on the soil structure and fertility. Crops are therefore arranged in such succession as to tap most effectively the supplies of plant food and moisture in the soil, to minimize the incidence of diseases, pests, and weeds, and to improve the structure and fertility of the soil.

The new cropping systems recommended or introduced have varied from region to region in the character and number of crops and their

[2] ANTSIFEROV, A. N., BILIMOVICH, A. D., BATSHEV, M. O., IVANTSOV, D. N. RUSSIAN AGRICULTURE DURING THE WAR, p. 55. (Carnegie Endowment for International Peace.) New Haven. 1930. *See also* AUHAGEN, OTTO. AGRARVERFASSUNG UND LANDWIRTSCHAFT IM BEZIRK ODESSA. BERICHTE UEBER LANDWIRTSCHAFT. Neue Folge 10: 3, 396, and 405. *And* PAVLOVSKY, GEORGE. AGRICULTURAL RUSSIA ON THE EVE OF THE REVOLUTION, p. 218. London. 1930.

[3] SOKOLOV, N. *In* Izvestiya, May 29, 1945.

rotation, depending on soil, climatic, and such topographic conditions as lowlands and sloping ground. Even the same kolkhoz may have two or more cropping systems, one emphasizing forage crops and another grain and other food and industrial crops. Two features, however, are considered essential in the Soviet Union to a good cropping system: A sod or grass crop to improve the soil and provide forage, and the use of fallow.

The planting of a grass crop, principally clover, had come into use in the peasant farming of the northwestern and north central districts of Russia by the beginning of the present century. Grass was grown to augment the forage supply for livestock, which was essential for farming in these regions because crops could not be grown on the poor podzolic soils without the use of manure. But the universal emphasis of the Soviet agricultural programs on grass in rotation as a soil-improving crop is a relatively recent phenomenon. It is associated primarily with the work of a Russian soil scientist of American parentage by the name of V. R. Williams (1863–1939), who taught for many years in the Timiryazev Agricultural Academy in Moscow.[4]

Professor Williams insisted that, in order to have the best effect on the soil, the sod crop must consist of a mixture of legumes and perennial grasses, and this principle has been incorporated as a must in the official program. Where the perennial grasses do not grow well, as on sandy soils, it is recommended that crops like lupine be grown for green manuring, that is, for plowing under as a fertilizer.[5]

In general, the use of a mixture of grass and legumes in the cropping system conforms to the best practice recommended in the United States. "Grass and legumes in rotation improve the structure of the soil by making it more granular and thus increasing its ability to absorb water. Residues from grass and legumes that are returned to the soil as green manure increase organic matter and nitrogen in the soil."[6] It seems questionable, however, in the light of the practice in the United States, that grass should be introduced into rotation in regions where moisture is a limiting factor, as has been prescribed by the Soviet Government. It was stated, for instance, by an American authority that in dry land regions "Sod crops, an integral part of rotation practice in humid and subhumid areas, are unsuitable for short rotations, because of the dry condition in which they leave the soil, and their value in deferred rotations is still to be determined."[7]

[4] Williams, during the last years of his life, had become one of the chief official pillars of Soviet agricultural sciences. His scientific authority remained unchallenged after his death until there appeared in *Pravda* of July 15, 1950, a long critical article by Trofim Lysenko, entitled "Concerning the Agronomic Teaching of V. R. Williams." In this article, Lysenko, who is the present dictator of Soviet agricultural and biological sciences, while paying tribute to Williams as a theoretician, nevertheless challenges a number of his agronomic ideas, particularly his negative attitude toward winter grains. The rigid uncritical adherence of many Soviet research workers and agronomists to Williams' doctrines, without taking into account various modifying factors, was, ironically enough, criticized by Lysenko, who did so much himself to stifle scientific criticism in the field of biological science in the Soviet Union.

[5] CHIZHEVSKII, M. G. VVEDENIE I OSVOENIE PRAVIL'NYKH SEVOOBOROTOV V KOLKHOZAKH, p. 23. Moscow. 1948.

[6] BAILEY, R. Y., and NIXON, W. M. ROTATIONS FOR PROBLEM FIELDS. *In* Grass. Yearbook of Agriculture 1948, p. 195. U. S. Dept. Agr. Washington. 1948.

[7] LEIGHTY, CLYDE E. CROP ROTATION. *In* Soils and Men. Yearbook of Agriculture 1938, p. 427. U. S. Dept. Agr. Washington. 1938.

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The possibility of a satisfactory crop rotation without grass in the dry regions is also indicated by an outstanding Russian authority.[8]

The effort of the Government, however, to introduce crop rotation in the 1930's was only partly successful. It was admitted by the Soviet Minister of Agriculture Benediktov (then Commissar of Agriculture) in 1939 that only 12 percent of the collective farms had a more or less satisfactory system of crop rotation.[9] The authorities responsible for the agricultural planning were often themselves responsible for this state of affairs by prescribing acreage goals inconsistent with the observance of the crop rotation system.

Whatever the improvement in rotations before the war, the situation of course greatly deteriorated during the German invasion, particularly in the invaded regions, although even in the uninvaded area rotations were often neglected. A new decree of the Council of People's Commissars of the USSR on "Measures for Improvement in the Introduction and Adoption of Crop Rotation in Collective Farms," which was published in June 1945,[10] once more set up in detail a comprehensive Government program dealing with this question. By January 1, 1949, it was claimed that 78 percent of the kolkhozy had introduced a crop rotation system.[11] However, a number of faults in this work were indicated at a special conference in the Ministry of Agriculture, according to the report in *Sotsialisticheskoe Zemledelie* on February 28, 1949. New complications have arisen since the wholesale merger of collective farms began in 1950.

A serious handicap had been the shortage of grass seed since grass plays a basic part in the whole scheme of crop rotation. Moreover, inferior crops of grass, which are common judging from Lysenko's article (see footnote 4), do not have the expected beneficial effect on soil and yields of the succeeding crops. In the meantime, poor grass crops also reduce agricultural output, when grass is introduced at the expense of other crops. Especially harmful, from the economic standpoint, according to Lysenko, is the competition of low-yielding grass with the usually high yielding winter wheat in regions where climatic conditions make its cultivation advantageous. This competition results from the insistence of Williams and his adherents that the land under perennial grasses be plowed only in the fall when it is already too late to plant winter crops. Lysenko, therefore, recommended that low-yielding grassland be plowed after the first haying in the summer so that it could be prepared for seeding to winter wheat in the fall.

It is evident that quick results cannot be expected from the introduction of systematic crop rotation. But with perseverance, increased experience, and a more elastic and realistic attitude, this program could contribute materially to the improvement of crop yields generally and an increase of the fodder supply in the long run.

The other basic feature of the cropping system is the use of a fallow plowed as early as possible after the crop is harvested, preferably in

[8] PRYANISHNIKOV, D. N. SEVOOBOROT I EGO ZNACHENIE V DELE PODNYATIYA NASHIKH UROZBAEV, p. 28. Moscow. 1945.
[9] Sotsialisticheskoe Zemledelie, Feb. 11, 1939.
[10] Izvestiya, June 22, 1945.
[11] Sotsialisticheskoe Zemledelie, Feb. 27, 1949.

the autumn.[12] The plowing of the fallow late in the spring and, especially, in the early summer of the year following the harvest—a practice that once was quite frequent—has been discouraged by the Soviet agricultural programs. Fallow has been advocated as a method of conserving the moisture supply and for controlling weeds. Weed infestation, as a result of careless tillage during the early years of collectivization, has become a major problem and alone is reason enough for the emphasis on fallowing.

Conservation of soil moisture, however, is of great importance in Russian farming, so much of which is centered in the semiarid zone. Among other farm practices designed to this end, retention of snow has received considerable attention. Fall plowing in preparation for seeding during the following spring has also been stressed in the Russian production program. Fall plowing has the added advantage of easing the heavy load of field work in the spring and has been increasingly practiced in Russian agriculture.

Special programs designed to combat droughts in the southeastern part of the country were developed by the Government. In 1932 a scheme for the irrigation of the Volga area, coupled with hydroelectric power development, was officially announced. This scheme, which involved substantial capital investment, never went beyond the exploratory stage.[13] In 1938, after a severe drought, a new program, centering on better adaptation of the cropping system and the use of various moisture-conserving practices and local irrigation, was put into operation by a decree of October 26, 1938.[14]

The war and the German invasion interrupted this work, but with the return of peace the threads have been picked up again. In October 1948, just a decade after the last prewar program for combating drought first saw the light of day, a new ambitious program was announced, which is to extend over a period of 15 years.[15] The most spectacular feature of the 1948 program is reforestation.

Actually, the reforestation scheme is divided into several projects. The most important are the planting of national forests on watershed divides and on river banks, such as the Volga and Don, and the planting of tree shelterbelts for the protection of crops on collective and state farms. Planting of trees on banks of ravines and gullies and around ponds and reservoirs, afforestation, and stabilizing of shifting sands on land of the public domain are also included in this program.

These projects represent another step in a general policy of reforestation, which was set in motion by the law of July 2, 1936, and

[12] The concept of fallow (*par* in Russian) in the Soviet Union corresponds to what is known as summer fallow in the dry-land regions of the United States, which is defined as "keeping the land free from weeds or competing crop growth during one crop season in order to store moisture for the next. This differs from the use of the word in other sections where land that stands idle or that grows a crop of weeds part of the year is often termed 'fallow'." (LEIGHTY, op. cit., p. 427.)

[13] It was revived in 1950, when other large irrigation projects were also announced; these will be discussed later.

[14] For Government decrees on this subject, unless otherwise specified, *see* VAZHNEISHIE RESHENIYA PO SEL'SKOMU KHOZYAISTVU ZA 1938–1946 GG. Moscow. 1948. *See also* VOLIN. EFFECTS OF THE DROUGHT. . . , pp. 175–196. *See also* MILLS, THEODORA. TREE SHELTERBELTS AT A SOVIET EXPERIMENT STATION. Foreign Agr. 9: 108–112. 1945.

[15] Izvestiya, Oct. 24, 1948.

subsequent legislation. It aims to repair, at least in part, the damage that has been done to water resources by the indiscriminate destruction of forests and to overcome or moderate the ill effects of winds blowing from the Asiatic deserts, on the climate and crops of the southeastern USSR.

Tree shelterbelts as a means of protecting crops in the treeless steppes also played a role, though a much more modest one, in the 1938 program. As a matter of fact, this is a method of conservation in which the Russians have done considerable pioneering under the leadership of the great soil scientist Dokuchaev, who established in the 1890's the first experiment station for the study of tree shelterbelts. These shelterbelts are supposed to perform a double function. In the first place, they help to retain the snow on the ground, which acts as a protective cover for winter (fall-sown) grain, improves the moisture-retaining capacity of the soil, and in itself is a highly important source of moisture. In the second place, they diminish wind erosion and evaporation, thus helping to improve growing conditions for crops. It is contemplated to plant a little more than 14 million acres to trees on collective and state farms between 1949 and 1965. Of this total, about 8.9 million acres of trees were to be planted by the kolkhozy at their own expense, paying cash to the MTS for such aid as they may give. Kolkhoz labor is also to be used in planting 1.4 million acres and the remaining 3.7 million acres are to be planted by the Government on public land and state farms.

In the United States a considerable difference of opinion exists on the effect of tree shelterbelts on crops. Some question the very possibility of growing trees under the climatic and soil conditions of certain Russian regions. In the Soviet Union, however, technical literature and official pronouncements in recent years affirm the great effectiveness of such belts, although Russian experience has demonstrated that unless good care is given to young trees, especially during the first 2 or 3 years after planting, they perish. On this score, the situation in a number of shelterbelt projects was found unsatisfactory by authorities responsible for the program.[16] It is well to bear in mind also that tree shelterbelts, according to the Soviet conception, constitute only one element, albeit an important one, in a system of scientific farming of which crop rotation and various soil-improving and moisture-conserving practices are also essential components.

Many of these practices have been found useful by scientists and farmers in the United States. Others, such as deep plowing in dry regions, are considered of dubious value or even harmful. In the Soviet Union, however, good results from all such practices have been almost universally reported in recent years. Unfortunately, figures on crop yields are among the least trustworthy of the none-too-reliable Soviet statistics. Furthermore, acceptance of Soviet data is made more difficult by the fact that once any development, even of a technical or scientific character, receives the official sanction of the

[16] CHEKMENEV, E. *In* Izvestiya, May 12, 1949. Likewise, before the war it was charged by Soviet sources "that many collectives and machine-tractor stations after planting 'forget' all about them, and the costly young forest plantings 'are overcome by weeds and perish in the dried-up soil,' or, what is even worse, become a breeding ground for plant pests." VOLIN. EFFECTS OF THE DROUGHT. . . , p. 186.

Kremlin, all criticism except that pertaining to minor details is stilled, and ruthless purges of scientists have become a familiar phenomenon.

This policy, of course, greatly diminishes the trustworthiness of any information published by the Soviets. It goes without saying that first-hand study and objective verification of reported facts by foreign specialists and scholars, always very difficult in the USSR, have become practically impossible since the purge of the 1930's. When to this barrier is added the uncertainty as to whether the new program will be pursued with the original zeal over a long period of years, it becomes evident that its results can hardly be predicted at the present juncture. Nor is its cost revealed, for the program, though prolific in technical details, is silent on this vital point. Even if the cost, which must be largely borne by the kolkhozy, is disregarded (as it often is in the Soviet Union), the task of "transforming nature," as the drought amelioration program is depicted in the Soviet press, is at best an arduous one not to be accomplished in a few years and fraught with much uncertaintly.

USE OF IMPROVED SEED

Considerable attention has been devoted to providing the collective and state farms with seed of pure strains. The system developed consists of three important stages: First, a plant-breeding station develops seed of pure strains; second, such seeds are supplied for propagation to a designated collective or state farm in each district, which specializes in seed production; third, the seed produced on such farms is delivered to a Government agency in charge of the stock of seed of pure strains, and the agency, in exchange for ordinary seed, supplies the collective and state farms with pure strains for planting on special plots, which are supposed to provide the seed supply for the farm. This system has resulted in considerable progress in the use of seed of pure strains. In 1937, 42 percent of the total grain acreage was planted with such seed and in 1940, 84 percent.[17] Corresponding advances have been made in other crops. The war adversely affected seed improvements that had been achieved in Russian agriculture, particularly in the regions invaded by the Germans. A new decree of the People's Commissar of the USSR on the "Improvement of the Grain Seed Supply" outlined various measures for postwar recovery and further improvements in this field.[18]

However, criticism of the various organizations dealing with introduction of selected seed have persisted in the Soviet press during the postwar years. The situation was apparently satisfactory as far as winter grains were concerned, but quite unsatisfactory with respect to various spring crops, according to statements made at a conference in the Ministry of Agriculture of the USSR, reported in *Sotsialisticheskoe Zemledelie* of February 2, 1949. State farms have also been chided on this score in the organ of the Ministry of State Farms, *Sovkhoznaya Gazeta* of November 22, 1949, January 31, and February 2, 1950.

USE OF FERTILIZERS

The extent to which manure is used differs markedly between the so-called non-black-soil and the black-soil areas. In the former, with

[17] Sotsialisticheskoe Zemledelie, Feb. 27, 1945.
[18] Ibid.

its poor podzolized leached soils, manure is absolutely essential for satisfactory crop yields and is widely used. In the more fertile regions of the black-soil area, manuring is less common. Broadly speaking, the use of manure decreases towards the south and southeast, where lack of moisture rather than inadequate fertility of the soil is a limiting factor in crop production.

Manure is used primarily for winter grains, row crops, and the so-called industrial crops such as sugar beets, flax, cotton, and tobacco, but little for spring grains. In the Moscow Province in 1934, for instance, more than one-third of the land in winter rye and nearly two-thirds of that in winter wheat was manured; whereas less than 5 percent of the oats acreage that is planted in the spring was so treated.[19]

In general, the amount of manure used in Soviet Russia decreased during the decade preceding World War II, and this decrease, according to an eminent Russian agricultural scientist, is the main cause of an unfavorable plant-food balance in the Russian crop area.[20] The situation, of course, has deteriorated still further since World War II with the decline of livestock, which was bound to reduce the quantity of manure available.

The decreased supply of manure, naturally, adversely affected the yields of crops in the non-black-soil area. In order to minimize this unfavorable influence some of the limited supply of commercial fertilizer was diverted for use in that area, where it formerly had not been used or had been used only in small quantities.[21]

Unlike manure, the use of commercial fertilizers in Russian agriculture greatly increased during the interwar period. In 1928, about 245,000 short tons of commercial fertilizers, of which 228,000 tons were superphosphates, had been supplied to agriculture. In 1938, nearly 2.9 million short tons were supplied: more than 1.7 million tons of superphosphates; 778,000 tons of nitrates; and more than 330,000 tons of potash. In addition, 668,000 short tons of ground phosphate were provided.[22] The increased use of commercial fertilizers paralleled the growth of the Soviet chemical industry and the discovery of phosphate and potash deposits. But this increase did not compensate for the shortage of manure.

During the war, production of commercial fertilizer sharply decreased. Output has been increasing during the postwar period, but it was still below the prewar level in 1948, when, it is estimated, about 2.5 million short tons of nitrates, potash, and superphosphates were produced. At the same time, fertilizer requirements are now larger than they were before the war because of the reduced supply of manure and the increased territory incorporated since the war. In much of this new territory, fertilizer is necessary for crop production. Some of these newly incorporated regions, particularly the Baltic area and former East Prussia (now the Kaliningrad Province), used sizable quantities of commercial fertilizer before the war. Consumption of

[19] SEL'SKOE KHOZYAISTVO SSSR, EZHEGODNIK 1935, p. 339.

[20] PRYANISHNIKOV, D. N. *In* [A Collection of Scientific Papers of the Faculty of Agricultural Chemistry and Soil Science], p. 10. Moskovskaya Ordena Lenina, Sel'skokhozyaistvennaya Akademiya Imeni K. A. Timiryazeva, Trudy No. 30. Moscow. 1945.

[21] NAIDIN, P. *In* Sotsialisticheskoe Zemledelie, Apr. 10, 1948.

[22] SOTSIALISTICHESKOE SEL'SKOE KHOZYAISTVO SSSR, STATISTICHESKII SBORNIK, p. 25.

commercial fertilizer in 1937 in Latvia, Estonia, and Lithuania alone amounted to more than 385,000 short tons.

The postwar 5-year plan set as a goal for 1950 the production of 5.6 million short tons of nitrates, phosphates, and potash and 441,000 short tons of ground phosphate rock—altogether more than 6 million short tons of fertilizer materials, as compared with 3.5 million on a smaller territory in 1938. However, fertilizer production in 1950, estimated at nearly 3.9 million short tons, was considerably short of this goal. The supply may have been increased by some imports of potash from the Soviet zone of Germany.

The utilization of the valuable commercial fertilizers has been marked by considerable inefficiency. The loss of fertilizers between the factory and the field has been estimated at as much as 20 to 25 percent of the total quantity. Lack of proper storage and wasteful and inefficient practices by the distributing organizations and farm authorities are blamed for this situation.[23] Besides, poor quality of the fertilizers and a lack of implements for their application are said to have sharply decreased their effectiveness. Vexing delays in shipment of fertilizers to the farms have also been a frequent source of complaint in editorials and articles in the Soviet press as, for instance, in *Sotsialisticheskoe Zemledelie* of January 10 and February 1, 1951.

Excessive reliance on commercial fertilizers in some regions of the Soviet Union also has come up for criticism. This was notably the case in the principal Soviet cotton-growing region, the Uzbek Republic, or Uzbekistan. (The discussion of this point is based on an article by the late D. N. Pryanishnikov, a noted Soviet agricultural scientist.)[24]

The amount of commercial fertilizer used in Uzbekistan increased from 148 pounds per acre in 1934 to 487 pounds in 1939, with a resulting rise in the yield of cotton. Very little manure, however, was applied, and in the use of commercial fertilizer Uzbekistan was ahead even of Germany, with its highly developed fertilizer industry. According to Professor Pryanishnikov, for every hundred parts of nitrogen withdrawn by crops in Germany and in Uzbekistan, quantities were returned as follows:

	By manure	*By mineral fertilizer*
In Germany (prewar)	42 parts	22 parts
In Uzbekistan (1940)	20 parts	55 parts

These ratios are all the more paradoxical in view of the fact that in Germany only 10 percent of the arable area is sown to clover mixtures; whereas in Uzbekistan 25 percent of the irrigated area is sown to alfalfa, which in that climate yields four cuttings a year and should provide forage requirements and therefore manure.

A closer analysis of Uzbekistan farming revealed the cause of the shortage of manure. The nitrogen in the liquid excrement mostly went to waste owing to lack of straw, grain crops having been excluded from the crop rotation on irrigated land in order to provide more space for cotton. They [grains] were imported from Siberia by a railroad specially constructed for the purpose (the Turkestan-Siberia railroad—Turksib). The transportation of straw for distances of 1500–2000 kilometers (932 to 1,243 miles) was, however, not rational. It made the proper preparation of manure impossible; the liquid excrement,

[23] VLADIMIROV, A. *In* Sotsialisticheskoe Zemledelie, June 6, 1947.

[24] PRIANISHNIKOV [PRYANISHNIKOV], D. N. SOME WARTIME AGRICULTURAL PROBLEMS IN THE SOVIET UNION. Foreign Agr. 9:146–150. 1945.

into which most of the nitrogen of alfalfa hay passes, flowed away or rapidly decomposed (owing to the hot climate), and the nitrogen fixed from the air by the alfalfa was (with the exception of the residue in the roots) lost in the form of ammonia.[25]

The remedy suggested for this situation by Professor Pryanishnikov was to grow more grain in that region and thereby increase the supply of straw and manure.

Soviet soil specialists have attached considerable significance to the use of lime, especially on the acid podzolic soils. Liming is particularly recommended for growing such legumes as clover and alfalfa, considered essential in crop rotation. In 1948, a Government decree called for the application of lime on 680,000 acres. This is a small area when it is considered that almost 30 million acres of cropland in the European part of the Soviet Union alone are classified as needing lime.[26] [27]

The use of peat for soil improvement has been of considerable importance in the Soviet Union, which has abundant supplies of this material. Out of the more than 12 million short tons of peat produced in 1940 on farms, 8.8 million were thus applied.[28] Peat production also sharply decreased during World War II, but the Soviet Government has shown considerable interest in its increased use in agriculture since the war.

FARM PRACTICES, CENTRALIZED PLANNING, AND RESEARCH

The progressive farm methods described above and others, such as, for instance, artificial insemination in livestock breeding, have been introduced on a large scale in the USSR through centralized planning and direction. The imposition of such improved practices from above, however, has certain drawbacks that often tend to offset more or less the beneficial results of the more progressive agricultural techniques.

For example, the effort by local officials and farmers to fulfill the plan, because nonfulfillment may result in unpleasant or even dire consequences, often leads to an emphasis on purely quantitative or formal results to the neglect or detriment of the quality of work. For instance, the fulfillment of the plan for fallowing does not actually help to control weeds and conserve soil moisture if, as frequently happens, the fallow is plowed late in the season and not properly cultivated subsequently. Again, the favorable fact that the plan of tractor work is overfulfilled may be more than offset as far as production results are concerned by, say, late seeding of winter crops or unduly delayed fall plowing, so often reported in the Soviet press. Likewise, the formal introduction of a system of crop rotation on collective farms is of no value if the rotation cycle is not actually observed in practice, which is not an unusual phenomenon in the USSR.[29]

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[25] Ibid., pp. 146–147.

[26] KEDROV-ZIKHMAN, O. *In* Sotsialisticheskoe Zemledelie, June 6, 1948.

[27] VLADIMIROV, A. *In* Sotsialisticheskoe Zemledelie, May 10, 1949.

[28] OLENIN, A. *In* Sotsialisticheskoe Zemledelie, Mar. 28, 1946.

[29] LOPATINA, O. and SMIRNOVA, N. [CONCERNING THE IMPROVEMENT OF THE AGRONOMIC SERVICE IN KOLKHOZY.] Mashinno-Traktornaya Stantsiya 1949 (12): 10. 1949.

The dependence on orders and plans from above has tended to greatly hamper the initiative of the farmers themselves and thereby lower efficiency in farm operations. As the well-known agronomist, Professor N. M. Tulaikov, put it:

> It is impossible to give directions according to the once-established prescription to a kolkhoz "Road to Socialism," how and when to tend the fallow, when to begin and when to end the sowing of spring or winter crops, etc., in order to obtain large yields. Even from the most responsible institutions in Moscow such directions can be given only in case the person who gives the advice knows personally and very well all the conditions under which the kolkhoz "Road to Socialism" operates.[30]

The excessive reliance on the plan is especially detrimental when the planning work is poor. A good illustration was provided in the pages of *Izvestiya* for December 28, 1949. The kolkhozy in one of the southeastern districts of the Saratov Province for a number of years received seed grain from the Government, which they planted so promptly that they were able to report completion of seeding earlier than many other districts of the Province. But they harvested hardly anything because the crop was usually burned. Eventually the authorities, after consulting the older peasants in the kolkhozy, discovered that conditions in the district are not suitable for grain production but are well adapted for livestock raising and decided to make the indicated shift. Thus, for years official plans presumably sanctioned a faulty pattern of farming in this district until authorities of the Province saw fit to institute a change.

Centralized planning and control has introduced not only improved agricultural methods but also some dubious, uneconomic, or even harmful practices. A typical example is the so-called yarovization (sometimes spelled iarovization), or vernalization, which received much international publicity in the 1930's.

> Iarovization is a slow and limited germination of seeds at certain controlled temperatures. The seeds are first wetted to start germination but the later progress of germination is greatly retarded by low temperatures, limited moisture, or salt solutions. The small grains—wheat, oats, and barley—are held at comparatively low temperatures ranging from 32 to 41° F., while such seeds as corn, sorghum, and millets are maintained at higher temperature ranges (68 to 86° F.). The latter seeds, according to published recommendations, must be germinated in darkness. The treatment, under the controlled conditions, is continued for periods of 5 to 65 days.[31]

The discovery of this method was claimed to have been made in the Soviet Union in the late 1920's by a Soviet agronomist, Trofim D. Lysenko; and from this alleged discovery he dates his rise to fame and eventually to a position of a virtual dictator of Soviet biological science. Thus, the Soviet agricultural reference dictionary speaks of "the greatest scientific discovery of the Academician of the Ukrainian Academy of Science, comrade Lysenko."[32] Actually, as Martin points out, "Iarovization is not new, as the principles on which it is based

[30] Cited by VOLIN *in* AGRARIAN COLLECTIVISM IN THE SOVIET UNION, p. 625.

[31] MARTIN, JOHN H. IAROVIZATION IN FIELD PRACTICE. U. S. Bur. Plant Indus. [Mimeographed.] 1934. This study contains also a useful bibliography.

[32] GAISTER, A. I., principal ed. SEL'SKHOZYAISTVENNYI SLOVAR-SPRAVOCHNIK, p. 1275. Moscow and Leningrad. 1934. *See also* article on yarovization *in* MILYUTIN, V. P., ed. SEL'SKOKHOZYAISTVENNAYA ENTSIKLOPEDIYA [AGRICULTURAL ENCYCLOPEDIA] v. 4, pp. 1045–1047. Moscow. 1935.

have certainly been known for nearly a century and probably much longer."[33]

Lysenko and his followers made great claims for the beneficial results of yarovization in the Soviet Union. Thus, in the introduction to a book on the subject, published in 1935, Lysenko states:

> Yarovization accelerates the maturation of different crops and thus increases their yields in many regions. Yarovization is one of the agronomic methods of overcoming unfavorable climatic conditions such as the drought and sukhovei [scorching winds] in the southern and eastern regions of the USSR. In those northern regions of the USSR, where the summer is short, many grain varieties (wheat, barley), and also other crops, may be brought to maturity by means of yarovization before the coming of frosts.[34]

Accordingly, many millions of acres were planted with seed treated by this laborious method in the Soviet Union in the 1930's, and favorable results were usually claimed. In the meantime, the opinion of scientists who studied the subject outside the Soviet Union, was decidedly unfavorable. According to a study published by the United States Department of Agriculture:

> No direct evidence regarding the practical value of iarovization is available in the United States. Sixty-two available comparisons of the yield of 'naturally iarovized' winter wheat, and of spring wheat seeded in the spring, show that the latter produced the higher average yields. Iarovized sorghum seed failed to produce earlier heading or better growth than untreated seed of the same varieties in experiments conducted in 1933. No satisfactory method of iarovizing seed on a commercial scale has yet been devised. The obvious difficulties, such as the necessity for accurate control of temperature, moldy seed, low germination, poor stands, and those inherent in drying the seed or in seeding moist, partly germinated seed are such as to leave little doubt that the method offers nothing of immediate value for the practical farmer.[35]

Professor Karl Sax of Harvard University has stated the case against yarovization even more bluntly:

> It has been tried all over the world, and is of practically no value in agriculture. It is easier to transfer the characters of winter wheat or a spring variety by hybridization than it is to mess with this treatment. Moreover, the vernalized seed usually produces an inferior crop, due to seed damage in sowing the softened seed. The only value of vernalization is to increase slightly the time of maturity, and even this is of doubtful agricultural value.[36]

Professor Eric Ashby, an Australian botanist who was attached to the Australian Legation at Moscow during the war, reports as follows:

> When the much advertised pre-treatment of grain by low temperatures, called vernalization, proved a great failure, Lysenko cleverly substituted another pre-treatment, which is virtually a germination test, but which appeared under his name in the decrees for the Spring sowing in 1945 and 1946.[37]

The eclipse of the much publicized yarovization in the Soviet Union is apparently corroborated by the fact that it was never mentioned in the highly important February 1947 decree of the Central Committee

[33] MARTIN, op. cit., p. 11.

[34] LYSENKO, T. D. TEORETICHESKIE OSNOVY YAROVIZATSII, p. 7. Moscow and Leningrad. 1935.

[35] MARTIN, op. cit., p. 11.

[36] SAX, KARL. GENETICS AND AGRICULTURE. Bulletin of the Atomic Scientists 5:143. 1949.

[37] ASHBY, ERIC. SCIENTIST IN RUSSIA, p. 115. New York. 1947.

of the Communist Party, which touched upon every significant phase of the postwar agricultural situation.

There have been many other reports of spectacular agricultural achievements in the Soviet Union. Such, for instance, is the much advertised program for agricultural conquest of the Arctic regions, which is spearheaded by the Science Research Institute of Polar Agriculture, with headquarters in Leningrad. An objective and not unsympathetic Australian observer, Professor Ashby, who was quoted above, reports as follows on this program:

> To carry out its programme the Institute has seventeen experiment stations, from Murmansk in the west to Anadyr on the Pacific coast. It claims that wheat is grown at a latitude of 63° N., and oats, potatoes, and cabbages at 68° N. It boasts of tomatoes in Igarka and mahorka tobacco along the Ob. It reports yields of potatoes as high as fourteen tons per acre.
>
> The high yields should not be taken seriously, for the Russians have a custom of calculating yields per acre from the yields on plots four metres square, or even from the yields of single plants; in fact potatoes on the Kola peninsula (varieties Vermont, Snowflake, and Imandra) yield about two-and-a-half tons per acre. Nor should the production of Arctic tomatoes be taken seriously, because, given a glasshouse with artificial heat and artificial light, there is nothing more remarkable in producing tomatoes in Igarka than ice-cream from a refrigerator in Singapore. But, discounting these extravagances, one can find nothing but praise for the work of the Institute. It has made a systematic study of the Arctic soils and the manuring they require. It has opened up great stretches of country for agriculture and for stock-raising. It has found varieties of crops adapted to the very short growth seasons. It has studied methods of cultivation suitable for the ice-bound earth. It has prepared composts which bring into the soil suitable bacteria to promote fertility.
>
> It is incorrect to imagine that these efforts have transformed the Soviet Arctic. The traveller through the Kola peninsula and around the White Sea, which is the mildest and most densely populated part of the Arctic, sees very little cultivation and no novel kind of agriculture. There are potatoes in allotments round every village. There is a little haymaking in sheltered places among the birch and pine scrub. There are patches of oats along the roadside, but these seem to be more a gesture of optimism than anything else, for one observer told me in Murmansk that he did not remember the grain ripening in any season during his stay of three years in that district. There are good cabbages and radishes. And near settled areas, there are extensive glasshouses where other crops and even flowers are grown.
>
> Owing to the poverty of the soil, it requires a great deal of manure to grow a crop in the Arctic. The Institute reports that on some soils anything up to forty tons of manure per acre are needed to produce a crop of potatoes. Most of this has to be brought by rail or ship to the Arctic. When I asked one Soviet official whether it would not be cheaper and more convenient to bring the potatoes into the Arctic rather than the manure, he replied: 'Yes, of course it would. But that is not our policy.' To carry out this policy, a great deal of trouble is taken. Potatoes, for instance, are exposed to light under glass for forty-five days before planting. They are planted at the end of May. Cabbages are raised in heated glasshouses in pots made of peat, and subsequently planted out. The Soviet Arctic is to be self-sufficient even for seed, and at every experiment station glass house space is provided for growing crops for seed production.
>
> Arctic agriculture is an ideal; uneconomic, difficult, and of doubtful political value.[38]

Other examples could be cited of uneconomic or scientifically doubtful methods having been adopted and publicized in the Soviet Union as spectacular achievements long after they were tried and discarded elsewhere. What has just been said, however, should not obscure

[38] ASHBY, op. cit., pp. 119–121.

the fact that a genuine scientific tradition has existed in Russia, dating back to the prerevolutionary period, a tradition that has resulted in solid accomplishments in scientific research. Many of these have been of value to agriculture, even preeminently so, as in soil science, for instance. The use of such Russian words as *chernozem* and *podzol* in our technical soil terminology illustrates perhaps better than anything else the extent of Russian influence in this matter.

The expansion of agricultural research facilities and the increase in the number of scientists engaged in research, as well as of all types of agricultural specialists, during the Soviet period is impressive. Some of the figures are as follows:[39]

	1913 (*Number*)	*1938* (*Number*)
Experiment stations	44	303
Research workers of experiment stations and research institutes	250	9,800
Experiment fields outside of the stations	78	507
Agricultural laboratories and seed control stations	18	2,720

In addition in 1938 there were 87 agricultural research institutes, including their branches in different localities, and more than 12,000 experiment laboratories in the kolkhozy, in which the interested kolkhoz members could carry on their experiments and tests. The number of agronomists increased from 16,800 in 1926 to 107,200 in 1938; surveyors and topographers, from 12,900 to 27,900; veterinaries, from 4,900 to 17,100. The number of graduates of agricultural colleges increased from 1,800 during 1909–13 to 41,600 during 1933–37; graduates of agricultural secondary schools, from 1,300 to 91,400.[40] An ambitious experiment in mass agricultural education began in the autumn of 1950 when new 3-year on-the-job agricultural courses for collective farmers were organized.

It is only fair to add also that during the decade preceding 1913 (a base year in the Soviet statistical publications) there was considerable progress in agricultural research, education, and extension work. The trend, therefore, was not entirely new, though it was doubtless accelerated during the Soviet period, often at the expense of quality of work and training. Such qualitative defects, however, are likely to be overcome in time.

Recurrent complaints have also been voiced in Soviet published sources regarding the improper use of agricultural specialists, overburdening them with office work and "red tape," failing to provide them with adequate transportation, etc. To give them greater incentive to spend more time in the field working with farmers and to stimulate their interest in increased production, agricultural specialists have been given salary increases and bonuses, according to a Government order published in *Sotsialisticheskoe Zemledelie* on August 13, 1947.

Although the Soviet Government apparently has often provided material facilities on a generous scale for scientific research, at the same time it has hindered scientific progress and even stifled some branches of science by political interference. This interference extends to

[39] SOTSIALISTICHESKOE SEL'SKOE KHOZYAISTVO SSSR, STATISTICHESKII SBORNIK, p. 104.

[40] Ibid., p. 103.

fundamental scientific principles and doctrines, and, as a rule, aims to destroy the world unity of science and genuine international scientific cooperation. The most flagrant and notorious case of such political interference, one that touches agricultural research closely, is the fight against scientific genetics, which has been waged since the middle 1930's by Lysenko and his followers with full backing of the Government and the Communist Party. This campaign, in which doctrines accepted by scientists the world over were discarded by Lysenko, ended in the summer of 1948 with a complete rout of the Soviet geneticists and heavy casualties in practically all other branches of the biological science, which were likewise purged.[41] Such a war against science is bound to have a detrimental effect on agricultural research in the Soviet Union and, by the same token, to hamper agricultural progress.

[41] For a detailed account of this episode *see* COOK, R. C. LYSENKO'S MARXIST GENETICS. SCIENCE OR RELIGION? Journal of Heredity 11: 169–202. 1949. This also contains a good bibliography on the subject. *See also* (1) E[UGENE] R[ABINOWITCH]. HISTORY OF THE GENETICS CONFLICT. Bulletin of the Atomic Scientists 5: 131–140, 156. 1949. (2) SAX, op. cit., pp. 143, 146. (3) DOBZHANSKY, T. THE SUPRESSION OF A SCIENCE. Bulletin of the Atomic Scientists 5: 144–146. 1949. (4) MULLER, A. J. THE DESTRUCTION OF SCIENCE IN THE USSR. Saturday Review of Literature, Dec. 4, 1948, pp. 13–15, 63–65. (5) BACK TO BARBARISM—SCIENTIFICALLY. Saturday Review of Literature, Dec. 11, 1948, pp. 8–10. (6) ZIRKLE, CONWAY, ed. DEATH OF A SCIENCE IN RUSSIA; THE FATE OF GENETICISTS AS DESCRIBED IN PRAVDA AND ELSEWHERE. 319 pp. Philadelphia. 1949. (7) COUNTS, G. S., and LODGE, N. P. COUNTRY OF THE BLIND; THE SOVIET SYSTEM OF MIND CONTROL. 378 pp. New York. 1949.

VI

LAND UTILIZATION

Only a little more than 10 percent of the enormous area of the Soviet Union proper[1] is classified as tillable land (table 18). Of this area, about 60 percent was under crops in 1938; the rest was either plowed fallow or uncropped. Acreage both in pastures and especially in forests exceeded considerably the acreage in tillable land. The proportion of tillable land is much larger in the European part of the country than in the Asiatic regions, amounting in the former to nearly 30 percent of the total.

In European Russia itself there are also considerable regional variations. The proportion of tillable land is higher in the black-soil area than in the non-black-soil area and the proportion of meadows and pastures is lower. In the Ukraine, for instance, most of which is black soil, tillable land constitutes 69 percent and meadows and pastures 8.5 percent of total land; and in White Russia, which is non-black soil, tillable land is 34 percent and meadows and pastures 22 percent. The great importance of meadows and pastures in the agricultural economy of the non-black-soil area stems from the essential role of livestock in farming because of the need for manure, without which crops could not be grown on the poor soils of these regions.

In the newly acquired territory the pattern of land utilization differs markedly from that of the Soviet Union proper; tillable land accounts for more than 40 percent of the total and greatly exceeds pastures and forests.[2] The area under crops also occupies a higher proportion of the tillable land than it does in the Soviet Union proper. Another significant feature of land utilization in the acquired territories is the high proportion of permanent meadows, which exceed pastureland. In the Soviet Union proper, permanent meadows occupy a much smaller proportion than pastures.

Not all of the tillable land is planted to crops in any one year. Part of the land lies fallow each year, either as tilled fallow in a regular system of rotation, or is reverted to sod after continuous cropping has exhausted the fertility of the soil. Fallowing is considered essential in the Soviet Union for conservation of soil moisture and for weed control, which has been made even more necessary by the serious weed infestation that occurred during World War II. The tilled fallow area in the kolkhozy increased from 31.9 million acres in 1933 to 69.2 million in 1938[3] and may be compared with the total 1938 crop area of the kolkhozy, about 290 million acres.[3] [4]

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[1] Without territories incorporated since World War II.

[2] A comparison of the acquired territories with the western regions of the Soviet Union proper would reveal a much closer resemblance in land utilization.

[3] SAUTIN. KOLKHOZY VO VTOROI STALINSKOI PYATILETKE, p. 91.

[4] POSEVNYE PLOSHCHADI SSSR (DINAMIKA ZA 1928. . .), STATISTICHESKII SPRAVOCHNIK, p. 6.

The tillable land in the USSR can, of course, be increased at the expense of meadows and pastures in the steppe regions and by cutting down forests in the more northern regions. This latter practice, however, has long since reached the danger point in the central and southern regions of the country. The increase of cultivated acreage in the semiarid steppe regions, where most of the meadows and pasture

TABLE 18.—*Land utilization in the Soviet Union proper and acquired territories*

Utilization of land	Area				Percent of total area	
	Soviet Union proper [1]		Acquired territories [2]		Soviet Union proper [1]	Acquired territories [2]
	1,000 hectares	1,000 acres	1,000 hectares	1,000 acres		
Area with farm buildings	6,989	17,270	([3])	([3])	0.3	([3])
Fruit orchards and vineyards	1,236	3,054	[4] 497	[4] 1,228	.1	[4] 1.2
Tillable land [5]	230,771	570,235	16,385	40,487	10.5	41.1
Permanent meadows	53,274	131,640	5,054	12,488	2.4	12.7
Pastures	344,050	850,148	3,961	9,788	15.6	9.9
Forests and brushland	811,142	2,004,332	8,745	21,609	36.8	22.0
Unproductive land	[6] 107,002	[6] 264,402	[7] 2,004	[7] 4,952	[6] 4.8	[7] 5.0
Other	[8] 652,407	[8] 1,612,097	3,175	7,846	[8] 29.5	8.1
Total	2,206,871	5,453,178	39,821	98,398	100.0	100.0

[1] Data are for 1935.
[2] Data are for 1938 or the nearest prewar year available and include Estonia, Latvia, Lithuania and areas acquired from Rumania, Poland, and Czechoslovakia. Data for former Finnish and East Prussian territories are unavailable.
[3] Not available. Included in "other."
[4] Data incomplete.
[5] Includes vegetable gardens.
[6] Marshes only.
[7] Includes water surface for Rumanian territory.
[8] Includes 167.5 million hectares (413.8 million acres) of undistributed land in the far north and in Sakhalin.

U. S. Office of Foreign Agricultural Relations and official sources of countries concerned.

land available for such purposes can be found, is also a precarious undertaking, as the Soviet Government learned from its expansion program in the 1930's.

A portion of the unclassified land, which appears in table 18 under the heading of "other," may also become available for the growing of crops. Most of this land is in the Asiatic part of the country, covered by taiga forests, or in the dry steppes, deserts, and mountains.

That most of the best land for agricultural purposes in Asiatic Russia was taken up during the period of rapid settlement of the country preceding World War II is asserted by one authority on Russian colonization, writing in an official Soviet publication:

> The Black Soil Belt which crosses Siberia in its steppe and wooded-steppe regions from west to east and which served both in Europe and in Asia, as the principal axis of Russian colonization during the course of several centuries, must be considered at present as fully occupied. Already, beginning with 1910–11, the work of settling new colonists shifted into regions with inferior natural conditions to the north and south of the Black Soil Belt. In the colonization regions of Siberia, the northern and southeastern parts of European Russia, and in the land of the Kirghiz and in Turkestan, there is still a considerable area of free land available but it consists largely of forest or arid land requiring considerable preliminary improvement and expenditure of money prior to its utilization.[5]

A statement of a similar nature to the one just quoted is contained in a publication of the Bureau of Colonization of the Commissariat of Agriculture of RSFSR (Russia proper), published in 1929 for the information of prospective settlers. Commenting on the ease with which, in the past, new land in Siberia could be cultivated by the settlers, the statement proceeds:

> At present there remains in Siberia very little new land which can be easily adapted for cultivation. Most of the remaining unoccupied land is in the forest regions and is frequently marshy. It is true there is a great deal of such land in Siberia but it requires improvement.[6]

During 1933–37, more than 7 million acres were added to the cropland in the non-black-soil area (Northern, Northwestern, Western, Central Industrial, and Upper Volga Regions) of European Russia. Of this area, prior to reclamation, 13 percent was meadows and pastures, presumably of a very poor type; 27 percent, brushland; 29 percent, small woods; 15 percent, forests; 13 percent, cut-over land; and 3 percent, other land.[7]

There is still a considerable area of brushland and marsh land in this zone that could be adapted for crop production. In White Russia, for instance, drainage of extensive marshes would provide a sizable addition to the cropland of that region. A Government decree of March 6, 1941, outlined a program for draining nearly 4 million acres during 1941–47, of which more than 1.3 million were to be adapted for crops and nearly 2 million acres for meadows and pastures.[8] The war, of course, not only interfered with this program but seriously damaged the drainage system.

The extension of the drainage system in western Russia has been resumed since the war, but on a much more modest scale than before. The postwar 5-year plan, 1946–50, specifies drainage of 667,000 acres of agricultural land in the enlarged territory of White Russia, which

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[5] BOL'SHAKOV, M. *In* Kritsman, L. N., and others, eds. Na Novykh Putyakh. Itogi Novoi Ekonomicheskoi Politiki 1921–22 G., issue 5, pt. 1, p. 489. Moscow. 1923.

[6] OTDEL PERESELENIYA NARKOMZEMA RSFSR. PERESELENIE V SIBIRSKII KRAI V 1929 GODU, pp. 6–7. Moscow. 1929.

[7] PAVLOVSKII, M. *In* Sotsialisticheskoe Sel'skoe Khozyaistvo 1939 (11): 84, 86.

[8] Sotsialisticheskoe Zemledelie, Mar. 7, 1941.

now includes western provinces formerly under Polish control. In the Ukraine, the plan specifies drainage of 100,000 acres of agricultural land.

Although the Soviet Union has a large proportion of land in semi-arid or arid regions, irrigation, until the midcentury, did not play an important role except in the cotton-growing regions of Soviet Central Asia (Turkestan) and Transcaucasia. The total irrigated area in 1942 was stated to be 17.8 million acres, as compared with 15.2 million in 1938, 10.6 million in 1928, and 9.3 million before the Revolution of 1917. Of the total 1938 irrigated area, 29 percent was in the Uzbek Republic, 16 percent in Kazakhstan, 12 percent in Kirgiz, 6 percent in Turkmen, and 5 percent in Tadzhik Republics, or altogether 68 percent in Central Asia, including Kazakhstan. Of the remainder, 17.5 percent was in the Transcaucasian Republics (including 11 percent in Azerbaidzhan), 2 percent in the Ukraine, and 12.5 percent in other regions of the USSR.[9] "Despite the significant growth of irrigation, the technical level of the irrigation systems is still a low one."[10] A considerable proportion of the irrigated land was not utilized, or became unusable because of swampiness or salinity, especially during the war. The postwar 5-year plan called for an expansion of the irrigated area of more than 1.6 million acres. That this program was apparently proceeding well is indicated by the statement of the Minister of Agriculture of the USSR, I. A. Benediktov, that "in 1949 our country received an additional irrigated area of 381,600 hectares [943,000 acres]."[11]

A new era in Soviet irrigation seems to have dawned in 1950. In August and September of that year, there was announced, by a swift succession of Government decrees, a series of projects for water development and utilization in the Middle and Lower Volga regions, North Caucasus, Southern Ukraine, Northern Crimea, and Turkmen Republic in Soviet Central Asia.[12] This program, to be completed in the late 1950's, far surpasses anything that has been previously undertaken along such lines in the Soviet Union. The aim is to bring water to a large semi-arid and arid area in southeastern and southern USSR, which will be used for power generation, irrigation, and for the improvement of climatic conditions. Cotton is high on the list of the crops to be grown on the irrigated land of Southern Ukraine and Crimea, where it is planned to irrigate 3.7 million acres. The same motive of increasing cotton production is largely behind a similar project in the Turkmen Republic, where an additional area of more than 3 million acres of desert land is to be irrigated. The implementation of these grandiose plans will no doubt be beset by manifold technical and organizational difficulties. However, when and if the plans are successfully completed, they will increase substantially the Soviet irrigated area and make irrigation a really significant factor in the southeastern regions of European Russia.

Besides these new irrigation projects, there was also announced a scheme of technical reconstruction of the existing irrigation system on

[9] BURDASHVILI, I. [CONCERNING IRRIGATION MANAGEMENT.] Sotsialisticheskoe Sel'skoe Khozyaistvo 1939(8):100. 1939.
[10] Ibid., p. 101.
[11] Sotsialisticheskoe Zemledelie, Jan. 1, 1950.
[12] Izvestiya, Aug. 22 and 31, Sept. 12 and 21, 1950.

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an area of 10.7 million acres.[13] The old system permitted irrigation sectors of less than 4 acres (1.5 hectares), while the new system calls for land tracts as large as 150 acres, with a minimum of 25 acres (60 and 10 hectares).

In addition to the various technical advantages claimed and the expected favorable effect on agricultural production, especially that of cotton, it is probable that the transition to the new system of irrigation will contribute to the further tightening of state control over the kolkhozy by increasing the part played by the machine-tractor stations. Furthermore, the increased size of land tracts, which would result from reconstructing the irrigation network, would facilitate the merger of kolkhozy fostered by the present Soviet policy. While the decree has taken into account and provided for training additional

TABLE 19.—*Sown area, total and per capita, 1913, 1927, 1938, and 1942*

Year	Total sown area		Population (Jan. 1, following year)	Per capita	
	1,000,000 hectares	*1,000,000 acres*	*Millions*	*Hectares*	*Acres*
1913	[1] 105.0–[2] 116.7	259.5–288.4	[3] 138.2	0.76–0.84	1.9–2.1
1927	[4] 112.4	277.7	[3] 150.4	.75	1.9
1938	[1] 136.9	338.3	[5] 170.3	.80	2.0
1942 (plan)	[6] 147.4	364.2			

[1] POSEVNYE PLOSHCHADI SSSR (DINAMIKA ZA 1928 . . .), STATISTICHESKII SPRAVOCHNIK, p. 5. Moscow. 1939.

[2] KONTROL'NYE TSIFRY NARODNOGO KHOZYAISTVA SSSR NA 1928–29 GOD, p. 408. Moscow. 1929.

[3] STATISTICHESKII SPRAVOCHNIK SSSR ZA 1928, p. 18–19. Moscow. 1929.

[4] SOTSIALISTICHESKOE STROITEL'STVO SSSR, STATISTICHESKII EZHEGODNIK, p. 323. Moscow. 1935.

[5] LORIMER, FRANK. THE POPULATION OF THE SOVIET UNION: HISTORY AND PROSPECTS, p. 134. League of Nations, Geneva. 1946.

[6] TRETII PYATILETNII PLAN RAZVITIYA NARODNOGO KHOZYAISTVA SOYUZA SSR (1938–1942), p. 219. Moscow. 1939.

personnel and for manufacturing the new equipment required in the program, still these phases may present serious obstacles to the achievement of the expected goals.

About 60 percent of the tillable land available for crops was actually seeded to crops (area for harvest) before World War II in the Soviet Union proper. A much larger proportion of the arable land of the acquired territories, more than 90 percent, was seeded to crops. The official statistics of crop acreage showed a significant increase in the sown area of the Soviet Union proper in the 1930's, compared with the precollectivization period and the pre-World War I period (table 19). The increase, as Professor Prokopovich had pointed out, may be somewhat exaggerated because the total acreage data for the collectivization and precollectivization periods may not be fully comparable. It is easier to estimate accurately the acreage of large

[13] Izvestiya, Aug. 18, 1950.

collective and state farms than of the many millions of small peasant holdings. Especially it is true of minor crops and of small kitchen gardens, which under individual peasant farming usually escaped the crop estimator, but which are included under collective farming.[14]

The pre-World War I acreage figures were considered by Soviet statisticians in the 1920's as underestimated and were, therefore, adjusted upward. But, in the 1930's, Soviet statistical publications reverted to the older 1913 figures, on the basis of which a much greater increase is indicated in 1938. When the acreage figures are considered on a per capita basis, we find that there were only slight changes in the figures for the collectivization and precollectivization periods, for the increases in acreage essentially kept pace with the growth of population.

The extension of the area under cultivation has been traditionally the most important method of increasing agricultural production in Russia, where abundance of land relative to population, as well as economic and social conditions, historically favored extensive agriculture. It would be premature, as yet, to rule out completely this avenue of approach. For instance, the last prewar (third) 5-year plan contemplated considerable increase in the crop area by 1942 (table 19). Even the 5-year plan, adopted in 1946 in the wake of war devastation, called for a 1950 crop area larger by 14 million acres, or 3.7 percent compared with that of 1938 (for the enlarged postwar territory of the USSR). Nevertheless, as the foregoing discussion attempted to make plain, expansion of acreages is becoming increasingly more difficult and costly with the approach to the margin of cultivation. This explains the great store that the Soviet Government has set since the 1930's on the more difficult method of increasing agricultural production through the improvement of crop yields per acre. No change appears likely in the foreseeable future, either in Government policy of industrialization or in the continued growth of population[15] (though it will probably slow down with increased urbanization), which demand increased agricultural production. Consequently, the emphasis on higher crop yields is likely, if anything, to be accentuated in the future, particularly if there is to be any improvement of the low standard of living of the people.

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[14] PROKOPOVICH, S. N. *In* Byulleten Ekonomicheskogo Kabineta, No. 97, p. 3. June-July 1932. Prague.

[15] GORDON, M. K. RUSSIA'S GROWING POPULATION. *In* Annals of American Academy of Political and Social Science, v. 237, pp. 57–64. January 1945.

VII

CROP PATTERN

There is hardly a crop of the moderate and subtropical zones that is not grown in the vast territory of the Soviet Union (tables 20 and 21). The outstanding feature of the Russian crop pattern, however, is the predominance of grains, which greatly outrank all other crops. Grains, including such grain legumes as peas and lentils, accounted in 1938 for three-fourths of the total crop acreage. The proportion was even greater a decade earlier. In the eastern regions, it is greater than in the western; but even in the northwest, where the proportion is smallest, 55 percent of the acreage was under grains in 1938. In the Baltic Republics in that same year it was nearly 60 percent; in the former Polish territories, 68 percent; and in the former Rumanian territories, 88 percent (table 24).

The share of grain crops in the total crop acreage of the Soviet Union proper was decreasing during the interwar period. Conversely, the share of the nongrain crops increased from 18.4 percent in 1928 to 21.7 in 1933 and 25.2 in 1938, pointing to an increased intensity of Soviet agriculture. The postwar Government program, embodied in the 5-year plan announced in 1946, aimed to accelerate the above trends by setting as a goal a smaller grain acreage and a larger area under nongrain crops.

Wheat and rye are the principal bread grains. Barley and especially oats are the most representative feed grains. Corn is of relatively minor importance. Among the nongrain crops, potatoes, flax, sugar beets, sunflower seed, cotton, and the various forage crops, including tame hay, are outstanding (tables 20–24).

GRAINS

Wheat

Foremost among grains—in fact, the leading crop of the Soviet Union in normal times—is wheat (table 25). It accounted for about 30 percent of the total 1938 crop acreage of the Soviet Union proper, ranging from less than 10 percent in the western regions to 50 percent and more beyond the Urals (tables 23 and 24). As compared with the Soviet Union proper, the regions acquired since World War II are not significant wheat producers. An exception is Bessarabia, controlled by Rumania during the interwar period.

Wheat is the principal export crop of the Soviet Union. Exports, however, have greatly declined since the period before World War I, when Russia was the principal wheat-exporting nation in the world. Most of the Russian wheat is shipped through seaports of the Black and Azov Seas and normally originates in the adjacent regions of the Ukraine, Crimea, and North Caucasus. (For further discussion of this subject, see the chapter on foreign trade.)

TABLE 20.—*Acreage and production of principal crops, Soviet Union proper, average 1933–37*

Crop	Acreage		Production [1]	
Grains:	*1,000 hectares*	*1,000 acres*	*1,000 metric tons*	*1,000 bushels*
Wheat:				
Winter	12,289	30,366	11,700	430,000
Spring	24,890	61,503	17,100	630,000
Total wheat	37,179	91,869	28,800	1,060,000
Winter rye	23,184	57,288	19,200	755,000
Spring barley	8,086	19,981	7,000	320,000
Oats	17,740	43,836	15,300	1,055,000
Millet [2]	6,277	15,510	2,900	[3] 135,000
Corn	3,357	8,295	3,400	135,000
Buckwheat [2]	2,035	5,028	1,100	[3] 50,000
Rice	140	346	300	[4] 700
Other grains, and legumes	5,315	13,133	3,600	----
Total grains and legumes	103,313	255,286	81,600	----
Potatoes	6,721	16,608	57,463	2,111,382
Forage crops, including tame hay	8,862	21,898	----	----
Flax	[5] 2,446	[5] 6,044	----	----
Seed	269	665	[6] 723	[6 7] 28,463
Fiber	2,177	5,379	566	[4] 1,248
Tobacco	198	489	212	[4] 467
Hemp:				
Fiber	555	1,371	([8])	([8])
				1,000 short tons
Seed	89	220	([8])	([8])
Sugar beets	1,214	3,000	15,049	16,589
Sunflower seed [2]	3,427	8,468	1,988	2,191
Cotton	2,021	4,994	562	[9] 2,592
Other crops	3,771	9,319	----	----
Total, all crops	132,617	327,697	----	----

[1] Estimates, Soviet or U. S. Office of Foreign Agricultural Relations. For grains, except rice, downward adjustments have been made, since the official grain crop estimating methods used in the Soviet Union do not take full account of harvesting losses.

[2] Production represents 4-year average 1933–35 and 1937.

[3] In bushels of 48 pounds.

[4] In millions of pounds.

[5] Of this, 2.2 million hectares (5.4 million acres) were sown primarily for fiber, and 269,000 hectares (665,000 acres) to seed varieties.

[6] Production represents 3-year average 1933–35 from seed varieties and 5-year average, 1933–37, from varieties grown mostly for fiber.

[7] In bushels of 56 pounds.

[8] Production estimates for hemp fiber and seed not available for 1933–37 average and no official production figures available after 1933 when 234,000 metric tons (258,000 short tons) of fiber and 277,000 metric tons (305,000 short tons) of seed were grown on 755,000 hectares (1,866,000 acres).

[9] In thousand bales of 478 pounds net each.

Acreages: POSEVNYE PLOSHCHADI SSSR (DINAMIKA ZA 1928 . . .), STATISTICHESKII SPRAVOCHNIK. Moscow and Leningrad. 1939. Production: U. S. Office of Foreign Agricultural Relations (see footnote 1).

Wheat, which is exacting with respect to soil, is primarily a crop of the black-soil area (fig. 5); but during the 1930's wheat acreage expanded considerably in the more northern non-black-soil area. Still, out of a total wheat acreage of more than 100 million acres, only about 7 million were in the non-black-soil area in 1938 and even some of that acreage was reduced in 1939 and 1940.[1] Of greater importance was the marked expansion in wheat growing in the eastern and southeastern regions of the country.

This expansion paralleled the construction of railroads, such as the Siberian railroad, and the increasing settlement of these regions during

TABLE 21.—*Estimated acreage and production of principal crops, Soviet acquired territories,[1] average 1933–37*

Crop	Acreage		Production	
	1,000 hectares	*1,000 acres*	*1,000 metric tons*	*1,000 bushels*
Wheat	1,944	4,804	2,000	75,000
Rye	2,998	7,408	3,400	135,000
Barley	1,764	4,359	1,700	80,000
Oats	1,918	4,739	2,000	140,000
Corn	1,120	2,768	1,000	40,000
Legumes[2]	300	700	200	7,000
Potatoes	1,455	3,595	16,375	601,672
Flax	243	600		
Seed			100	3,937
Fiber			78	[3] 172
Tobacco	10	25	[4] 11	[3] 24
				1,000 short tons
Sugar beets	46	113	935	1,031
Sunflower seed	166	410	135	149

[1] Includes Latvia, Lithuania, Estonia, and areas acquired from Rumania, Finland, Poland, Germany, and Czechoslovakia. Data for Finnish and German areas are for 1938.

[2] Incomplete.

[3] Million pounds.

[4] Production in Ruthenia (formerly part of Czechoslovakia) based on 2-year average 1934–35.

U. S. Office of Foreign Agricultural Relations. Estimates based on official statistics of countries involved.

the latter part of the nineteenth and early twentieth centuries, resembling to some extent the settlement of the West in the United States. With the aid of tractors, wheat acreage in these regions continued to expand during the 1930's. Between 1928 and 1938 the combined wheat area of western Siberia, the Urals, and Kazakhstan increased by nearly 30 percent. Much of the wheat area in these and adjacent European regions, such as the basin of the Middle and Lower Volga and Don Rivers, is in the zone of precarious farming. Some reduction of wheat acreage in this zone occurred in 1939–40 as a consequence of a shift to winter grain.

[1] DEMIDOV, S. *In* Sotsialisticheskoe Sel'skoe Khozyaistvo 1941 (2): 21. 1941.

TABLE 22.—*Sown area (in hectares) of specified crops, by regions, 1938*

Region	Winter wheat	Spring wheat	Winter rye	Oats	Barley	Potatoes	Vegetables	Legumes	Flax fiber	Flaxseed	Total flax	Hemp	Sunflower seed	Sugar beets
	1,000 hectares	*1,000 hectares*	*1,000 hectares*	*1,000 hectares*	*1,000 hectares*	*1,000 hectares*	*1,000 hectares*	*1,000 hectares*	*1,000 hectares*	*1,000 hectares*	*1,000 hectares*	*1,000 hectares*	*1,000 hectares*	*1,000 hectares*
Soviet Union proper:														
North	18.9	151.1	372.5	383.5	215.5	123.1	12.9	53.1	117.8	----	117.8	0.9	----	----
Northwest	187.9	280.5	1,182.9	1,109.2	247.4	670.7	80.2	127.7	700.6	----	700.6	7.6	----	----
White Russia (Belorussia)	73.9	148.5	910.8	443.0	249.3	632.6	36.9	31.8	210.6	----	210.6	23.2	----	----
Central Industrial	613.1	544.7	2,182.4	2,111.2	92.6	1,162.5	142.5	147.2	294.2	3.3	297.5	32.1	4.3	9.0
Central Agricultural	1,138.0	1,421.0	3,752.5	2,146.4	417.4	1,153.2	149.6	546.6	30.9	19.3	50.2	236.6	515.7	277.6
Upper Volga	45.0	909.3	2,585.1	1,874.7	301.7	438.8	38.9	381.6	241.2	27.2	268.4	35.2	25.7	----
Middle and Lower Volga	234.4	4,760.6	2,732.2	922.7	589.9	274.3	212.2	226.1	----	61.0	61.0	9.2	589.1	3.7
North Ukraine	2,107.0	337.8	2,395.9	1,174.3	1,172.2	1,067.0	278.8	402.1	112.6	.7	113.3	119.3	147.4	715.0
South Ukraine and Crimea	4,811.6	668.3	726.1	491.3	1,836.8	430.1	357.2	62.2	----	63.1	63.1	43.8	531.0	90.7
North Caucasus	3,506.7	1,171.5	527.0	593.9	1,826.6	211.8	289.5	40.8	----	21.1	21.1	45.1	733.9	18.2
Transcaucasia	814.4	210.8	14.0	21.4	407.8	49.2	50.7	39.3	----	9.4	9.4	.1	21.9	6.5
Ural	24.9	5,030.8	2,353.5	2,434.1	392.5	448.0	103.8	308.4	49.1	34.2	83.3	26.0	281.3	.8
West Siberia	24.7	5,125.7	845.4	2,240.5	232.9	352.8	57.1	93.9	107.4	30.6	138.0	44.0	136.1	26.9
East Siberia	.8	1,416.6	389.2	1,012.8	197.9	132.1	24.2	16.4	17.0	.8	17.8	19.2	1.3	----
Far East	----	330.7	10.3	260.2	8.5	74.4	25.5	.9	.5	1.3	1.8	----	4.2	4.5
Kazakh	155.2	3,253.2	200.3	577.6	361.8	102.1	59.3	5.4	----	7.1	7.1	4.2	149.1	13.7
Central Asia	827.8	1,166.4	.5	85.3	661.9	42.3	101.1	35.3	----	73.1	73.1	7.9	3.5	13.7
Total	14,584.3	26,927.5	21,180.6	17,882.1	9,212.7	7,365.0	[1] 2,020.4	2,518.8	1,881.9	352.2	2,234.1	654.4	3,144.5	1,180.3
Acquired territories:														
Finnish	1.2	17.3	23.7	42.6	9.8	11.3	----	1.0	----	----	[2] .4	----	----	----
Baltic	238.8	174.4	962.8	851.9	482.6	401.7	46.8	99.8	----	----	166.8	----	----	22.7
Kaliningrad [3]	25.9	3.9	114.3	57.0	41.7	44.8	1.3	3.0	----	----	----	----	----	2.3
Polish	639.4	116.4	1,836.7	921.8	490.9	991.6	----	86.3	----	----	99.8	25.0	----	13.4
Rumanian	766.9	179.1	214.6	61.8	516.5	[4] 56.1	11.2	23.9	----	----	2.0	10.6	132.5	12.9
Carpathian Ruthenia [5]	37.1	.8	30.1	28.6	2.8	37.6	4.2	38.3	----	----	.3	1.3	25.3	----
Total	1,709.3	491.9	3,182.2	1,963.7	1,544.3	1,543.1	63.5	252.3	----	----	269.3	36.9	157.8	51.3
Grand total	16,293.6	27,419.4	24,362.8	19,845.8	10,757.0	8,908.1	2,083.9	2,771.1	1,881.9	352.2	2,503.4	691.3	3,302.3	1,231.6

[1] Includes 700,800 hectares of melons.
[2] Includes hemp.
[3] Former East Prussian territory.
[4] Excludes 8,300 hectares of intertilled potatoes.
[5] Former Czechoslovakian territory.

Soviet Union proper: POSEVNYE PLOSHCHADI SSSR (DINAMIKA ZA 1928 . . .), STATISTICHESKII SPRAVOCHNIK. Moscow and Leningrad. 1939. Acquired territories: based on official statistics of countries involved.

TABLE 23.—*Sown area (in acres) of specified crops, by regions, 1938*

Region	Winter wheat	Spring wheat	Winter rye	Oats	Barley	Potatoes	Vegetables	Legumes	Flax fiber	Flaxseed	Total flax	Hemp	Sunflower seed	Sugar beets
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*
Soviet Union proper:														
North	47	373	920	948	532	304	32	131	291	--------	291	2	--------	--------
Northwest	464	693	2,923	2,741	611	1,657	198	316	1,732	--------	1,732	19	--------	--------
White Russia (Belorussia)	183	367	2,251	1,095	616	1,563	91	79	521	--------	521	57	--------	--------
Central Industrial	1,515	1,346	5,393	5,216	229	2,873	352	364	727	8	735	79	11	22
Central Agricultural	2,812	3,511	9,272	5,303	1,031	2,850	370	1,350	76	48	124	585	1,274	686
Upper Volga	111	2,247	6,388	4,632	746	1,084	96	943	596	67	663	87	64	--------
Middle and Lower Volga	579	11,764	6,751	2,280	1,458	678	524	558	--------	151	151	23	1,456	9
North Ukraine	5,206	835	5,920	2,902	2,896	2,637	689	994	278	2	280	295	364	1,767
South Ukraine and Crimea	11,889	1,651	1,794	1,214	4,538	1,063	883	154	--------	155	155	108	1,312	224
North Caucasus	8,665	2,895	1,302	1,468	4,514	523	715	101	--------	52	52	112	1,814	45
Transcaucasia	2,012	521	35	53	1,008	122	125	98	--------	23	23	--------	54	16
Ural	62	12,431	5,815	6,015	970	1,107	257	762	121	85	206	64	695	2
West Siberia	61	12,666	2,089	5,536	576	872	141	232	265	76	341	109	336	66
East Siberia	2	3,500	962	2,503	489	326	60	40	42	2	44	47	3	--------
Far East	--------	817	26	643	21	184	63	2	1	3	4	--------	10	11
Kazakh	384	8,039	495	1,427	894	252	146	13	--------	18	18	10	368	34
Central Asia	2,046	2,882	1	211	1,636	104	250	87	--------	180	180	20	9	34
Total	36,038	66,538	52,337	44,187	22,765	18,199	[1] 4,992	6,224	4,650	870	5,520	1,617	7,770	2,916
Acquired territories:														
Finnish	3	43	59	105	24	28	--------	3	--------	--------	[2] 1	--------	--------	--------
Baltic	590	431	2,379	2,105	1,193	992	116	246	--------	--------	412	--------	--------	56
Kaliningrad [3]	64	10	282	141	103	111	3	7	--------	--------	--------	--------	--------	6
Polish	1,580	287	4,539	2,277	1,213	2,450	--------	213	--------	--------	247	62	--------	33
Rumanian	1,895	442	530	153	1,276	[4] 139	28	59	--------	--------	5	26	328	32
Carpathian Ruthenia [5]	92	2	74	71	7	93	10	95	--------	--------	1	3	62	--------
Total	4,224	1,215	7,863	4,852	3,816	3,813	157	623	--------	--------	666	91	390	127
Grand total	40,262	67,753	60,200	49,039	26,581	22,012	5,149	6,847	4,650	870	6,186	1,708	8,160	3,043

[1] Includes 1,732,000 acres of melons.
[2] Includes hemp.
[3] Former East Prussian territory.
[4] Excludes 20,509 acres of intertilled potatoes.
[5] Former Czechoslovakian territory.

Based on table 22.

TABLE 24.—*Total sown area and percentage distribution of specified crops, by regions, 1938*

Region	Total sown area		All wheat	Winter rye	Oats	Barley	Other grains and legumes	Total grains and legumes	Potatoes	Forage incl. hay	Other crops	Total
	1,000 hectares	*1,000 acres*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Soviet Union proper:												
North	1,636.5	4,044	10.4	23.2	23.4	13.2	3.6	73.8	7.5	10.6	8.1	100
Northwest	5,940.8	14,680	7.9	20.3	18.7	4.2	4.0	55.1	11.3	20.3	13.3	100
White Russia (Belorussia)	3,336.8	8,245	6.7	27.7	13.3	7.5	6.9	62.1	19.0	10.4	8.5	100
Central Industrial	9,734.1	24,053	11.9	22.5	21.7	1.0	7.6	64.7	11.9	17.9	5.5	100
Central Agricultural	14,741.3	36,426	17.4	25.5	14.6	2.8	13.3	73.6	7.8	9.0	9.6	100
Upper Volga	7,990.4	19,744	11.9	32.4	23.5	3.8	8.8	80.4	5.5	9.2	4.9	100
Middle and Lower Volga	12,709.0	31,404	39.3	21.5	7.3	4.6	8.4	81.1	2.2	7.4	9.3	100
North Ukraine	13,199.8	32,617	18.5	18.2	8.9	8.9	13.5	68.0	8.1	11.8	12.1	100
South Ukraine and Crimea	13,398.4	33,107	40.9	5.4	3.7	13.7	8.0	71.7	3.2	13.8	11.3	100
North Caucasus	12,698.1	31,377	36.8	4.2	4.7	14.4	10.8	70.9	1.7	14.5	12.9	100
Transcaucasia	2,514.7	6,214	40.8	.6	.8	16.2	20.8	79.2	2.0	4.8	14.0	100
Ural	12,980.6	32,075	38.9	18.1	18.8	3.0	7.7	86.5	3.5	5.9	4.1	100
West Siberia	10,304.2	25,462	50.0	8.2	21.7	2.3	3.9	86.1	3.4	5.9	4.6	100
East Siberia	3,689.1	9,116	38.4	10.5	27.5	5.4	8.6	90.4	3.6	4.0	2.0	100
Far East	899.1	2,222	36.8	1.1	28.9	1.0	8.3	76.1	8.3	2.8	12.8	100
Kazakh	6,106.5	15,089	55.8	3.3	9.5	5.9	12.6	87.1	1.7	4.4	6.8	100
Central Asia	5,063.7	12,512	39.4	----------	1.7	13.1	5.4	59.6	.8	9.1	30.5	100
Total	136,943.1	338,387	30.3	15.5	13.1	6.7	9.2	74.8	5.4	10.3	9.5	100
Acquired Territories:												
Finnish	[1] 253.2	[1] 626	7.3	9.4	16.8	3.9	.4	37.8	4.5	57.6	.1	100
Baltic	5,196.2	12,840	8.0	18.5	16.4	9.3	[3] 7.5	59.7	7.7	27.5	5.1	100
Kaliningrad [2]	575.9	1,423	5.2	19.8	9.9	7.2	12.5	54.6	7.8	26.4	11.2	100
Polish	6,515.5	16,100	11.6	28.2	14.2	7.5	[4] 6.8	68.3	15.2	13.4	3.1	100
Rumanian	[5] 3,226.0	[5] 7,971	29.4	6.7	1.9	16.0	33.7	87.7	1.7	2.6	8.0	100
Carpathian Ruthenia [6]	282.5	698	13.4	10.7	10.1	1.0	31.9	67.1	13.3	6.2	13.4	100
Total	16,049.3	39,658	13.7	19.8	12.2	9.6	13.0	68.3	9.6	16.8	5.3	100
Grand total	152,992.4	378,045	28.6	15.9	13.0	7.0	9.6	74.1	5.8	11.0	9.1	100

[1] Represents the total of major crops.
[2] Former East Prussian territory.
[3] Peas only legume for Latvia.
[4] Broad peas and beans only legumes.
[5] Excludes 180,000 hectares (444,780 acres) of intertilled crops.
[6] Former Czechoslovakian territory.

U. S. Office of Foreign Agricultural Relations.

In the Soviet Union, as in the United States, both winter and spring wheat are grown.[2] In the United States, winter wheat predominates; whereas in the Soviet Union spring wheat holds the leading place, accounting, before World War II, for approximately two-thirds of the total wheat acreage. Winter wheat acreage, however, had been increasing rapidly before the war.

The winter and spring varieties of wheat are grown, for the most part, in different geographical belts (figs. 6 and 7). Most of the spring wheat is produced in regions having severe winters, while winter wheat is grown where the climate is milder. The spring wheat belt is largely in the Middle and Lower Volga Basin, the Urals, western Siberia, and Kazakhstan. Thus, spring wheat is a typical crop of the semiarid zone and suffers accordingly from the frequent droughts. More favorable are the climatic conditions in the winter wheat belt, which comprises all of the Ukraine except its extreme southeastern

TABLE 25.—*Wheat*:[1] *Area, yield, and production, selected years*

Year	Area		Yield [2 3]		Production [2 3]	
	Million hectares	*Million acres*	*Quintals per hectare*	*Bushels per acre*	*Million metric tons*	*Million bushels*
Prewar boundaries:						
Average 1933–37	37.2	91.9	7.8	11.5	28.8	1,060
1938	41.5	102.6	7.9	11.7	32.7	1,200
Postwar boundaries:						
Average 1935–39 [2]	42.1	104.0	[4] 8.0	[4] 11.9	[4] 33.8	[4] 1,240
1947 [2]	29.5	73.0	7.8	11.6	23.0	850
1948 [2]	38.5	95.0	7.3	10.8	28.1	1,025
1949 [2]	41.7	103.0	7.2	10.7	30.0	1,100

[1] Crop includes both spring and winter wheat.
[2] Rounded estimates, U. S. Office of Foreign Agricultural Relations.
[3] Since official grain crop estimating methods used in the Soviet Union do not take full account of harvesting losses, the official estimates have been adjusted to a harvested basis.
[4] Less than a 5-year average.

corner, Crimea, much of North Caucasus, and the irrigated regions of Central Asia and Transcaucasia. In these regions the yield of winter wheat per acre is higher than that of spring wheat.

Expanding winter wheat acreage especially was the goal of Soviet policy in the 1930's as evidenced by the 24-percent increase in acreage for harvest in 1935–39 as compared with the 1930–34 figures. During the same time, spring wheat acreage increased by 15 percent only. In so important a wheat region as the Ukraine, winter wheat acreage nearly doubled between the middle 1920's and late 1930's and was increasingly replacing spring wheat. The acreage under the latter in the Ukraine reached a peak of more than 8 million acres in 1930 and subsequently declined to less than 2.5 million acres by 1938.

[2] The term winter wheat is applied to varieties seeded in the fall and harvested during the following summer. Spring wheat is seeded in the spring and harvested in the summer or early fall of the same calendar year. Winter varieties seeded in the spring do not mature the same year. However, seeding of spring varieties in the autumn is successfully practiced in some regions with mild winters.

The place of wheat in the cropping system varies from region to region. In most regions where plowed fallow land (summer fallow) is available, it is used for seeding winter wheat, which has a first priority on this type of land. In many of the principal winter wheat regions, however, the plowed fallow area is usually smaller than the winter wheat acreage, making it necessary to plant winter wheat following a variety of crops or even to plant it 2 years in succession on the same field following summer fallow.[3] Spring wheat is seeded on plowed fallow land only in the eastern regions, where winter grain acreage is limited or nonexistent. For the most part, spring wheat

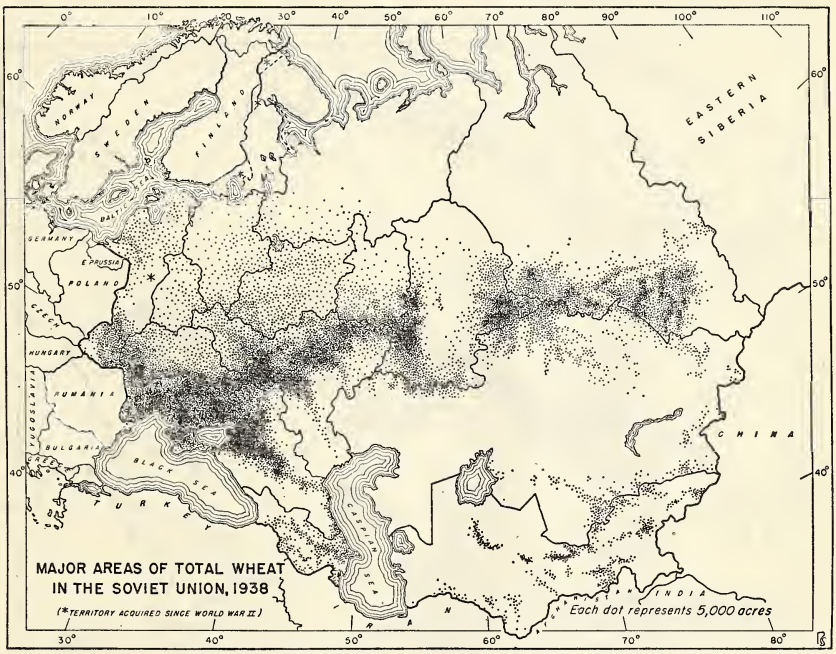

FIGURE 5.—Major wheat areas in the Soviet Union, 1938.

either follows other crops or is continuously grown on the same land for a number of years. The latter practice, though fairly common in the spring wheat belt,[4] is strongly opposed by the official policy on crop rotation. This policy, set out in the decree of June 21, 1945, prohibits the planting of small grains in one field for a period longer than 2 years in succession.

The time of seeding wheat varies from region to region and also from year to year with weather conditions. Seeding of spring wheat begins in the southernmost regions and extends northward. A small acreage, around 10 percent for the country as a whole, is seeded in March, mostly in the Central Asiatic Republics where, however, it

[3] SMIRNOV, A. I. RASTENIEVODSTVO, 4th ed., p. 59. Moscow. 1947.

[4] See, for instance, for evidence with regard to Kazakhstan, SULEIMENOV, I. S. KUL'TURA PSHENITSY V KAZAKHSTANE, p. 146. Moscow. 1948.

constitutes a considerable proportion of the wheat area. April and the first half of May is the principal seeding period, and normally most of the wheat in the European regions of the country is sown by mid-May. However, in the Asiatic regions, wheat seeding normally continues during the second part of May and often extends into June, though June seedings are looked upon officially with disfavor.

Speedy sowings of spring grains have been stressed by the agronomists and the Government in the Soviet Union. In the dry regions, particularly, late sowing is harmful because of the rapid drying of the soil, which adversely affects the growth of the plants. Furthermore, late seedings are more vulnerable to the scorching dry winds, to weeds, and plant diseases.[5]

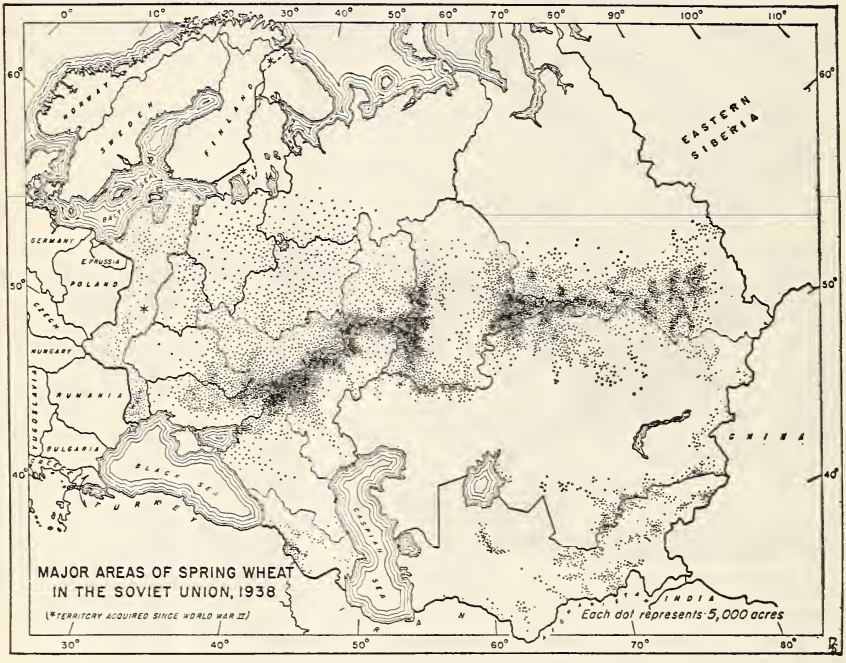

FIGURE 6.—Spring wheat areas.

Even in Central Russia, where moisture supply is normally not a problem, delay in sowing spring wheat tends to lower yields, mainly because late sowings are more vulnerable to infestation of insect pests and plant diseases, particularly rust.[6] Delayed sowings in the early years of collectivization were common but the situation improved considerably during the latter half of the 1930's.

The sowing of winter wheat begins in an order geographically reversed to that of spring wheat, namely, from the north southward. In most of the important winter wheat regions, the optimum period for seeding is during September and the first part of October.[7] The

[5] SMIRNOV, op. cit., p. 96.

[6] Ibid. *See also* YAKUSHKIN, I. V. RASTENIEVODSTVO, pp. 113–114. Moscow. 1947.

[7] YAKUSHKIN, op. cit., pp. 76–77.

seeding dates for winter wheat in different regions are strongly influenced by the need for avoiding the active season for the Hessian fly, a destructive insect pest. Often, however, the sowing of winter wheat begins too early and is excessively drawn out in the USSR.

The amount of seed used for seeding wheat varies from 1.5 to 2.4 bushels per acre (0.1 to 0.16 metric ton per hectare). Somewhat larger quantities of seed are used for spring than for winter wheat, because the former stools[8] less and is less resistant to dry conditions. Greater quantities of seed are used in the more humid western regions and the amount diminishes as one moves eastward into the drier

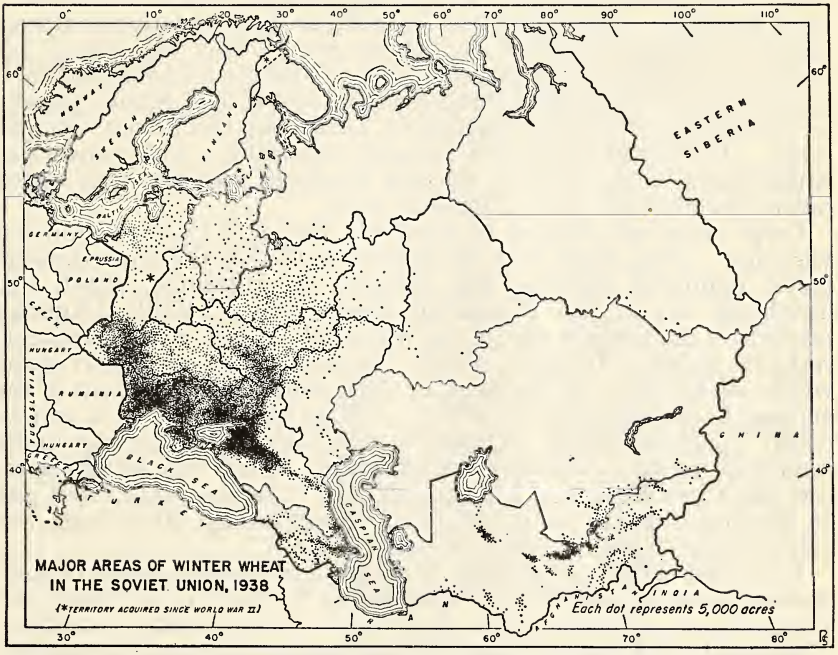

FIGURE 7.—Winter wheat areas.

areas. The quantity of winter wheat seed used also increases from north to south because of decreasing stooling.[9]

Harvesting winter wheat begins early in July in the southern regions and extends northward through the month. Spring wheat harvest begins in the south during the latter part of July and extends through August, and in Siberia even through September. Delayed or drawn-out harvesting, with consequent heavy shattering and loss of grain, has been a persistent handicap of Soviet collective agriculture.

A large number of wheat varieties exist in the Soviet Union and several well-known wheats grown in the United States, such as Turkey, Kharkov, Arnautka, Kubanka, and others, were introduced from

[8] Giving rise to several shoots from a plant.

[9] FLYAKSBERGER, K. A. PSHENITSY, p. 276. Moscow-Leningrad. 1938.

Russia.[10] About 180 winter wheat varieties and about 140 spring wheats are recorded in the Soviet Union.[11]

Much progress was made in the Soviet Union before World War II in improving and standardizing commercial wheats. In 1938, 88.3 percent of the winter wheat acreage and 80.4 percent of the spring wheat acreage in the collective farms were seeded with improved standard varieties. If the state farms are added, the figures are even slightly larger, 88.8 percent for winter wheat and 81.3 percent for spring wheat. By 1940, improved standard varieties occupied 95.1 percent of the winter wheat acreage and 90.8 percent of the spring wheat acreage of collective and state farms. This accomplishment would have been impossible without the fruitful work of the Russian plant breeders. Scientific wheat breeding and introduction in Russia began in the early years of the present century and was greatly advanced during the 1920's and early 30's, under the leadership of N. I. Vavilov, the distinguished Director of the Institute of Plant Industry in Leningrad, who was subsequently purged by the Soviet Government. The Institute of Plant Industry controlled a wide network of experimental fields in which the new improved varieties were tested before introduction on a commercial scale.

Large areas are planted to relatively few of the many improved varieties. Thus, more than 40 percent of the winter wheat acreage under improved varieties was occupied by Ukrainka, which was developed out of the Hungarian Banat wheat. While Ukrainka prevails in the western part of the winter wheat belt, a more drought-resistant variety, "Gostianum 0237," is used in the eastern part of the winter wheat belt. It occupied, in 1938, more than 17 percent of the acreage under improved varieties. Among spring wheats, a variety called "Lyutestsens 062" occupied, in 1938, a third of the acreage under improved wheats. Another spring wheat, which was widely used, especially in Siberia and Kazakhstan, was "Caesium 0111," but due to low resistance to smut and other disadvantages, its acreage was said to have sharply declined in recent years.[12]

In the late 1920's, 40 samples of varieties of Russian wheat of commercial value in that country were tested by the United States Department of Agriculture for their milling and baking qualities.[13] Classified by the United States standards, 5 of the samples were hard

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[10] CLARK, J. ALLEN. IMPROVEMENT IN WHEAT. *In* Yearbook of Agriculture 1936, pp. 216–217. U. S. Dept. Agr. Washington. 1936. As the author points out, the name of M. A. Carleton (1866–1925), of the U. S. Department of Agriculture, is particularly associated with the systematic introduction of Russian wheats in the United States during the early years of the present century. *See also* CARLETON, M. A. RUSSIAN CEREALS. U. S. Div. Bot. Bul. 23, pp. 3–42, 1900; MACARONI WHEATS. U. S. Bur. Plant Indus. Bul. 3, pp. 3–62, 1901.

[11] A description of Russian wheats will be found in the following sources: SORTOVYE POSEVY SSSR 1938 GODA, STATISTICHESKII SPRAVOCHNIK, pp. 6–7, Moscow-Leningrad, 1939; FLYAKSBERGER, op. cit., pp. 237–253; SMIRNOV, op. cit., pp. 50–52 and 85–87; TSITSIN, N. V., and MARINICH, P. E., ed., SORTA POLEVYKH KUL'TUR, SPRAVOCHNIK, pp. 25–77 and 88–133, Moscow, 1944; YAKUSHKIN, op. cit., pp. 62–67 and 85–87. *Also* a memorandum by VAVILOV, N. I., quoted by CLARK, op. cit., pp. 230–231.

[12] SMIRNOV, op. cit., p. 86.

[13] COLEMAN, D. A., DAWSON, OWEN L., AND OTHERS. MILLING AND BAKING QUALITIES OF WORLD WHEATS. U. S. Dept. Agr. Tech. Bul. 197: 151–157. 1930.

red spring wheats; 11, hard red winter wheats; 9, soft red winter wheats; 13, durum wheats; and 2, white wheats. Tests showed:

> that the hard red winter wheats had the best milling quality among the five classes of Russian wheats tested . . . Next in order of merit were the durum wheats, followed by the soft red winter wheats and the hard red spring wheats. The samples of white wheats were not sufficiently large to make it safe to draw conclusions . . . If a comparison is made of the baking quality of these Russian varieties and those of similar classes grown in North America, it is apparent that only the Russian durum wheat varieties had as great baking strength as those varieties grown in North America. The Russian spring and winter wheats, in spite of their very high protein content, displayed weakness in baking strength too frequently to be called the equals of North American wheats.[14]

The important durum type of wheat, which often is also referred to as macaroni wheat because of its use in the manufacture of macaroni and similar products, is entirely spring grown. It is typical of southeastern Russia, from which it was introduced at the turn of the century into the United States. No separate statistics, however, have been available on the production of durum wheat in Russia, which was estimated to have occupied in some years up to 28 percent of the total spring wheat acreage. Some decline, however, was observed in the durum wheat acreage before World War II.[15]

During World War II, the Russian winter wheat belt was overrun by the Germans, who made some inroads also into the spring wheat belt in the direction of Stalingrad. Wheat especially, therefore, suffered severely in the reduction of acreage that followed the invasion. Not only in the invaded zone, but also in the spring wheat belt of uninvaded Russia, wheat acreage dropped during the war, according to official statements. Since the end of the war, recovery of the spring wheat acreage has been emphasized by Soviet spokesmen and publications. The total wheat acreage by 1949 was only slightly below the prewar average. However, the recovery of yields per acre of wheat as of other crops was hampered during the early postwar years by deterioration of the farm technique and, in 1948 and 1949, also by adverse weather conditions in many regions.

Rye

Rye is the principal competitor of wheat in the Soviet Union. In the United States the relatively small quantity of this grain produced is used chiefly for animal feed and manufacture of alcohol and spirits. But in the Soviet Union rye has always been a staple bread of the people and a highly important component of the crop pattern (table 26 and fig. 8). In all USSR, rye accounted for about 16 percent of the crop acreage in 1938; in White Russia, the Central Agricultural Region, and former Polish territories, it exceeded 25 percent; and in the Upper Volga region it exceeded 30 percent.

Just as wheat is the typical grain of the black-soil area, so rye is the leading grain of the non-black-soil area, to whose inferior soils it is better adapted. Rye predominates over wheat in the whole of northern and central European Russia as well as in the Baltic Republics and the former Polish territory but is outranked or almost entirely

[14] Ibid., p. 157.
[15] YAKUSHKIN, op. cit., p. 94.

replaced by wheat in the more southern and eastern regions (tables 22, 23, and 24).

FIGURE 8.—Rye-growing regions.

TABLE 26.—*Winter rye:*[1] *Area, yield, and production, selected years*

Year	Area		Yield [2] [3]		Production [2] [3]	
	Million hectares	*Million acres*	*Quintals per hectare*	*Bushels per acre*	*Million metric tons*	*Million bushels*
Prewar boundaries:						
Average 1933–37	23.2	57.3	8.3	13.2	19.2	755
1938	21.2	52.3	8.4	13.4	17.8	700
Postwar boundaries:						
Average 1935–39 [2]	24.6	60.8	9.1	14.6	22.4	885
1947 [2]	29.6	73.0	8.1	13.0	24.0	950
1948 [2]	29.6	73.0	8.0	12.7	23.7	930
1949 [2]	30.6	75.5	7.9	12.6	24.2	950

[1] Small quantity of spring rye is not included.
[2] Rounded estimates, U. S. Office of Foreign Agricultural Relations.
[3] Since official grain crop estimating methods used in the Soviet Union do not take full account of harvesting losses, the official estimates have been adjusted to a harvested basis.

Rye is, with insignificant exceptions, a winter-grown crop—it is seeded in the fall and harvested the following summer. It is hardier than wheat and therefore can be grown in the northern and eastern regions, where climatic conditions make production of winter wheat

hazardous. Although rye is sensitive to excessive heat and for that reason is not grown too far south, it stands spring drought better than spring-sown grains do and so is a valuable insurance crop in such semiarid regions as those of the Middle and Lower Volga. It is also an effective crop from the standpoint of weed control, so important in Russia.

All these factors contribute to the wide use of rye in the Russian cropping system. Nevertheless, before World War I[16] and again during the interwar period it was losing in competition with wheat (table 27 and fig. 9). During the decade preceding World War II, in accordance with Soviet policy, wheat acreage was increasing

TABLE 27.—*Sown area of wheat and rye, 1925–39*[1]

Year	Winter wheat		Spring wheat		Total wheat		Rye [2]	
	Million hectares	*Million acres*	*Million hectares*	*Million acres*	*Million hectares*	*Million acres*	*Million hectares*	*Million acres*
1925	7.9	19.5	17.0	42.0	24.9	61.5	28.8	71.2
1926	9.0	22.2	20.4	50.4	29.4	72.6	28.5	70.4
1927	10.7	26.4	20.6	50.9	31.3	77.3	27.3	67.5
1928	6.2	15.3	21.6	53.4	27.8	68.7	24.6	60.8
1929	6.6	16.3	23.2	57.3	29.8	73.6	24.9	61.5
1930	10.1	24.9	23.7	58.6	33.8	83.5	28.9	71.4
1931	11.3	27.9	25.6	63.3	36.9	91.2	27.6	68.2
1932	11.8	29.1	22.7	56.1	34.5	85.2	26.2	64.7
1933	10.8	26.7	22.4	55.3	33.2	82.0	25.4	62.8
1934	10.8	26.7	24.5	60.5	35.3	87.2	24.0	59.3
1935	12.5	30.9	24.6	60.8	37.1	91.7	23.5	58.1
1936	13.1	32.4	25.9	64.0	39.0	96.4	21.8	53.9
1937	14.3	35.3	27.1	67.0	41.4	102.3	23.0	56.8
1938	14.6	36.1	26.9	66.5	41.5	102.6	21.5	53.1
1939	13.4	33.1	27.5	68.0	40.9	101.1	17.8	44.0

[1] Area for harvest, excluding winterkilled acreage.
[2] Spring rye included.

1925–35: SOTSIALISTICHESKOE STROITEL'STVO SSSR, STATISTICHESKII EZHEGODNIK, p. 280. Moscow. 1936.
1936–38: POSEVNYE PLOSHCHADI SSSR V 1938 G., STATISTICHESKII SPRAVOCHNIK, p. 11. Moscow and Leningrad. 1939.
1939: SOTSIALISTICHESKOE SEL'SKOE KHOZYAISTVO 1940 (3): 31. 1940.

whereas rye acreage was declining. When, in the fall of 1938, the Government decreed an increase of winter-grain acreage in the spring wheat belt of the Middle and Lower Volga and adjacent regions as part of the program of combatting droughts and large fluctuations of crop yields, winter wheat was still given preference. But a decree of January 4, 1939, dealing with the expansion of winter crops in eastern regions (Siberia and Kazakhstan), provided for the extension primarily of acreage in winter rye. Further expansion in these regions took

[16] TIMOSHENKO, V. P. AGRICULTURAL RUSSIA AND THE WHEAT PROBLEM (Food Research Institute, Grain Economics Series, No. 1), pp. 147–150. Stanford University, Calif. 1932. *Also* RUBINOV, I. M. RUSSIA'S WHEAT SURPLUS; CONDITIONS UNDER WHICH IT IS PRODUCED. U. S. Dept. Agr., Bur. Statis. Bul. 42, pp. 14–15. Washington. 1906.

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place during the war. In general, rye acreage held up better than wheat during the war years because it is a more certain and manageable crop; but it probably will show a downward trend as wheat begins once more to forge ahead.

Statistics of railroad and inland waterways shipments reflect the fact that rye is a much less commercial crop than wheat. As an exportable grain, rye has always trailed wheat, and a higher proportion of the former was used domestically even before World War I, when Russian grain exports were large. Rye exports from Russia

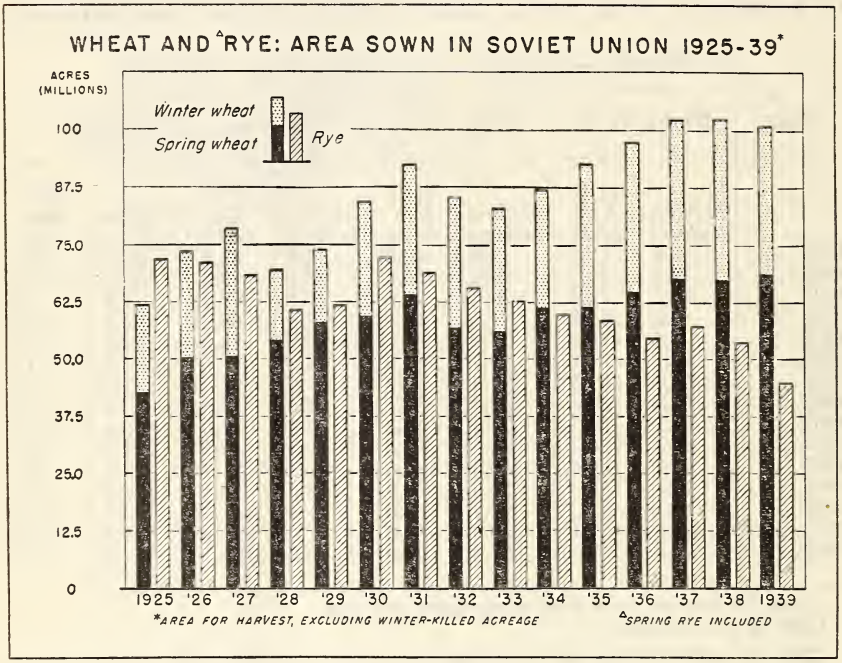

FIGURE 9.—Wheat and rye area sown, 1925–39.

were declining before World War I and were insignificant during the interwar period. (For further discussion, see chapter on foreign trade.)

Oats

Oats is next in importance to wheat and rye as far as acreage is concerned, but in a number of the more northern regions it occupies second or even first place. (For statistical data on oats, see tables 22, 23, 24, 28 and fig. 10.) The crop is entirely spring sown and is widely distributed over the Soviet Union, except in the more southern and dry regions, where it is replaced by the more drought-resistant barley.

Oats is predominantly a feed crop, and the amount normally used for food is insignificant. It would have been expected, therefore, that when the number of horses was greatly reduced in the 1930's, the acreage under oats would also have decreased, though not to so great a degree because of the established position of oats in the system of

crop rotation. Actually, although the acreage under oats decreased considerably between 1928 and 1938 in the Central Agricultural and Upper Volga regions, and in the south, it held its own or increased in

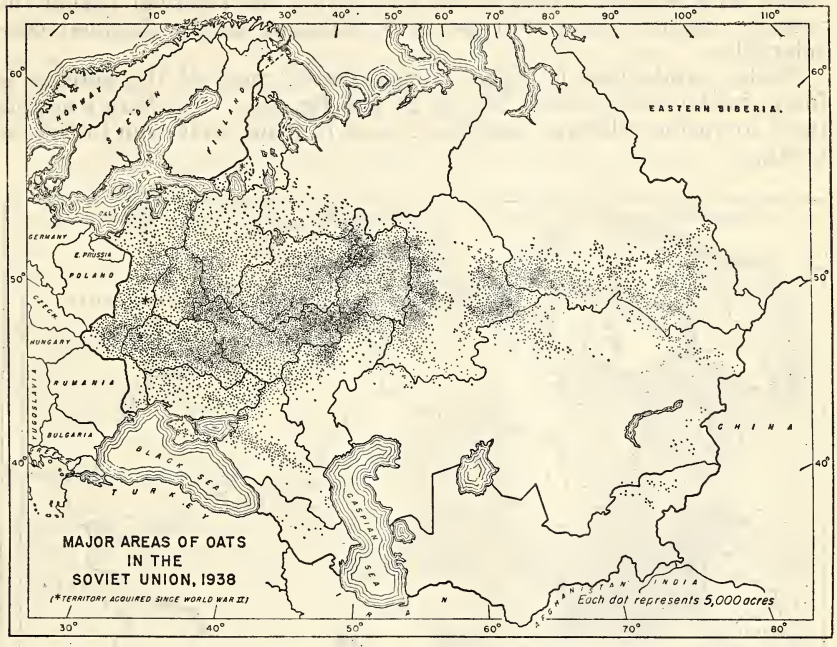

FIGURE 10.—Oat-producing areas.

TABLE 28.—*Oats: Area, yield, and production, selected years*

Year	Area		Yield [1] [2]		Production [1] [2]	
	Million hectares	*Million acres*	*Quintals per hectare*	*Bushels per acre*	*Million metric tons*	*Million bushels*
Prewar boundaries:						
Average 1933–37	17.7	43.8	8.6	24.1	15.3	1,055
1938	17.9	44.2	8.0	22.5	14.4	995
Postwar boundaries:						
Average 1935–39 [1]	20.0	49.5	8.4	23.5	16.9	1,165
1947 [1]	14.4	35.5	8.7	24.2	12.5	860
1948 [1]	14.7	36.5	7.7	21.4	11.3	780
1949 [1]	14.9	37.0	7.6	20.9	11.3	775

[1] Rounded estimates, U. S. Office of Foreign Agricultural Relations.
[2] Since official grain crop estimating methods used in the Soviet Union do not take full account of harvesting losses, the official estimates have been adjusted to a harvested basis.

other regions. Since the war, sizable quantities of oats have been used for the manufacture of alcohol, and as cereal and flour for human consumption.[17]

[17] Sotsialisticheskoe Zemledelie, Jan. 12, 1946.

Barley

Barley was a much more important crop in Russia before World War I than during the subsequent years. Before 1914 it rivaled wheat as a leading export grain; but during the interwar period the acreage, production, and exports of Russian barley declined considerably.

Barley production is highly concentrated; most of the acreage is found in the south (tables 22, 23, 24 and fig. 11). But barley adapts itself to various climatic conditions, and it grows well even in the far north.

FIGURE 11.—Barley-producing areas.

With some exceptions, barley is spring sown in the Soviet Union. Only spring varieties of barley show the great adaptability to climatic extremes that makes it possible for them to grow from the Black Sea littoral to beyond the Polar Circle. Winter or fall-sown barley, though a valuable crop in a rotation system, can be grown only in regions with mild winters, because it is not hardy enough to withstand severe weather. In this respect it is inferior even to wheat, let alone rye. Only in the extreme south, in the Crimea, was there a significant acreage under winter barley before World War II. (For statistical data on barley, see table 29.)

Barley is primarily a feed grain, and a valuable one, because of the high protein content that characterizes most of the Russian crop. But it is not so exclusively used for feed as is oats. Of the total farm consumption of barley in 1926–27, for instance, nearly four-fifths

was for feed and one-fifth for food.[18] In some northern regions, however, barley is used more for food than for feed. It is a source of kasha (porridge); and, in the north and northwest, barley flour, sometimes mixed with rye and oats, is made into bread.[19]

Barley is also used for beer, but beer-making requires uniform and well-matured grain, with a moderate protein content. These requirements are met by barley grown under sufficiently humid conditions in the western regions of the country; whereas most of the barley grown in the south is unsuitable.[20]

TABLE 29.—*Barley: Area, yield, and production, selected years*

Year	Area		Yield [1] [2]		Production [1] [2]	
	Million hectares	*Million acres*	*Quintals per hectare*	*Bushels per acre*	*Million metric tons*	*Million bushels*
Prewar boundaries:						
Average 1933–37	8.6	21.3	8.7	16.2	7.5	344
1938	[3] 9.2	[3] 22.8	7.6	14.0	7.0	320
Postwar boundaries:						
Average 1935–39 [1]	10.8	26.6	8.6	16.0	9.3	425
1947 [1]	8.3	20.5	8.1	15.1	6.7	310
1948 [1]	8.6	21.5	8.0	14.7	6.9	315
1949 [1]	8.7	21.5	7.8	14.4	6.8	310

[1] Rounded estimates, U. S. Office of Foreign Agricultural Relations.
[2] Since official grain crop estimating methods used in the Soviet Union do not take full account of harvesting losses, the official estimates have been adjusted to a harvested basis.
[3] Of this, 701,000 hectares (1,732,000 acres) seeded to winter barley.

Corn (Maize)

The minor role that corn plays in Russia constitutes, perhaps, the most striking difference between the agricultural patterns of that country and the United States. Only in some sections of the Caucasus and in what was once Rumanian territory is corn a major crop and a staple article in the diet of the people. In the former Rumanian territory, before World War II, corn accounted for nearly one-third of the sown acreage. The small corn acreage of the Soviet Union is concentrated in the southern part of the country: Southern Ukraine, North Caucasus, and Transcaucasia, principally Georgia, where it is the leading crop.

The trend in corn acreage before World War II was downward. In 1928 the area planted to corn was nearly 10.9 million acres; in 1932 it was 9 million; in 1933 it rose to 10 million; but by 1939 it had decreased to 6 million acres. Since the end of the war, effort has been made to restore corn cultivation, which suffered greatly during the German invasion.[21] But the large amount of labor involved in grow-

[18] STATISTICHESKII SPRAVOCHNIK SSSR ZA 1928, p. 244.
[19] REGEL, R. E. KHLEBA V ROSSII. *In* Trudy Po Prikladnoi Botanike I Selektsii, v. 13, supplement 22, p. 44. Petrograd. 1922.
[20] Ibid., p. 42.
[21] BILINSKII, K. [MORE ATTENTION TO CORN.] Sotsialisticheskoe Zemledelie, Mar. 17, 1946.

ing corn by hand methods was a handicap to corn culture during the early postwar years, when mechanization was at a low ebb and there was an acute shortage of animal draft power. Even before the war, an acre of corn in southern Ukraine required much more labor than in any section of the United States except the New England States. (For statistical data on corn, see table 30.)

TABLE 30.—*Corn: Area, yield, and production, selected years*

Year	Area		Yield [1] [2]		Production [1] [2]	
	Million hectares	*Million acres*	*Quintals per hectare*	*Bushels per acre*	*Million metric tons*	*Million bushels*
Prewar boundaries:						
Average 1933–37	3.4	8.3	10.1	16.3	3.4	135
1938	2.6	6.4	9.2	14.8	2.4	95
Postwar boundaries:						
Average 1935–39 [1]	4.1	10.0	10.5	17.0	4.3	170
1947 [1]	3.2	8.0	10.9	17.5	3.5	140
1948 [1]	3.4	8.5	10.0	15.9	3.4	135
1949 [1]	3.5	8.5	10.2	16.5	3.6	140

[1] Rounded estimates, U. S. Office of Foreign Agricultural Relations.

[2] Since official grain crop estimating methods used in the Soviet Union do not take full account of harvesting losses, the official estimates have been adjusted to a harvested basis.

Other Grains

Rice growing is of only local importance in the Soviet Union, principally in the irrigated regions of Soviet Central Asia (Turkestan) and Transcaucasia, where it is an important article in the diet of the native population. Beginning with the 1930's, rice growing began to be extended into the more northern regions, particularly into the Kuban or Krasnodar Province in North Caucasus, the Ukraine, and the Far East.

The total acreage under rice before World War II reached about 400,000 acres, and production exceeded 700 million pounds. The postwar 5-year plan provides for expansion of the rice area to about 570,000 acres. The Soviet Union is normally on an import basis for rice. During 1934–38 Soviet average net imports of rice exceeded 80 million pounds.

Among other grains that must be mentioned are buckwheat and millet, which play a significant part in the Russian diet as sources of porridge (kasha).

The area sown to buckwheat in 1938 was 5.2 million acres and in 1939, 4.6 million. Because of its short vegetation period, buckwheat can be cultivated quite far north despite its sensitiveness to spring frosts. It is also not exacting so far as soil is concerned. Actually, buckwheat is grown primarily in the central regions and in the northern Ukraine. Because of its sensitiveness to drought, it has not responded to efforts to extend it eastward and southward.

Millet, unlike buckwheat, is an excellent drought-resistant crop. The area under millet in 1938 was 9.7 million acres; but in 1939, after the drought of 1938, the Government set out upon a program to ex-

pand the millet area, and in that year it exceeded 13 million acres. Since millet can be planted late in the season and requires little seed, it is considered an important insurance crop in the semiarid zone of the USSR, providing a source of food and feed when other grain crops fail. A serious disadvantage of growing millet is that it needs much weeding and consequently makes heavy demands on labor. The Soviet Government has paid considerable attention to the millet crop during the past decade and encouraged its planting and better farm practices for it in order to improve the rather low yields per acre.

Such leguminous crops as peas and lentils are included in the Russian statistics with grain crops. These crops not only provide valuable food and feed rich in protein but also enrich the soil with nitrogen. The acreage under legumes trebled between 1928 and 1935–37, reaching more than 7 million acres, but it decreased during the years immediately preceding World War II. In 1939, grain legumes occupied an area of nearly 6 million acres. During World War II the area was drastically reduced but has apparently been increasing again in recent years.

NONGRAIN CROPS

Potatoes

Next to wheat and rye, potatoes constitute the most important food crop in the USSR. They are more important in the western and central regions of the country than in the east and south (tables 22, 23, 24 and figure 12). In a region like White Russia nearly one-fifth of the 1938 crop acreage was devoted to potatoes. In northern Ukraine also the potato acreage was sizable, but in southern Ukraine it was relatively insignificant. In the former Polish Provinces, 15 percent of the sown area was in potatoes; in the Baltics, nearly 8 percent; but in the former Rumanian Provinces potato acreage was insignificant (table 24).

Potato yields per acre were generally higher before World War II in the newly incorporated territories, particularly in the Baltics, than in USSR proper, though they were increasing in the latter before the war. Yields are especially low for the spring-planted potatoes in the southern regions, where the high temperature of the soil during the time when the tubers are developing has an adverse effect. Widespread virus diseases that result in the degeneration of the potato culture within 2 or 3 years in the southern steppe regions make it necessary to bring seed potatoes from northern or mountainous regions. Summer planting of potatoes in the south at the end of June or the beginning of July is encouraged in order to postpone the period of tuber development until September, when the temperature is lower and the humidity greater.

Although the use of potatoes for feed was less prevalent in Russia than in western Europe before the war, particularly in Germany, still more than one-fourth of the crop was used for feed in the USSR, according to the data available for 1925–26 through 1929–30.[22] The per capita food consumption of potatoes was, of course, largest in the northern and western parts of the country, where most of the potatoes

[22] NIFONTOV, V. P., comp. ZHIVOTNOVODSTVO SSSR V TSIFRAKH, p. 127. Moscow-Leningrad. 1932.

were grown. Thus, the food budget surveys for the years 1925 through 1927 showed that 541 pounds of potatoes per capita were consumed in the rural districts of the so-called consuming, or grain-deficit, area of northern and north-central Russia. In the so-called producing, or grain-surplus, area the average per capita consumption of potatoes during the same period was 334 pounds.[23] In Germany, in the 1930's, it was 417 pounds.

Before World War I, potatoes were used extensively for producing alcohol. During the interwar period, however, grain was substituted to a large extent as a source of alcohol, and the use of potatoes sharply declined. In 1914, potatoes constituted 70 percent of the raw material used in alcohol production; in 1935, the best interwar year,

FIGURE 12.—Potato-producing areas, 1938.

the proportion was only 22 percent; and in 1940 it decreased to 15 percent. A further reduction took place during World War II, when the area planted to potatoes for factory use decreased.[24] The objective of the Government has been to increase the industrial use of potatoes, which are more economical for those purposes than grains. They yield a much greater quantity of alcohol per acre than even corn, which is the most productive among grains in this respect.[25]

The war has greatly enhanced the importance of potatoes because of the large outturn in terms of calories per acre. "Victory garden"

[23] STATISTICHESKII SPRAVOCHNIK SSSR ZA 1928, pp. 850–851.

[24] ZOTOV, V. [POST-WAR PROSPECTS OF THE FOOD INDUSTRY.] Planovoe Khozyaistvo 1945 (5): 20. 1945.

[25] DEMIDOV, S. RAZVITIE SEL'SKOGO KHOZYAISTVA V POSLEVOENNOI PYATILETKE, p. 56. Moscow. 1946.

type of planting by the city population was prevalent during the war; and for that reason potato acreage held up better during that time

TABLE 31.—*Potatoes: Area, yield, and production, selected years*

Year	Area		Yield		Production	
	1,000 hectares	*1,000 acres*	*Quintals per hectare*	*Bushels per acre*	*1,000 metric tons*	*1,000 bushels*
Prewar boundaries:						
Average 1933–37	6,721	16,608	85.5	127	57,463	2,111,382
1938	7,365	18,199	57.0	85	41,960	1,541,750
Postwar boundaries:						
Average 1933–37 [1]	8,176	20,203	90.3	134	73,838	2,713,054
1947 [1]	8,300	20,500	86.3	128	71,600	2,631,000
1948 [1]	9,100	22,500	86.2	128	78,400	2,881,000
1949 [1]	9,500	23,400	80.2	120	76,200	2,800,000

[1] Rounded estimates, U. S. Office of Foreign Agricultural Relations.

than the acreage of many other crops. (For statistical data on potatoes see table 31.)

Sugar Beets

Sugar beets constitute the only domestic source of sugar in the USSR. Sugarcane has been introduced into Soviet Central Asia but production is still in its infancy. Since sugar beets are a highly intensive crop, requiring large expenditures of labor and bringing high returns per acre, they are of greater importance in the economy of the country than is suggested by the size of the area planted to them (table 32).

Before World War II the growing of sugar beets was concentrated in northern Ukraine and the adjoining Provinces of the Central Agricultural Region (tables 22 and 23 and fig. 13). Expansion of sugar-beet production into other regions, especially into the irrigated regions of Soviet Central Asia, and even into Siberia with its severe climatic conditions, has been accelerated since the war years, when the principal sugar-beet regions were occupied by the Germans. Some sugar beets are also grown in the Baltic Republics, Latvia and Lithuania, and in the Rumanian and Polish territories occupied since the war.

But most of the acreage is still in the old sugar-beet regions of the Ukraine and adjacent parts of the Central Agricultural Region, where the sugar-refining industry is also concentrated. Historical, natural, and economic conditions, such as priority of development, fertility of the soil, favorable climatic conditions, and normally abundant labor supply, have combined to make for localization of the sugar-beet industry in these regions.

In accordance with Government policy, the acreage under sugar beets more than doubled during the early collectivization period, reaching 3.8 million acres in 1932 as compared with 1.9 million acres in 1928. The yield per acre, however, declined from 5.9 and 3.6 short tons in 1928 and 1929 to only 1.9 in 1932, owing largely to the deterioration of the farm technique, though probably also to the bringing

of poorer land under cultivation. The expansion of sugar-beet acreage then ceased, and in subsequent years it declined. The Government made a great effort to raise yields through improvement of farm prac-

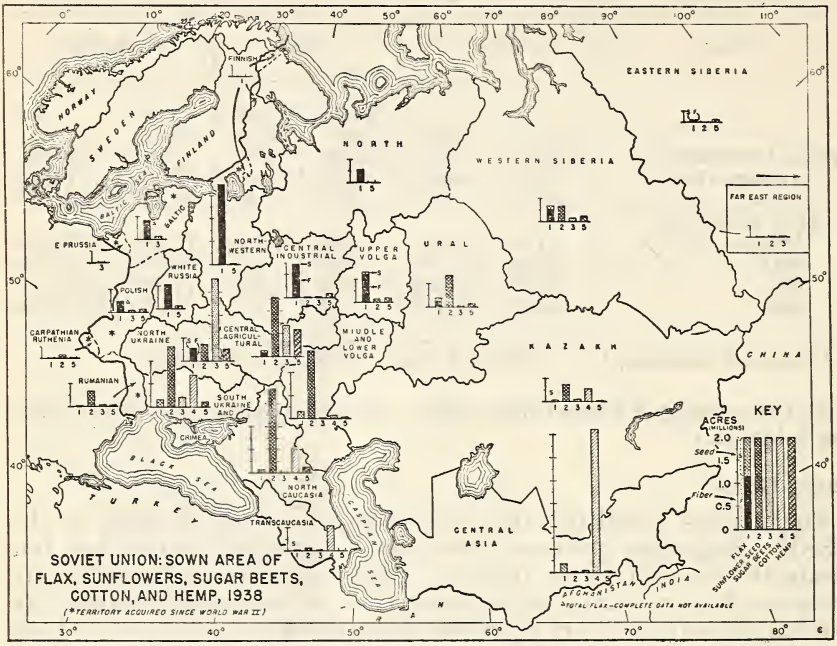

FIGURE 13.—Sown area of fiber, oilseed, and sugar-beet crops, 1938.

tices and increased use of commercial fertilizer. The area planted during the years 1937–40 was less than 3 million acres per year, and the yields varied between 6.3 and 8.2 short tons per acre.

TABLE 32.—*Sugar beets: Area, yield, and production, selected years*

Year	Area		Yield		Production	
	1,000 hectares	*1,000 acres*	*Quintals per hectare*	*Short tons per acre*	*1,000 metric tons*	*1,000 short tons*
Prewar boundaries:						
Average 1933–37	1,214	2,999	124	5.5	15,049	16,589
1938	1,180	2,916	141	6.3	16,680	18,386
Postwar boundaries:						
Average 1933–37 [1]	1,260	3,113	127	5.7	15,984	17,619
1947 [1]	980	2,422	138	6.1	13,500	14,881
1948 [1]	1,150	2,842	133	5.9	15,300	16,865
1949 [1]	1,153	2,850	135	6.0	15,513	17,100

[1] Rounded estimates, U. S. Office of Foreign Agricultural Relations.

Considerable field losses of beets because of failure to complete harvesting on time or to transport beets to the refineries are frequent in the Soviet Union. The rate of Government procurements of the

estimated production varies from year to year, sometimes widely. During 1928–34 the range was from 84 to 97 percent.[26]

In 1937 there were 189 sugar refineries in the Soviet Union. Production of sugar amounted to about 2.4 million short tons (refined basis) (table 33). The Ukraine accounted for 74 percent of the total output; and the central regions of European Russia, for 17 percent.[27] Thus, the great bulk of Russian sugar production originated in those

TABLE 33.—*Sugar production, prewar and postwar boundaries, 1930–39 and 1946–49*

Year	Prewar boundaries				Present boundaries [1]			
	In terms of raw		In terms of refined		In terms of raw		In terms of refined	
	1,000 metric tons	*1,000 short tons*	*1,000 metric tons*	*1,000 short tons*	*1,000 metric tons*	*1,000 short tons*	*1,000 metric tons*	*1,000 short tons*
1930	2,004	2,209	1,805	1,990	2,104	2,319	1,895	2,089
1931	1,501	1,655	1,352	1,491	1,590	1,753	1,432	1,579
1932	889	980	801	883	1,012	1,116	912	1,005
1933	1,219	1,344	1,098	1,211	1,370	1,510	1,234	1,360
1934	1,478	1,629	1,332	1,468	1,658	1,828	1,493	1,647
Average, 1930–34	1,418	1,563	1,277	1,408	1,547	1,705	1,393	1,536
1935	2,255	2,486	2,032	2,240	2,423	2,671	2,183	2,406
1936	1,999	2,203	1,801	1,985	2,154	2,374	1,941	2,140
1937	2,687	2,962	2,421	2,668	2,848	3,139	2,566	2,828
1938	2,300	2,535	2,072	2,284	2,450	2,700	2,207	2,433
1939	[2] 2,540	[2] 2,800	[2] 2,288	[2] 2,522	2,648	2,919	2,386	2,630
Average, 1935–39	[2] 2,356	[2] 2,597	[2] 2,123	[2] 2,340	2,505	2,761	2,257	2,487
1946	-------	-------	-------	-------	703	775	633	698
1947	-------	-------	-------	-------	1,542	1,700	1,389	1,532
1948	-------	-------	-------	-------	1,814	2,000	1,634	1,802
1949 [3]	-------	-------	-------	-------	1,996	2,200	1,798	1,982

[1] Includes Latvia, Lithuania, and estimates for areas acquired from Poland, Germany, and Rumania.

[2] 1939 figures include Polish occupied area.

[3] Preliminary.

U. S. Office of Foreign Agricultural Relations. Prepared or estimated on basis of official statistics and office records.

areas that were in the zone of military operations and German occupation during World War II.

Some of the acquired territories also have small sugar industries. In Latvia the average acreage during the years 1935–39 amounted to

[26] SEL'SKOE KHOZYAISTVO SSSR, EZHEGODNIK 1935, p. 447.

[27] SOTSIALISTICHESKOE STROITEL'STVO SSSR (1933–1938 GG.). STATISTICHESKII SBORNIK, p. 79. Moscow and Leningrad. 1939.

33,000 acres with a production of 282,000 short tons of sugar beets and 44,000 short tons of sugar (refined basis). The corresponding figures for Lithuania were 20,000 acres, 168,000 short tons of beets, and 27,000 short tons of sugar. The area acquired from Poland had, in 1938, an estimated 33,000 acres sown to sugar beets. During that year about 310,000 short tons of beets were processed, producing approximately 48,000 short tons of sugar (refined basis).

Before World War II, the Soviet Union was on an export basis for sugar. Net exports of sugar averaged more than 100,000 short tons (refined basis) during 1934–37. It should be noted, however, that exports were entirely a matter of Soviet Government decision, for domestic consumption was small; supplies available for consumption but not necessarily actually consumed (production minus net exports) in 1937–38 averaged only 30.6 pounds per capita,[28] compared with an actual per capita consumption in 1937 of 95.8 pounds in the United States[29] and 52.9 pounds in Germany.[30] (All statistics are on the refined basis.)

During World War II, the Soviet Union was on an import basis for sugar. Total shipments under lend-lease arrangements amounted to 517,600 short tons of refined sugar (553,900 short tons raw basis). During the postwar years, the Soviet Union has imported sizable quantities of sugar from Czechoslovakia, the Soviet zone of Germany, and possibly other satellites and shipped some sugar to Iran and Afghanistan.

The war caused great damage to the sugar industry, and both the acreage and the yields of beets and sugar declined sharply while many refineries were seriously damaged or destroyed. Considerable progress in reconstructing the refineries has been recorded by Soviet sources, and the prewar industrial capacity has been restored, according to reports in 1950.[31] Sugar-beet acreage and production, as well as the output of sugar, in 1949–50 was still below prewar, though the situation was better than it had been in the preceding year, when a considerable area of beets had remained unharvested while the refineries had been short of supplies.

Sunflower Seed

Sunflower seed is the principal oilseed crop of the Soviet Union, which before World War II produced almost 80 percent of the world output. The crop is concentrated in the Central Agricultural, Middle and Lower Volga, and southern regions of European USSR (tables 22 and 23 and fig. 13). Sunflowers are also the chief oil-bearing crop in the territory newly acquired from Rumania.

Hardy and drought-resistant, the sunflower plant is well suited to the Russian climate, and all parts of the plant are profitably used. Oil from the seeds is the basic vegetable oil used for food in Russia;

[28] On the basis of 2,668,000 short tons of refined sugar produced minus 118,201 short tons exported during the year beginning July 1, 1937, and an estimated population of 166.9 million on January 1, 1938. (LORIMER, op. cit., p. 134.)

[29] U. S. DEPT. OF AGRICULTURE. AGRICULTURAL STATISTICS 1946, p. 106. 1946.

[30] U. S. ARMY SERVICE FORCES. CIVIL AFFAIRS HANDBOOK, GERMANY (Manual M 356–7), p. 100a. 1944.

[31] PAVLOV, D. *In* Izvestiya, Mar. 10, 1949. *Also* Sakharnaya Promyshlennost 7:1. 1950.

before World War II most of it was consumed within the country. Oil cake is a valuable feed concentrate for domestic use and export. The part of the flower remaining after threshing can be used as a coarse fodder. The husk of the flower is used for fuel, and the ashes of the stalk are a source of potassium carbonate. In the principal producing regions, whole sunflower seeds are eaten like peanuts and constitute a popular delicacy.

In growing sunflower seed there is the same incongruity of improved techniques side by side with poor farm practices, such as neglect of weeds and delay in harvesting, that is characteristic of the rest of Russian agriculture. During World War II sunflower production in the Soviet Union was reduced because a large part of the producing area lay in the path of invasion. An effort has been made to recover

TABLE 34.—*Sunflower seed: Area, yield, and production, selected years*

Year	Area		Yield		Production	
	1,000 hectares	*1,000 acres*	*Quintals per hectare*	*Pounds per acre*	*1,000 metric tons*	*1,000 short tons*
Prewar boundaries:						
Average 1933–37 [1]	3,489	8,621	5.7	510	1,988	2,191
Postwar boundaries:						
Average 1933–37 [2]	3,600	8,900	5.8	520	2,100	2,300
1947 [2]	3,100	7,700	5.5	490	1,711	1,890
1948 [2]	3,300	8,200	5.1	460	1,692	1,870

[1] Represents 4-year average.
[2] Rounded estimates, U. S. Office of Foreign Agricultural Relations.

these losses, but there has been more success in reestablishing the area sown than in raising the yields to their prewar levels (table 34).

Cotton

Since the turn of the century, cotton has become the leading fiber crop of the Soviet Union; it is also the principal irrigated crop of that country. The Soviet Union was the third most important cotton-growing country in the world, following the United States and prewar India, and like these two countries has an important cotton-manufacturing industry and a large domestic market for cotton goods.

In Russia the growth of a modern cotton-manufacturing industry antedated large-scale development of cotton growing. The spinning industry traces its origin to the first half of the nineteenth century, particularly to the period that followed the lifting of the ban on exports of textile machinery from England in the 1840's.[32] [33] Thus the Russian industry shared the general course of development of the European textile industry, which began with the industrial revolution in England in the late eighteenth century and spread during the next century to the Continent. During the last quarter of the nineteenth century an important domestic source of raw cotton supply was de-

[32] MASSAL'SKII, V. I. KHLOPKOVOE DELO V SREDNEI AZII I EGO BUDUSHCHEE, p. 9. St. Petersburg. 1892.
[33] ODELL, R. M. COTTON GOODS IN RUSSIA. U. S. Dept. Commerce and Labor, Bureau of Manufactures, Special Agent Series, No. 51. 1912.

veloped in the newly won Turkestan, or Central Asia, and, to a lesser extent, in Transcaucasia.

Cotton varieties of the so-called Asiatic type (*Gossypium herbaceum* L.), which yields coarse fiber of short staple, were grown in these areas for many centuries, apparently having been brought over from Persia.[34] Trade with Russia proper, in which homespun cotton yarn originally predominated over raw cotton, also had been carried on long before the conquest of Turkestan by the Russians in the middle of the nineteenth century. An impetus to cotton growing in Central Asia and in Transcaucasia, as in other cotton-growing areas of the world, was given in the 1860's by the American Civil War and the cotton famine abroad that accompanied it.[35] [36]

Real progress, however, came later, with the introduction by the Russians during the last quarter of the nineteenth century of the American upland types (which largely replaced the indigenous varieties) and the construction of railroads connecting the cotton regions with European Russia. A number of measures aiming to encourage cotton cultivation, such as the imposition of a customs duty on raw cotton, taxation privileges for cotton growers, and some agronomic assistance, were undertaken and these were intensified during the last few years before World War I.

That war, which made difficult the shipment of American cotton into Russia, temporarily stimulated further the expansion of Russian cotton acreage. In 1915 the total cotton area exceeded 2 million acres. Of this area Central Asia accounted for 88 percent and Transcaucasia for the remaining 12 percent. The production of lint, which reached its pre-revolutionary peak in that year, was estimated at 1.5 million bales of 478 pounds each. The acreage, however, declined sharply with the general economic dislocation that the revolution and the ensuing civil war brought in their train. The shrinkage of the market for cotton and the shortage of breadstuffs due to the disruption of communications with central Russia led to increased self-sufficiency of farming in cotton regions and a shift from cotton to cereals. After reaching the low point in 1922, Russian cotton acreage again showed an upward trend with the general economic recovery of the country (table 35).

Coincidentally with the inauguration of the first 5-year plan of economic development and the move to force collectivization of agriculture, the Soviet Government embarked on a program of cotton self-sufficiency, designed to speed up domestic production and decrease imports. This policy was embodied in the following decree of the Central Committee of the Communist Party on July 18, 1929.

> The development of cotton production in the current 5-year period (1928 to 1932) must follow the lines of a maximum utilization of all resources for the increase of cotton acreage and the increase of cotton yields in order to be able at the end of 5 years (1932) to free the textile industry of the Union from the necessity of importing foreign cotton, and also to have the necessary (reserve) stocks for further development of the textile industry.[37]

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[34] ZAITSEV, G. S. KHLOPCHATNIK, ed. 2, pp. 158, 204–205. Leningrad. 1929.

[35] PETROVICH, P. KHLOPKOVODSTVO V ZAKAVKAZ'E, p. 10. Tiflis. 1912.

[36] YUFEREV, V. I. KHLOPKOVODSTVO V TURKESTANE, pp. 16–17. Leningrad. 1925.

[37] DZHANUMYAN, S. A. EKONOMIKA KHLOPKOOCHISTITEL'NOI PROMYSHLENNOSTI, p. 11. Moscow-Leningrad. 1937. (Cited by MICHAEL, LOUIS G. COTTON GROWING IN THE SOVIET UNION. Foreign Agr. 2: 354. 1938.)

As a result, the Government began energetically to expand cotton cultivation, both in the old irrigated cotton regions and in new nonirrigated regions farther north. The expansion reached its peak in 1932, when 5.4 million acres were planted to cotton, compared with less than 2 million in 1927. Since 1932, cotton acreage has been at a lower level. The expansion in cotton in the early 1930's was accompanied initially by a decline in yields per acre. Extension of acreage

TABLE 35.—*Cotton area, production, and yield per acre, average, 1909–10 to 1913–14, annual, 1922–40 and 1945–50*

Year	Area	Production [1]	Yield per acre
	Million acres	*Million bales of 478 pounds (net)*	*Pounds*
Average, 1909–10 to 1913–14	1.57	0.90	276
1922	.17	.06	151
1923	.53	.20	179
1924	1.24	.45	174
1925	1.46	.78	255
1926	1.63	.83	243
1927	1.98	1.10	264
1928	2.40	1.17	234
1929	2.61	1.23	225
1930	3.91	1.59	194
1931	5.28	1.84	167
1932	5.37	1.82	162
1933	5.07	1.88	177
1934	4.80	1.74	173
1935	4.83	2.25	223
1936	5.02	3.40	324
1937	5.25	3.70	337
1938	5.15	3.80	353
1939	5.19	4.00	368
1940	4.94	3.00	290
1945	3.00	1.70	271
1946	3.22	2.24	333
1947	3.62	2.40	317
1948 [2]	4.10	2.60	303
1949 [2]	4.55	2.70	284
1950 [2]	5.88	----------	----------

[1] The unit changes to bales of 480 pounds (net) after 1945.
[2] Preliminary.

Compiled from official sources or estimates of U. S. Office of Foreign Agricultural Relations.

into low-yielding nonirrigated regions with a short growing season, where cotton often had not time to mature before it was damaged by frosts, tended to depress the level of yields for the country as a whole. In the old cotton belt also the use of inferior land, the abuse of the single-crop system, aggravated by inadequate fertilization and difficulties with native peasant labor as a result of the forced collectivization, adversely affected the yields of the crop.

Although labor difficulties in cotton regions have persisted, judging from numerous published Soviet reports, the yields in the old cotton belt have increased appreciably. In Uzbekistan, the principal cotton-growing region, the yield of cotton per acre in the period 1934–40 more than doubled, largely because of the vastly increased use of commercial fertilizer.[38]

The increased use of alfalfa in rotation with cotton doubtless also had a favorable effect on yields. In Uzbekistan, for instance, 25 percent of the irrigated area was sown to alfalfa.[39] Improvement of the seed supply was another contributing factor. Soviet sources attribute an important role in raising the cotton yields to the Stakhanovist pacemakers, some of whom were reported to have achieved record yields. The effect of the latter on the general level of cotton yields was probably exaggerated just as it was in other branches of Soviet agriculture.

The principal cotton-growing regions of the Soviet Union have many peculiarities that set them apart from most other Russian agricultural areas. The following description is taken from an article by Louis G. Michael, former United States Agricultural Attaché in the Soviet Union, who visited a number of these cotton regions.

> In its beginning, the cotton industry of Russia centered in Central Asia, or Turkestan.[40] The cotton-producing districts of Central Asia lie south of latitude 45° N. and north of 35° 17′ N., in that part of the Soviet Union bounded on the west by the Caspian Sea and on the east by Chinese Turkestan or Sin-Kian. To the south are the mountain regions of Iran (Persia) and Afghanistan, and farther to the east rise the ranges of the Himalayas. The southeastern part of Central Asia, comprising the republics of Kirghizia and Tadjikstan, is ribbed with chain upon chain of lofty snow-capped mountains . . . which reach altitudes well above 20,000 feet. From the foothills of the mountain regions, the floor of a dried-up sea extends for more than 1,200 miles toward the west and north. This plain, sloping to the Caspian and Aral Seas, is characterized by stretches of barren sands, saline steppes, and gypsum wastes. It is for the most part a bleak, wind-swept, rolling plain in winter and a broiling desert in summer. Here lie the Soviet Republics of Turkmenistan and Kara Kalpak and the southern districts of Kazakstan. On the fringe of the desert and pushing back into the foothills and valleys of the

[38] PRIANISHNIKOV [PRYANISHNIKOV], op. cit., p. 146.

[39] Ibid. The author also pointed out, as will be recalled from the discussion in the section on fertilizers, that the alfalfa in rotation with cotton did not produce its full effect on the fertility of the soil because only the nitrogen provided by its roots was properly utilized. The manure, however, resulting from the alfalfa hay, was largely wasted because of the absence of grain in rotation and consequently the lack of straw for bedding. The adverse effect of the shortage of manure on cotton yields became fully apparent only during the war when commercial fertilizers were lacking. The above-mentioned decree of June 21, 1945, dealing with crop rotations, attempted to remedy this deficiency by providing for one field under crops other than cotton or alfalfa, which could be used for grain and thus also supply the necessary straw. In any event, there was apparently a shift to grain in cotton-growing regions during the war. However, in the effort to increase rapidly the shrinking cotton production, a shift from grain back to cotton and alfalfa was again ordered by the Government in 1946. A decree, published in *Pravda* on Feb. 3, 1946, dealing with the cotton program for Uzbekistan during the period 1946–53, required that nearly 540,000 acres of irrigated land under grain be planted to cotton and alfalfa.

[40] The term "Central Asia" is used loosely to include Central Asia proper (Uzbekistan, Turkmenistan, and Tadjikstan), the southern cotton-producing districts of Kazakstan and Kara Kalpak, and certain favored valleys of western Kirghizia. It is roughly equivalent to former Russian Turkestan, Trans-Caspian Krai, the Emirate of Bukhara, and the Khanate of Khiva.

mountains to the east, is the Republic of Uzbekistan, the most important cotton-growing region in the Soviet Union.

The plains receive practically no rain in summer, and annual precipitation is less than 10 inches. The vast southeastern mountain region, however, forms several catch-basins for summer rain and winter snow. Here the snow accumulates until its weight forces it to flow down the canyons in the form of glaciers. In summer, these glaciers reach altitudes low enough to cause them to melt and, melting, to feed three large river systems: the Amu Daria, the Syr Daria, and, between these two, the Zeravshan.[41] The Amu Daria and the Syr Daria, both flowing west and north, reach the Sea of Aral. The Zeravshan flows westward through a series of canals to beyond Bukhara, where, wholly consumed, it fades into the desert sands. It has no mouth. There are other lesser streams: The Vakhsh and the Pianj, which unite to form the Amu Daria; the Narin, the Kara Daria, and the Chirchik, which are tributaries to the Syr Daria. Part of the water of these rivers is used to irrigate cotton. Many other rivers, tumbling down through the foothills, end in irrigation canals and are completely used up or seep into the desert sands. Other sources of water supply are the occasional subterranean streams that flow beneath the surface of the desert and whose waters, where they emerge, result in oases. Central Asia is a region of rivers without mouths, of lakes that have no outlets, of seas whose inflow is offset by evaporation and whose salty waters never reach the ocean.[42]

For centuries nomad tribes have sought the scant pasturage on the lowland desert wastes. Other nomad bands have grazed their flocks and herds upon the Alpine steppes, and, wherever water could be found, have tilled the soil. Civilization after civilization has been built up and destroyed in this mountain-desert region by Turk, Mongol, and Tartar. The oases have probably been irrigated for thousands of years, and cotton has been a staple crop for centuries. An early reference to cotton growing in this region was made more than 700 years ago at the time of the coming of the Mongol hordes under Genghis Khan.[43]

* * * * * * *

Westward from Central Asia, across the Caspian Sea and south of the lofty, snowcapped range of the Caucasus Mountains, which mark the dividing line between Europe and Asia, lies Transcaucasia. This land is divided by the Syrian Mountains into two areas of entirely different character. To the west, the land falls away to the shores of the warm Black Sea and lies open to warm winds from that direction and is sheltered from the cold winds of the north by the main range of the Caucasus. This is Georgia, which the natives call "Gruzi"—a country of sunshine and warmth. The farm lands on the western slopes of Georgia are largely devoted to the production of commodities more valuable than cotton—citrus and other fruit, tea, etc.

The eastern part of Transcaucasia slopes toward the Caspian Sea and lies open to the dry east winds from the Central Asiatic deserts. The climate is arid, and there are vast stretches of steppe, semidesert and desert land, uninhabited and waterless. This is Azerbaijan, the most important cotton-growing district of Transcaucasia, through which, from the Gruzi highlands, flows the Kura River . . . Armenia, the third republic in Transcaucasia, is situated in the south-central part of the area and is largely tableland, with an elevation of from 2,600 to 5,000 feet. . .

* * * * * * *

There is, today, only a small area under cotton in Armenia and a still smaller acreage in Georgia. But in Azerbaijan, where the lower valley of the Kura widens out into the bottom lands of a dried-up arm of the Caspian Sea to form the Mugan Steppe, long-staple Egyptian cotton is grown under irrigation. The upper waters of the Kura, the Araxes, and several lesser streams flowing down from the mountains through foothill valleys are used to irrigate cotton of American origin—long-staple in the lowlands, quick-maturing, short-staple in the higher elevations.[44]

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[41] Adapted from DAVIS, A. P., IRRIGATION IN TURKESTAN. Civil Engineering, v. 2, No. 1. Jan. 1932.

[42] MIKHAILOV, N. SOVIET GEOGRAPHY. London. 1935.

[43] FOX, RALPH. GENGHIS KHAN, p. 149. 1936.

[44] MICHAEL, op. cit., pp. 355-359.

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For growing cotton under irrigation, the climatic conditions in Central Asia are favorable, though not as favorable as in the irrigated regions of the United States. The frost-free period varies from 180 to 200 days in the more northern section to more than 220 days in the southern. The actual growing season for cotton, which is measured by the number of days with temperature above 15° C. (59° F.), is 167 in Tashkent, in the northern part of the cotton belt; 174 in Andizhan, in the heart of the cotton-growing region; and 190 in Ashkhabad, in Turkmenistan. The total warmth (summer temperatures during this period of these points) is 3,700°, 3,900°, and 5,200° C., respectively. Comparison with the United States should be with regions where cotton is also grown under irrigation. Thus, in the cotton district of California the growing period is 200 days or more, with a total warmth of 4,400° to 4,600° C.; in Phoenix, Ariz., it is 258 days, with a total warmth of 6,400° C.; in El Paso, Tex., it is 216 days, with a total warmth of 4,900° C. (All data are from SELYANINOV, G. T., ed. Mirovoi Agro-Klimaticheskii Spravochnik. [The World's Agro-Climatic Handbook.] Leningrad-Moscow. 1937.)

The prevailing gray soils of the agricultural regions of Central Asia are of the loess types. They are rich in alkalies, and so-called alkali soils are easily formed if irrigation is defective. Loess soils are poor in humus, a deficiency that gives them a weak structure, a tendency to crumble when dry, and a pasty condition on irrigation with a subsequent formation of a thick crust on drying. They are deep, contain an adequate amount of phosphoric acid (if not subjected to an excessive irrigation and exhausted by cultivation), and are rich in potash but very poor in nitrogen.[45]

A significant change in the geographical distribution of cotton in the Soviet Union came with the extension, beginning in 1928, of cotton cultivation into new regions of southern European Russia, where cotton is not grown under irrigation (table 36 and fig. 13). These new regions, which comprise southern Ukraine, Crimea, eastern and western parts of the North Caucasus, and the delta of the Volga, increased their cotton acreage from 26,000 acres in 1929 to more than 1 million acres in 1932. In 1929 these regions had accounted for about 1 percent of the total Russian acreage, but by 1932 their share had increased to 20 percent. The new cotton belt accounted for nearly 40 percent of the increase in the total Russian acreage between 1929 and 1933. Although the acreage in these regions decreased during 1933–35, it reached a new peak in 1937–38, when it accounted for one-fourth of the total Russian cotton acreage.

Southern Ukraine has the largest of the new cotton regions. The next largest is in the North Caucasus area, throughout which cotton growing is concentrated in several distinct sections: In the southwestern part, along the coast of the Azov Sea and the valley of the Lower Kuban River; in the southeastern part, in the valley of the River Terek; and in the east, in the Dagestan Republic, including the stretch of the Caspian coast. Crimea has a much smaller cotton area

[45] SHAKHNAZAROV, A. I., comp. SEL'SKOE KHOZYAISTVO V TURKESTANSKOM KRAE, p. 30. St. Petersburg. 1908.
PONYATOVSKII, S. V. OPYT IZUCHENIYA KHLOPKOVODSTVA V TURKESTANE I ZAKASPIISKOI OBLASTI, p. 138. St. Petersburg. 1913.
RASTENIEVODSTVO SSSR, v. 1, pt. 1, p. 264.
PRYANISHNIKOV, D. N. CHASTNOE ZEMLEDELIE, ed. 7, p. 619. Moscow. 1929.

than the first two regions; and the Lower Volga region has the smallest of them all. Cotton in the new belt is "rain grown," with minor exceptions, and this fact constitutes the most striking difference between the new and old cotton-growing regions of Central Asia and Transcaucasia.

Although attempts to grow cotton in various sections of European Russia date back to the early nineteenth and even eighteenth centuries,[46] it was only after 1928 that cotton was introduced on a commercial scale in these new regions. This shift has extended the Soviet

TABLE 36.—*Cotton area, by regions, 1938*

Region	Area	
	1,000 hectares	*1,000 acres*
Irrigated regions:		
Central Asia:		
Uzbek	917	2,266
Turkmen	154	381
Tadzhik	111	274
Kirgiz	64	158
Total	1,246	3,079
Transcaucasia:		
Azerbaidzhan	195	482
Armenia	17	42
Georgia	2	5
Total	214	529
Kazakh	110	272
Total irrigated regions	1,570	3,880
Nonirrigated regions:		
Southern Ukraine	229	565
Crimea	50	124
North Caucasus	212	524
Middle and Lower Volga	22	54
Total nonirrigated regions	513	1,267
Grand total	2,083	5,147

POSEVNYE PLOSHCHADI SSSR (DINAMIKA ZA 1928 . . .), STATISTICHESKII SPRAVOCHNIK. Moscow and Leningrad. 1939.

cotton-growing area considerably northward. Even in the old cotton belt of Central Asia, cotton is grown farther north than in the United States. In the former, the northern boundary of cotton cultivation is about 43° north latitude, although even at 41.2°, in the neighborhood of Tashkent, it was considered so far north as to be risky.[47] In the European part of the Union, cotton growing is extended to 46° or 47°

[46] KOVALEVSKY, G. [CONCERNING THE HISTORY OF COTTON CULTIVATION IN RUSSIA.] Annals of the State Institute of Experimental Agronomy 6 (3–4). Leningrad. 1928.

[47] PRYANISHNIKOV. CHASTNOE ZEMLEDELIE, p. 612.

north latitude, which corresponds approximately to the latitude of the northern part of the United States. In the United States, cotton is not cultivated farther north than 36° or 37° north latitude. Obviously, the cotton area is situated considerably farther north in the Soviet Union than in the United States, and this is particularly true of the new Russian cotton regions, in which the climatic conditions are not favorable to cotton production.

The best sections of the new cotton belt have a growing season (i.e., a season with temperatures of more than 15° C., or 59° F.) of 146 or 147 days, with a total of 3,000° C. during that period. The other areas used for unirrigated cotton have a growing season of 130 to 140 days and about 2,800° of total warmth.[48] Thus the growing period in the new cotton belt is much shorter than even that of Central Asia, let alone that of the United States, where the minimum is about 190 to 200 days. The correlation between the total warmth of the growing season and the quality of the crop is, of course, a close one.

Frost killing of cotton in the new regions presents a serious problem, since a considerable proportion of the cotton crop remains immature with the approach of the frosts due to the insufficiently warm temperature and shortness of the growing period. The former head of the cotton section of the Commissariat of Agriculture of the USSR stated that "until the development of extra rapidly maturing varieties of cotton for the new regions with a growing period of 100 to 105 days instead of 116 to 120 days, half of the cotton crop in the new regions will be gathered after the coming of the frost."[49]

Very low yields and inferior quality, and, in some years, almost complete failure of the crop were characteristic of the nonirrigated Russian cotton before the war, according to the study of Jasny referred to above.

> In 1928 through 1934, it averaged almost exactly one quintal of seed cotton per hectare, or 28 pounds of lint per acre. Most of this unsatisfactory result must be assigned to unfamiliarity with growing techniques, great shortage of draft power (and consequently of labor), and unwillingness of the growers—all these factors coming in the wake of the compulsory collectivization drive.
>
> During the last 5 years before Russia's entrance into the war, yields in the new areas averaged 3.5 quintals of seed cotton per hectare,[50] or not quite 100 kilograms of lint per hectare (90 pounds per acre). It may be of interest to mention some of the specific information with reference to the latest prewar crops. A considerable amount of low-quality cotton was garnered in the new areas in 1937; serious adjustments were believed necessary to enable the processing plants to utilize it.[51] There were also many complaints by the manufacturers about the high moisture content of that cotton. Close to 20,000 metric tons (22,000 short tons), or about one-quarter of the total crop, remained unharvested in the kolkhoz fields of the Ukraine in 1938; a considerable part of it perished under snow.[52] In 1939, about 40,000 metric tons of cotton were

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[48] JASNEY [JASNY], NAUM. UNIRRIGATED COTTON IN SOUTHERN RUSSIA AND THE DANUBIAN COUNTRIES. Foreign Agr. 11: 7. 1947.

[49] REINGOLD, I. *In* Socialisticheskoe Zemledelie, Aug. 14, 1934.

[50] Socialist Agriculture, Apr. 2, 1946. The source does not specify the years. The actual yield was slightly less than 3.5 quintals, because the system of crop estimating was changed in 1939 to include in addition to the harvested cotton all cotton which is entirely lost under snow or otherwise.

[51] SHESTAKOV, V. I. [THE TASKS OF LIGHT INDUSTRY IN 1938.] Light Indus. 17 (3): 9–18. 1938.

[52] REINGARDT, V. [HARVEST THE COTTON IN THE NEW DISTRICTS ON TIME.] Soviet Cotton 1939 (9): 12–15. 1939.

snowed under in the new cotton areas.[53] In *Soviet Cotton* for March 1940, V. Reingardt[54] even writes:

"In the whole of the RSFSR and Ukraine up to 50,000 metric tons [55,000 short tons] of cotton, or about one quintal per hectare [that is, more than one-quarter of the harvest] remained in the field. This occurs year after year."

Moreover, according to the same source, part of the harvested cotton is lost, because it is harvested wet and not dried in time.[55]

The low yielding and inferior nonirrigated Russian cotton is a very costly product.

In the last prewar years the prices paid for seed cotton of the unirrigated areas were 30 to 40 percent higher than for seed cotton of Central Asia. The highest premium was for the three lowest grades, prices of which were of greater interest to the unirrigated than to the irrigated areas. Since prices are fixed for seed cotton in Russia, the producers of the unirrigated areas are not penalized for the shortness of the lint which is obtained from their cotton. However, they do get somewhat less for their cotton than is indicated by the above-mentioned price relationship, because a larger percentage of their cotton falls into the lower grades than is the case in Central Asia.

An additional advantage to the growers of unirrigated cotton in the Soviet Union is that the charge for the services of State machine-tractor stations, which are practically obligatory, is almost nominal to them. In recent prewar years, the growers of unirrigated cotton paid for the same operations only about one-tenth as much as the average growers of irrigated cotton.[56] This reduction in the charge of the machine-tractor stations was equivalent to an extra premium for unirrigated cotton of about 13 percent of the price of Central Asiatic cotton.[57]

Practically all the nonirrigated cotton-growing areas were in the zone of German invasion during World War II and produced little if any cotton. The Government postwar 5-year plan provided for a much smaller nonirrigated cotton acreage than existed just before the war: 416,000 acres by 1950 compared with nearly 1.3 million acres in 1938–39.[58] By 1950, however, this policy was sharply, if quietly, reversed. The agricultural plan for 1950 provided for considerable expansion of cotton acreage in the nonirrigated regions of southern Ukraine, North Caucasus, Crimea, etc., according to a statement by a high Soviet official. He admonishes that, "It is necessary to take into account and to forestall the faults and errors of 1949, when in a number of the non-irrigated cotton regions a low crop outturn was obtained because of a faulty rotation system (wrong choice of crops preceding cotton), and neglect of farm technique and the seed problem."[59] Due to the decision to expand cotton growing once more on a large scale in the nonirrigated regions, the cotton area in 1950 increased by more than 1,300,000 acres (540,000 hectares),[60] bringing the total Russian cotton acreage above prewar (table 35).

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[53] REINGARDT, V. [THE ORGANIZATION OF COTTON HARVESTING IN THE NEW AREAS.] Soviet Cotton 1940 (9): 9–14, illus. 1940.

[54] REINGARDT, V. [TEN YEARS OF COTTON SOWING IN THE NEW AREAS AND THE IMMEDIATE TASKS.] Soviet Cotton 1940 (3): 11–16. 1940.

[55] JASNEY, op. cit., pp. 8–9.

[56] [MODEL CONTRACT BETWEEN MACHINE-TRACTOR STATIONS AND KOLKHOZY, APPROVED FEBRUARY 17, 1934.] *In* KILOSANIDZE, op. cit.

[57] JASNEY, op. cit., p. 12.

[58] VOLIN, LAZAR. SOVIET COTTON PRODUCTION PLANS. Foreign Agr. 10: 152. 1946.

[59] DEMIDOV, S. [TOWARDS NEW SUCCESSES IN THE EFFORT TO RAISE THE TECHNICAL LEVEL OF THE SOCIALIST AGRICULTURE.] Sotsialisticheskoe Sel'skoe Khozyaistvo 1950 (5): 7. 1950.

[60] Pravda, July 28, 1950. (Mostly nonirrigated area.)

The Soviet Government has closely supervised cotton growing since the forced collectivization of agriculture in the 1930's, and it owns all of the gins and textile mills. Government control includes such matters as distribution of seed and fertilizer, the use of water for irrigation, and the various production practices to be employed. The seed situation was characterized in the early 1930's by a great deal of confusion and was criticized by Stalin at the Seventeenth Communist Party Congress in January 1934 as being "so tangled that it will take a long time to disentangle it." Although good varieties of cotton were developed by the Russian plant breeders from the original United States types, care was not exercised in keeping those varieties pure and in preserving their original qualities.

Important improvement and standardization of the seed supply, however, were accomplished in the late 1930's. The number of varieties of cotton used decreased from 73 in 1933 to 16 in 1939. At the same time, the area seeded to cotton of longer staples increased substantially.[61] In 1938 the Egyptian varieties of long staple cotton that had been introduced accounted for about 6 percent of the acreage.

The first place among regions growing Egyptian varieties was occupied, in 1938, by Azerbaidjan (Transcaucasia) with 134,000 acres, followed by Tadjik Republic with 76,000, Uzbek Republic with 71,000, and Turkmen Republic with 60,000 acres.[62]

Growing and delivery of cotton is supposed to be governed by so-called annual contracts concluded, on the basis of official plans, by Government agents with the kolkhozy. Actually these documents, though in a contractual form, are directives to the kolkhozy, specifying the acreage to be planted, the various production practices to be used, and the minimum quantity and quality of cotton to be delivered to the Government. All cotton, however, and not just the minimum quantity, must be delivered by the kolkhozy and state farms to Government warehouses. No cotton is supposed to be retained by the producers for any reason whatsoever.[63] Growers receive from the Government a fixed price in accordance with the grade of the cotton delivered, but for the quantities delivered in excess of the minimum specified in the contract, the price is from 50 to 150 percent higher, rising as the quantity increases.

The Government advances cash to the growers on the basis of the quantity of cotton that the contract specifies for delivery. In discussing this advance of cash, Dr. Michael says:

> There are three such advances: (1) At the time the contract is signed; (2) after the acreage seeded has been officially verified; and (3) after the second cultivation.
>
> The total amount of the cash advanced varies from region to region and with the different types of cotton planted.
>
> * * * * * * *
>
> At the time of closing the contract and at specified times thereafter, cottonseed oil, oil cake, and linters are delivered to the grower, who pays for these products at the rate below the usual market prices.[64]

[61] SMIRNOV, op. cit., p. 272.

[62] POSEVNYE PLOSHCHADI SSSR V 1938 G., STATISTICHESKII SPRAVOCHNIK, p. 96. Moscow and Leningrad. 1939.

[63] MARKOVICH, M., comp. ZAGOTOVKI KHLOPKA UROZHAYA 1936 GODA, SPRAVOCHNOE POSOBIE, p. 70. Moscow. 1936.

[64] MICHAEL, op. cit., p. 375.

In 1939–40, a new program of expansion of cotton growing in Central Asia was announced by a series of Government decrees.[65] During World War II, however, production not only was practically wiped out in the new cotton belt of European Russia, which was in the zone of German invasion, but also seriously declined in the uninvaded Central Asia and Transcaucasia. Both acreage and yields were reduced because of the shortages of labor and draft power, the lack of commercial fertilizers, and the need to grow more bread grains.

Increasing cotton production to a level even higher than before the war has been one of the main preoccupations of the Soviet Government in the agricultural sphere during the postwar period. But the Government cotton program has met many obstacles. Perhaps the most important, judging from reports in the Soviet press, has been the labor problem, although that problem is not so much one of numbers as of the workers' attitude toward working in the kolkhozy in the cotton districts. It is not a new problem but has bedevilled Soviet cotton growing ever since the forced collectivization of the small and highly intensive peasant agriculture of Central Asia. Hardly a season has passed without complaints in the Soviet press about poor labor discipline in the cotton-growing kolkhozy, side by side with recitals of the achievements of the Stakhanovists and "shock" workers. The new seriousness of the labor situation, however, may be reflected by the concessions that were made to the cotton growers, including increased prices for delivered cotton and reduced prices for bread grains, according to a decree of February 4, 1949.[66] This reduction followed the increase in the quantities of grain sold to cotton growers of the Uzbek Republic, and probably in other regions, at a discount price since 1946.[67]

Another difficult problem has been that of irrigation. There have been frequent complaints by Soviet spokesmen of faulty irrigation methods whereby valuable irrigated areas become alkaline or marshy.

Despite all efforts of the Government, cotton production has lagged (table 35). In 1949 the cotton crop was estimated as being still below the prewar figure. Unfavorable weather conditions, no doubt, played a large part in depressing cotton yields that year. The outlook improved in 1950, but the crop was expected to be still far short of the goal of 4.6 million bales specified by the postwar 5-year plan.

An important step toward centralizing the supervision of cotton production was taken when the new Ministry of Cotton Growing of the Soviet Union was created by a decree published in the Soviet press on April 6, 1950. The Ministry is charged with managing cotton production on collective and state farms; managing deliveries to the state; cotton ginning; and constructing and operating the irrigation system in all the cotton-growing regions. The new Ministry is taking over the functions that formerly devolved on (1) the Ministry of Agriculture, which controlled the collective farms in the cotton-growing regions; (2) the Ministry of State Farms, which similarly administered the state farms; and (3) the Ministry of Light Industry,

[65] VAZHNEISHIE RESHENIYA PO SEL'SKOMU KHOZYAISTVU ZA 1938–40 GODY, pp. 262–299 and 317. Moscow. 1940.

[66] While there were various references in the Soviet press to this decree the full text was never available.

[67] VAZHNEISHIE RESHENIYA PO SEL'SKOMU KHOZYAISTVU ZA 1938–1946 GG., p. 404.

which was in charge of cotton deliveries and ginning. U. Y. Usupov has been appointed to head the new Ministry. He was the party head of the Uzbek Republic, the principal cotton-growing region of the Soviet Union, and has been prominent in Soviet cotton administration. Parallel to the All-Union Ministry of Cotton Growing, similar ministries are being formed in the most important cotton-growing Republics; and, in the less important Republics, Chief Administrations of Cotton Growing are being established under the Councils of Ministers of Republics.

The creation of the separate Ministry of Cotton Growing appears to be in contrast to the recent trend of consolidating the ministries in charge of the various branches of Soviet economy. This move seems

TABLE 37.—*United States cotton exports to the Soviet Union, calendar and crop years, 1926 through 1950*

[In bales of 500 pounds gross]

Year	Calendar year	Crop year [1]
1926	271,979	522,028
1927	494,728	443,009
1928	446,963	328,388
1929	300,577	134,118
1930	82,864	30,397
1931	----------	---------
1932	----------	44,268
1933	66,042	51,529
1934	29,756	115,218
1935	115,218	431
1936	866	740
1937	720	415
1938	----------	---------
1939	---------	---------
1940	146,861	146,861
1941–48	0	0
1949	28,411	28,711
1950	0	---------

[1] Year beginning August 1.

Official records of the U. S. Bureau of the Census.

to confirm the significance attached by the Kremlin to the speeding up of cotton production and, perhaps, also to the special need for correction of inefficient practices in this branch of agriculture.

Before World War I and again in the 1920's, Russia was not able to produce enough cotton to supply the textile industry and was importing cotton from abroad, principally from the United States. From one-third to more than one-half of the Russian mill consumption during 1924–25 to 1928–29 was foreign, mostly American cotton. In 1927 exports from the United States to the Soviet Union reached nearly half a million bales (table 37). But since the Soviet Government inaugurated its policy of cotton self-sufficiency in the 1930's, imports of cotton have been confined to small quantities from the United States and Middle Eastern countries, largely from Iran (Persia) (table

38). In 1948 and 1949 the USSR was importing some American and Egyptian cotton but was apparently shipping considerable quantities of its own cotton to the satellite countries, particularly Poland, Eastern Germany, Czechoslovakia, and Hungary. Part of this exported cotton was used to process textiles for the Soviet Union.

The desire to supply most or all of the cotton requirements of the satellite countries, in addition to those of the recovering domestic industry, undoubtedly has been an important factor in the strong Soviet drive for increased cotton production during the postwar period.

TABLE 38.—*Cotton imports into the Soviet Union by countries of origin, 1933–36 and January–September 1937*[1]

Country from which imported	1933	1934	1935	1936	[2] 1937
	Bales [3]	*Bales* [3]	*Bales* [3]	*Bales* [3]	*Bales* [3]
United States	77,083	44,014	119,385	872	0
Egypt	([4])	([4])	([4])	0	0
Iran (Persia)	20,492	64,874	77,138	66,042	73,859
Turkey	466	0	2,292	4,391	0
Others	5,981	5,839	5,134	5,552	9,127
Total	104,022	114,727	203,949	76,857	82,986

[1] Years begin on January 1.
[2] First 9 months only. Not reported by countries after September 1937.
[3] Bales of 478 pounds (net).
[4] If any, included with "Others."

U. S. Office of Foreign Agricultural Relations. Compiled from official sources.

Flax

Flax is one of the oldest industrial crops in the USSR. Fiber for linen fabrics is obtained from its stalk. Its seed is a source of linseed oil, which is used as a drying oil and, after refining, as an edible oil, or for the manufacture of such products as margarine. The oil cake remaining after the extraction of oil is a valuable feed concentrate.

Different varieties of flax are planted in the USSR, depending on whether it is grown primarily for fiber or seed. The fiber types, of course, also produce some seed, but the yield of seed per acre is considerably smaller than from the specialized seed varieties. Fiber varieties also require different climatic conditions from those essential for seed types. The former need a humid climate with moderate summer temperature, whereas the latter will grow better in regions with warmer and drier weather.

Flax is grown in the United States for its seed, but in the Soviet Union it is produced largely for fiber. In the Soviet Union proper, exclusive of the newly acquired territories, 4.7 million acres were sown in 1938 to fiber flax, so-called dolgunetz, and 870,000 acres to flax grown only for its seed, so-called kudryash.

Fiber flax production is centered in the western regions of European Russia (Northwestern and White Russia), in the Central Industrial Region, and the Upper Volga. In these regions flax is the most

important industrial crop (tables 22 and 23 and fig. 13). Fiber varieties also predominate in the Ural and Siberia. The Middle and Lower Volga and the southern regions of the country lead in flaxseed acreage.

In the newly acquired territories, nearly 670,000 acres of flax were grown in 1938, of which a little more than 60 percent were in the Baltic Republics and were mostly fiber flax. The yields per acre of both fiber and seed were higher in the acquired territories than in the USSR proper before the war.

It is more characteristic of flax than of many other crops that growing it continuously on the same land reduces yields. Even a generous application of fertilizer does not remedy the situation, as some of the deterioration in yield may be due to the prevalence of wilt and other fungus diseases. Rotation of flax with other crops, therefore, is essential for maintaining yields. Clover combined with timothy is considered one of the best predecessors for flax because it

TABLE 39.—*Flax fiber: Area, yield, and production, selected years*

Year	Area		Yield		Production	
	1,000 hectares	*1,000 acres*	*Quintals per hectare*	*Pounds per acre*	*1,000 metric tons*	*Million pounds*
Prewar boundaries:						
Average 1933–37	2,177	5,380	2.6	232	566	1,248
1938	1,882	4,650	2.9	261	550	1,213
Postwar boundaries:						
Average 1933–37 [1]	(2)	(2)	(2)	(2)	644	1,420
1947 [1]	1,112	2,750	2.2	200	245	540
1948 [1]	1,500	3,700	2.3	200	345	760

[1] Rounded estimates, U. S. Office of Foreign Agricultural Relations and official sources.

[2] Not available separately for fiber. Total estimated flax area of 243,500 hectares (600,000 acres) in newly acquired territories includes seed and fiber varieties.

enriches the soil with nitrogen in proper proportion, maintains good structure of the soil, and keeps it clean of weeds.[68] The development of flax growing in Russia, therefore, was accompanied by the expansion of the area under clover in the principal flax regions.

The methods of flax farming saw considerable improvement before World War II. Progress was made in mechanizing various operations connected with flax production and processing, which had required a great amount of hand labor. By 1938, about 20 percent of the fiber flax acreage in kolkhozy was harvested by tractor power.[69] Nearly 80 percent of the flax acreage was seeded with standard improved varieties in 1938.[70] The quantity of commercial fertilizer used was also increasing from year to year before World War II. However, the Government was not satisfied with the increase in the annual yields of flax fiber during 1933–37, which were, on the average, about 13 percent

[68] YAKUSHKIN, op. cit., p. 451.

[69] MALYSHEV, op. cit., p. 83.

[70] SORTOVYE POSEVY SSSR 1938 GODA, p. 12.

higher than during 1928–32.[71] Considerable losses in the harvesting and processing of flax fiber were common. The third 5-year plan, which was approved in 1939, called for an increase of more than 75 percent in yields per acre over the 1933–37 average.

Russian flax fiber was an important export commodity during the nineteenth century and early years of the twentieth century. In fact, before World War I Russia was the leading exporter of flax and tow in the world. These exports, however, became insignificant during the interwar period.

Flax production suffered a tremendous set-back during the war. Large stretches of the most important flax-growing regions were invaded by the Nazis and great damage was done to the industry. In the uninvaded regions, flax production was handicapped by wartime shortages of labor, draft power, and fertilizer, which were aggravated by the need for concentrating on food production. Decrease of the clover area, encroachment of weeds, difficulties of adequately replacing and repairing machinery, and general deterioration of farm technique

TABLE 40.—*Flaxseed: Area and production, selected years*

Year	Area [1]		Production	
	1,000 hectares	*1,000 acres*	*1,000 metric tons*	*1,000 bushels* [2]
Prewar boundaries:				
Average 1933–35	2,446	6,093	723	28,460
Postwar boundaries:				
Average 1933–35[3]	2,709	6,694	823	32,400
1947 [4]	1,300	3,200	350	13,800
1948 [4]	1,800	4,400	490	19,300

[1] Includes area for fiber, which also produces seed.
[2] Bushels of 56 pounds.
[3] Area and production for the newly acquired territories are for 1933–37 average.
[4] Rounded estimates, U. S. Office of Foreign Agricultural Relations.

affected the crop adversely. For all these reasons, both acreage and yields of flax per acre, and, consequently, production of fiber and seed, were greatly reduced during the war. In 1946 the acreage under flax was only 45 percent of the estimated prewar (1938) flax acreage for the present territory of the Soviet Union. The acreage goal for 1948, set by the February 1947 decree, referred to previously, was 76 percent of prewar. Under these circumstances, the announcement in the official report on the fulfillment of the state economic plan for 1949 (*Izvestiya*, January 18, 1949) that the flax crop in that year considerably exceeded the 1940 crop is open to doubt, especially since flax was not mentioned specifically in a similar report for 1950 (tables 39 and 40).

Hemp

Before the war the Soviet Union was also a leading producer of another fiber and oilseed crop—hemp. From its seed is obtained

[71] Table 39 *and* SEL'SKOE KHOZYAISTVO SSSR, EZHEGODNIK 1935, p. 422.

an edible oil and also cake for fodder; and from its stalk comes a fiber that is used in the manufacture of rope and of such durable cloth as canvas, bagging, and sailcloth.

Two kinds of hemp are grown in the Soviet Union: The middle-Russian, or northern, hemp accounting in 1938 for two-thirds of the total acreage, and the more recently introduced Italian and Japanese varieties known as southern hemp. The latter has a longer growing period, 100 to 110 days by comparison with 80 to 90 days for northern hemp, but the fiber of the southern hemp is of superior quality.

Hemp, particularly northern hemp, is grown widely in the USSR (tables 22 and 23 and fig. 13). But the principal producing regions are the Central Agricultural Region and North Ukraine, where northern hemp is the type usually grown. In the more southern regions (South Ukraine, North Caucasus, and Central Asia) the southern variety predominates.

Hemp, which is highly responsive to fertilizer, has been grown, as a rule, on abundantly manured plots of land adjacent to the peasants' kitchen gardens and devoted exclusively to the crop. As a result, even after collectivization, northern hemp continued to be grown to a greater extent than many other crops by peasants individually on their kitchen garden plots. In 1938, out of 1 million acres of northern hemp, 232,000 were thus grown, but the individually grown acreage under southern hemp was insignificant.[72]

Before World War I, Russia shared with Italy the leading place as supplier of hemp fiber to the world industry. But during the interwar period Russian hemp fiber exports dwindled to insignificance. No production figures for hemp have been available since 1933, when about 258,000 short tons of northern hemp fiber and about 305,000 tons of seed were produced from an area of 1.7 million acres.[73] By 1938 the area under northern hemp had decreased to 1 million acres; but the area under the higher fiber-yielding southern hemp, which in 1933 was 109,000 acres, had increased to 568,000 acres.[74] A drastic decline of hemp acreage took place during World War II, and by 1946, in the present territory of the USSR, it was little more than one-third of the prewar area. The Government postwar program specified a rapid increase of the hemp acreage, and the goal for 1948 was nearly three-fourths of the prewar area.[75]

Tobacco

Two kinds of tobacco are grown in the Soviet Union: (1) The so-called yellow tobacco, which is predominantly a cigarette leaf of the oriental type, though there are also some cigar kinds, and (2) a low-grade coarse, strong tobacco high in nicotine content, which is called makhorka (*Nicotiana rustica* L.). The latter is used both for smoking and for the extraction of nicotine and has other industrial uses. In 1938, within the prewar boundaries of the USSR, 236,000 acres of

[72] POSEVNYE PLOSHCHADI SSSR V 1938 G., STATISTICHESKII SPRAVOCHNIK, pp. 103–104.

[73] SEL'SKOE KHOZYAISTVO SSSR, EZHEGODNIK 1935, p. 437.

[74] POSEVNYE PLOSHCHADI SSSR (DINAMIKA ZA 1928 . . .), STATISTICHESKII SPRAVOCHNIK, p. 5.

[75] VOLIN, LAZAR. SOVIET CROP AND LIVESTOCK NUMBERS MUCH BELOW PREWAR. U. S. Off. Foreign Agr. Rel. Cir., p. 3. Apr. 14, 1947.

yellow tobacco were planted and nearly 258,000 acres of makhorka.[76] In that year, the yellow tobacco area was more than double that of 1928 and the makhorka area nearly treble.

The best cigarette-tobacco regions are in Crimea and on the Black Sea coast of the Caucasus (Georgia), where high-grade tobacco of the Oriental type is produced and exported in small quantities to the United States. More than one-third of the makhorka acreage is concentrated in northern Ukraine. The total tobacco acreage is estimated to have nearly reached the prewar size in 1948, but the

TABLE 41.—*Tobacco: Area and production, selected years*

Year	Area		Production	
	1,000 hectares	*1,000 acres*	*1,000 metric tons*	*Million pounds*
Prewar boundaries:				
Average 1933–37	197	487	212	467
Postwar boundaries:				
Average 1933–37 [1]	208	514	223	490
1947 [1]	203	502	168	370
1948 [1]	206	509	174	380

[1] Rounded estimates, U. S. Office of Foreign Agricultural Relations and official sources.

yield per acre and, consequently, the production of tobacco appear to be still below prewar (table 41).

Miscellaneous Crops[77]

Numerous other crops, in addition to those discussed above, are grown in the USSR; and the introduction of new crops and varieties has received considerable impetus during the interwar period.

Among the crops that should be mentioned are a number of oil-bearing plants, such as soybeans, castor beans, sesame seed, peanuts, and perilla. These are all relatively new crops in the USSR, and the increase in their acreage during the period before World War II is shown in table 42. An oil-bearing and spice crop that has long been grown in the USSR, particularly in the Middle and Lower Volga region, is mustard seed. The area in this crop increased from 205,000 acres in 1928 to 850,000 acres in 1938, the last year for which detailed statistics are available. A winter (fall sown) oilseed crop is rape, the area in which was 130,000 acres in 1937 and more than 170,000 acres in 1938. A group of medicinal plants and plants yielding essential oils are combined in Soviet statistics; the area under these increased from 262,000 acres in 1935 to 423,000 acres in 1938.

Considerable interest has been shown by the Soviet Government in the introduction of rubber-producing plants. In 1940 an area of 164,000 acres was devoted to such crops. Nearly 153,000 acres were

[76] POSEVNYE PLOSHCHADI SSSR (DINAMIKA ZA 1928 . . .), STATISTICHESKII SPRAVOCHNIK, p. 5.

[77] All acreage figures are from POSEVNYE PLOSHCHADI SSSR (DINAMIKA ZA 1928 . . .), STATISTICHESKII SPRAVOCHNIK.

occupied by kok-saghyz—a domesticated relative of the familiar American dandelion, which grows wild in Soviet Central Asia.[78] It is cultivated in the Ukraine and in a number of central and western regions of the USSR. Interest in the kok-saghyz in the USSR has continued unabated since World War II.

Vegetables were among the few crops in which acreage increased during the war. In 1938 about 3.4 million acres were planted to vegetables in the present territory of the USSR, and by 1946 the acreage had reached about 4.1 million.

The Government has given much attention to introducing silage feeds, a relatively recent development in the agricultural economy of the USSR. Crops such as sunflower seed, corn, sorghum, and legumes are used for silage in various regions. These crops are segregated in Soviet statistics under the general heading "silage crops," without a more detailed breakdown. No acreage under silage crops is reported for 1928, but in 1932 the record showed 4 million acres. A sharp decline to a little more than 1.5 million acres occurred in 1933, and in 1938 there were still only 1.6 million acres under silage crops. The

TABLE 42.—*Area of specified oil-bearing crops, 1928, 1935, and 1938*

Crop	1928		1935		1938	
	1,000 hectares	*1,000 acres*	*1,000 hectares*	*1,000 acres*	*1,000 hectares*	*1,000 acres*
Soybeans	48.5	120	109.4	270	193.8	479
Castor beans	42.4	105	156.3	386	228.6	565
Sesame seed	(1)	(1)	23.1	57	61.3	151
Peanuts	(1)	(1)	4.1	10	22.7	56
Perilla	(1)	(1)	7.9	20	16.8	42

[1] Not available.

POSEVNYE PLOSHCHADI SSSR (DINAMIKA ZA 1928 . . .), STATISTICHESKII SPRAVOCHNIK, p. 5. Moscow and Leningrad. 1939.

area under forage root crops, however, increased consistently, from about 750,000 acres in 1928 to nearly 2 million in 1938.

The importance attributed to grasses (tame hay) in Soviet agriculture has already been stressed in the section dealing with crop rotation. It will be recalled that grasses, under which are included legumes such as clover and alfalfa, are considered an absolutely essential feature of a scientific system of crop rotation because of their soil-improving character. This is the principal reason for the strong emphasis of Soviet agricultural policy on the cultivation of grasses in recent years. Another and equally weighty reason is the need for fodder, especially in the more thickly populated agricultural regions of the USSR, where cropland is increasingly encroaching on natural meadows and pastures.

The acreage under grasses (harvest area of tame hay) increased from about 8.4 million acres in 1928 to 28.7 million in 1938. In addition, grasses were grown with other crops in 1938 on 8.4 million

[78] BRANDES, E. W. RUBBER FROM THE RUSSIAN DANDELION. Agr. in Americas 2: 127–131. 1942.

acres. The area under grasses continued to increase during the years 1939–41, but it received a severe set-back during World War II. Shortage of seed and other factors have hindered the recovery of the grass acreage since the war, despite the stress of the Government program on speedy expansion.

Among the subtropical crops, which have been grown almost entirely in the narrow belt on the Black Sea coast of the Caucasus, must be mentioned especially tea and citrus fruit, particularly tangerines. The acreage under tea increased from about 2,200 acres before World War I to more than 120,000 acres in 1948. Citrus fruit trees covered an area of only 395 acres before World War I, more than 60,000 acres in 1940, and 54,000 acres in 1949.[79] The Government announced an ambitious program in the fall of 1948 for expanding the citrus-fruit industry by growing citrus in trenches in the more northern regions of North Caucasus, Crimea, Southern Ukraine, and Moldavia (former Bessarabia), where citrus fruit was not considered suitable for climatic reasons, as well as in the dry subtropics of Soviet Central Asia. There were encouraging reports on the wintering of citrus fruit in the new regions during the unusually severe winter of 1949–50. "On those farms where the trenches were correctly constructed and sealed in time and the plants were carefully prepared for wintering, lemons and oranges did not suffer at all from frost. In well-protected trenches, even with the most severe frosts, the temperature did not drop below zero. In the majority of farms of the Crimea, the Ukraine, and the Republic of Central Asia, citrus is in good condition. . . ."[80] Still, at the present juncture, the success of this costly program must be considered as problematical.

[79] Sotsialisticheskoe Zemledelie, Nov. 13, 1948.

[80] KAPTSINEL, M. *In* Sotsialisticheskoe Zemledelie, Apr. 9, 1950.

VIII

LIVESTOCK

The livestock industry of the Soviet Union passed through several alternate phases of decline and recovery after World War I (table 43). Between 1916, when the first general Russian census of livestock was taken, and 1922—a period that encompassed World War I and the Revolution—livestock numbers declined. Between 1922 and 1928–29 (the period of the NEP) a recovery took place and in the latter year the numbers of most types of livestock were higher than they had been in 1916. Another decline took place in the early 1930's, during the collectivization campaign, when the peasants, who were joining the collective farms or who were being liquidated as independent farmers, slaughtered their livestock on a huge scale. Poor management in the new collective and state farms, and shortage of feed and housing, contributed to excessive mortality of livestock. Between the summers of 1928 and 1933, cattle decreased in number by a little less than a half, sheep and goats by two-thirds, and hogs by more than a half.

With Government encouragement of individual ownership of livestock by members of collective farms, a recovery again took place in the middle 1930's. But the precollectivization level had not been reached by the summer of 1938, except for hogs, the number of which exceeded that of 1928. Most of the livestock, except horses, was individually owned in 1938.

Little interest was shown in collectivized (communal) livestock not only by the peasant members of the kolkhoz, who seldom obtained dairy and other animal products in payment for their labor, but also by the management.[1] To the management, communal livestock, which required a great deal of care and effort, was a burdensome problem. There was a shortage of shelter space and a considerable amount of labor was required to provide the communal livestock with feed. The great shortage of horses made the carting of coarse feeds difficult. Inadequate supply and poor quality of hay and straw resulted in poor feeding of the communal livestock, especially in spring when feed supplies are often at a low ebb, and the consequent lowering of the production of milk, meat, etc. This in turn made compulsory delivery of animal products difficult. Low-weight young animals were often delivered to meet the obligations of the state, leading to a sort of a vicious circle. In order to meet the required quantity of meat by weight, the kolkhoz delivered many more head of cattle and hogs than was originally provided by the Government plan. As a result, the plans of the growth of communal livestock were not fulfilled year in and year out.[2]

[1] MAKSIMENKO, N. [THE FATE OF ANIMAL HUSBANDRY IN U.S.S.R.] Sotsialisticheskii Vestnik 5:94–96. 1950. The author, a refugee Russian agronomist, writes on the basis of first-hand observation and experience.

[2] Ibid.

Another factor that seriously militated against communal livestock was the low prices paid by the Government for the delivered products. For instance, kolkhozy were receiving 0.05 ruble per litre of milk,[3] while its retail price in Moscow was, in the late 1930's, 1.6 to 2.10 rubles per litre.[4] At the same time, communal livestock required a large amount of labor in terms of kolkhoz workdays with the result that the payment per workday was bound to decrease. Thus, the kolkhozy had no incentive to develop communal livestock and shied away from it.

The situation changed when in 1939 the Government again swerved toward a more collectivist policy on livestock. By a decree of July 8,

TABLE 43.—*Number of livestock, 1916 and 1921–38*

[In millions]

Year [1]	Cows	Cattle (including cows)	Sheep and goats	Hogs	Horses
1916	26.0	60.6	121.2	20.9	35.8
1921	27.2	50.8	110.9	19.4	29.6
1922	24.8	45.8	91.1	12.1	24.1
1923	26.1	52.9	95.3	12.9	24.6
1924	27.1	59.0	109.0	22.2	25.7
1925	28.6	62.1	122.9	21.8	27.1
1926	29.7	65.5	132.5	21.6	29.2
1927	29.9	68.0	139.7	23.2	31.6
1928	30.7	70.5	146.7	26.0	33.5
1929	30.4	67.1	147.0	20.4	34.6
1930	26.7	52.5	108.8	13.6	30.2
1931	24.4	47.9	77.7	14.4	26.2
1932	21.0	40.7	52.1	11.6	19.6
1933	19.6	38.4	50.2	12.1	16.6
1934	19.5	42.4	51.9	17.4	15.7
1935	20.1	49.2	61.1	22.5	15.9
1936	22.1	56.7	73.7	30.5	16.6
1937	23.3	57.0	81.3	22.8	16.7
1938	25.2	63.2	102.5	30.6	17.5

[1] Summer count, June–July. Boundaries for years indicated.

ZHIVOTNOVODSTVO SSSR ZA 1916–38 GG., STATISTICHESKII SBORNIK, p. 4. Moscow. 1940.

1939,[5] each kolkhoz was required to have a specified minimum number of communal (collectivized) cattle and hogs or sheep, depending on the total acreage of the collective farm. This specified minimum varied from region to region. According to the customary Soviet practice in such cases the country was divided into several zones. For example, in the Ukraine a kolkhoz with an area up to 500 acres was to have no fewer than 10 cows and 6 sows if communal hog raising were adopted; a kolkhoz with more than 500 acres but less than 1,250 acres, no fewer

[3] Ibid.

[4] 1 litre of milk is equal to 2.3 pounds.

[5] [MEASURES FOR THE DEVELOPMENT OF COMMUNAL LIVESTOCK IN THE KOLKHOZY.] *In* VAZHNEISHIE RESHENIYA PO SEL'SKOMU KHOZYAISTVU ZA 1938–1940 GODY, pp. 346–362.

than 20 cows and 10 sows. In Moscow Province, however, which is in a different zone, all kolkhozy with more than 375 acres must have no fewer than 8 cows, and so forth. The kolkhozy were expected to acquire at least 60 percent of the specified minimum by the end of 1940 and all of it not later than the end of 1942.

In order better to enforce these requirements the Government, beginning in 1940, changed the basis on which compulsory deliveries of meat, milk, and other animal products were levied. Instead of being required to deliver specified quantities per head of collective livestock, the kolkhozy were obliged to deliver specified quantities per unit of kolkhoz land. This radical change in taxation practically compelled the kolkhozy to increase their communal livestock as rapidly as possible.

Collectivized livestock numbers, of course, increased, but the increase was offset by a slump in the number of individually owned livestock; as a consequence there were fewer cattle and hogs in 1941

TABLE 44.—*Number of livestock, Jan. 1, 1938 and 1941*

Kind	1938 [1]	1941 [2]	Percentage 1941 is of 1938
	Million head	*Million head*	*Percent*
Horses	16.2	17.6	108.6
Cows	22.7	22.8	100.4
All cattle including cows	50.9	47.4	93.1
Sheep and goats	66.6	85.5	128.4
Hogs	25.7	22.3	86.8

[1] Numbers for 1938 are smaller than those given in table 43 because they are taken in the winter, when livestock numbers are at a minimum.

[2] Boundaries of 1938 assumed.

NEMCHINOV, V. S. SEL'SKOKHOZYAISTVENNAYA STATISTIKA, p. 133. Moscow. 1945.

than in 1938 (table 44). Since the number of cows was practically the same in 1941 as in 1938, the incidence of the decline was borne entirely by young cattle and hogs, which the peasants probably became less inclined to raise, knowing that the animals would eventually find their way into the collective herds.

World War II, and particularly the destructive German occupation of a large Russian territory, brought another sharp decline in livestock, especially in communal herds. At the beginning of 1946 the number of cattle was one-fifth below the 1938 figure; the number of horses was a little more than one-half of what it had been in 1938; and that of hogs, only one-third (table 45). The hog population, which is concentrated in the western part of the country, bore the brunt of war devastation.

The recovery of livestock numbers was retarded by the drought in 1946, but even in the course of the next 4 years the goals that were set up were not reached. During the postwar period, the Soviet Government has again been increasingly stressing the development

of collectivized livestock farming, particularly in the decree "on the 3-year plan on the development of the kolkhoz communal and state farm livestock industry (1949–51)."[6] The decree prescribed a considerable increase in the minimum number of communal livestock in kolkhozy. The delivery quotas of animal products of those collective farms that met the new high minimum requirements were to be reduced 10 percent, while, by the same token, an increase of 10 percent was decreed for kolkhozy that failed to meet the new requirements.

Although it was stated in the decree that the collectivized herds were rapidly increasing and that the numbers of cattle, sheep, and goats exceeded even those of 1940, nevertheless it severely criticized

TABLE 45.—*Number of livestock,*[1] *as of January 1, selected years*

Type	1938 estimate	1946	1947	1949		1951		Percentage 1951 reported is of—	
				Estimate	Goal	Reported	Goal	1938	1951 goal
	Millions	*Millions*	*Millions*	*Millions*	*Millions*	*Millions*	*Millions*	*Percent*	*Percent*
Cattle	59.8[2]	46.9	46.8	54.0	56.1	57.2	65.3	95.7	87.6
Sheep and goats	75.0[2]	69.4	69.1	87.0	97.8	99.0	121.5	132.0	81.5
Hogs	32.3	10.4	8.6	15.0	20.3	24.1	31.2	74.6	77.2
Horses	19.9	10.5	10.8	(3)	12.9	13.7	15.3	68.8	89.5

[1] Present (postwar) boundaries.

[2] The numbers of cattle and sheep and goats are smaller than those given in table 43 because they are taken in the winter, when livestock numbers are at a minimum.

[3] Not available.

U. S. Office of Foreign Agricultural Relations and official sources.

the kolkhozy for the unsatisfactory state of the collective livestock farming.

> In many kolkhozy, as a result of poor feeding and care of the collective herds, there are occurring every year large losses of livestock due to mortality and barrenness, and the productivity [yields of animal products] of livestock is low. The fattening of the animals in the kolkhozy is unsatisfactory, and many poorly fed, low-weight animals are slaughtered. The kolkhozy in delivering a fixed quantity of meat to the state, in accordance with their compulsory obligations are compelled to slaughter an excessive number of animals, and thus preclude a more rapid expansion of livestock numbers.

These criticisms have a familiar ring. They have occurred over and over again in the Soviet press and speeches of Soviet officials and may be considered a fair summary of the weaknesses of collectivized livestock farming.

[6] Sotsialisticheskoe Zemledelie, Apr. 19, 1949.

As had many previous Soviet pronouncements, the decree stressed the difficult feed-supply problem.

> The rapid increase in numbers and the raising of the productivity of livestock are chiefly impeded at the present time by the unsatisfactory state of the forage supply. Many collective and state farms do not fulfill the annual sowing goals for clover, alfalfa, timothy, fodder beets and other forage crops, as well as hay cutting and silage goals. Proper attention is not given to the improvement of meadows and pastures, and hay cutting is greatly delayed, which reduces the feeding quality of the hay. Natural pastures are not effectively utilized, especially in the eastern regions of the country.

The decree then proceeded to criticize the poor farming practices that result in low yields of forage crops and states that many collective farms do not provide adequate grain for collective livestock. Accordingly, it sets forth various measures for improving the feed situation.

TABLE 46.—*Number of horses, by regions, in specified years, 1928 to 1938*

[In thousands]

Region	1928, summer	1933, summer	1935		1936		1938, winter
			Winter	Summer	Winter	Summer	
North	629.1	476.3	461.6	488.2	479.9	485.3	460.1
Northwest	2,077.0	1,376.0	1,240.3	1,282.0	1,251.9	1,266.6	1,135.4
White Russia (Belorussia)	1,079.4	783.0	679.8	706.5	685.9	707.3	632.9
Central Industrial	2,204.5	1,447.0	1,360.4	1,453.1	1,390.7	1,476.6	1,312.8
Central Agricultural	2,853.6	1,664.9	1,381.7	1,514.7	1,473.1	1,647.3	1,451.4
Upper Volga	1,496.8	1,054.0	983.7	1,031.6	1,007.0	1,080.4	940.2
Middle and Lower Volga	1,513.1	652.1	508.7	547.9	539.6	609.9	603.4
North Ukraine	3,320.9	1,754.4	1,522.7	1,619.9	1,597.5	1,795.5	1,872.6
South Ukraine and Crimea	2,315.9	930.7	969.5	1,005.7	983.9	1,074.3	1,146.2
North Caucasus	1,797.4	856.1	798.5	870.0	850.7	933.0	1,000.5
Transcaucasia	324.4	385.4	366.5	388.9	392.1	401.0	421.2
Ural	2,997.9	1,342.5	1,166.3	1,267.1	1,255.0	1,375.4	1,296.6
West Siberia	3,530.1	1,340.8	1,272.6	1,303.0	1,246.9	1,270.4	1,289.1
East Siberia	1,919.0	1,007.8	922.9	969.1	948.0	967.5	986.8
Far East	339.4	122.3	124.5	148.9	147.0	153.6	123.7
Kazakh	3,735.2	458.7	422.5	465.8	472.7	543.8	638.7
Central Asia	1,403.1	922.9	749.8	820.1	792.4	860.8	909.3
Total USSR	33,536.8	16,574.9	14,932.0	15,882.5	15,514.3	16,648.7	16,220.9

U. S. Office of Foreign Agricultural Relations and official sources.

A decree published on March 24, 1950, reviewing the first year of implementation of the "3-year livestock plan," indicated that an improvement had occurred in the feed situation but again complained that it was "insufficient." The decree stated that "forage production still does not keep pace with the growing needs of collectivized livestock, the unsatisfactory condition of the forage base [supply] in the kolkhozy still is a principal obstacle to the further growth of livestock numbers and their increased productivity." The decree thus stresses the fact that growing collectivization of livestock has increased the seriousness of the forage problem, which has always been a weak link in collective farming.

Large increases in numbers of collective livestock have been frequently reported since the war. Great caution, however, must be exercised in correctly interpreting such reports, especially when they are not accompanied by figures of the total number of livestock.

Increases in collectivized herds on the large scale often reported usually take place primarily at the expense of individually owned livestock, especially in the newly acquired regions, where agricultural collectivization has been taking place since the end of World War II. The kolkhozy may obtain livestock in new regions of collectivization from new members or by transfer from the liquidated individual peasant farmers. Much of the young stock is acquired through voluntary or involuntary purchase from individual owners. In any event, the total number of livestock in the USSR is likely to be lower when a large increase in collectivized herds is reported, and the official figures released at the beginning of 1951 confirm this (table 44).

As could be expected in a country as large as the Soviet Union, there is a considerable regional variation in the distribution of livestock (tables 46, 47, 48, 49, 50, 51). It should be noted that the regional

TABLE 47.—*Number of cattle,*[1] *by regions, in specified years, 1928 to 1938*

[In thousands]

Region	1928, summer	1933, summer	1935		1936		1938, winter
			Winter	Summer	Winter	Summer	
North	1,814.4	1,293.7	1,299.4	1,701.3	1,461.9	1,723.3	1,221.4
Northwest	3,908.4	2,975.1	2,496.5	3,416.7	2,925.6	3,734.2	2,765.9
White Russia (Belorussia)	2,218.2	1,565.5	1,491.9	2,007.2	1,845.3	2,358.6	1,905.3
Central Industrial	4,159.2	3,193.4	3,058.7	4,238.5	3,419.0	4,505.3	3,144.8
Central Agricultural	5,191.9	2,899.4	2,802.5	3,798.2	3,449.0	4,544.2	3,480.9
Upper Volga	2,574.3	1,966.4	1,775.8	2,428.9	2,101.6	2,810.4	1,968.9
Middle and Lower Volga	4,375.4	1,904.2	1,950.0	2,471.5	2,392.5	3,014.0	2,824.1
North Ukraine	5,452.9	2,787.0	2,940.6	3,717.7	3,676.6	4,597.9	4,647.8
South Ukraine and Crimea	3,382.9	1,803.2	2,208.6	2,786.6	2,677.5	3,351.8	3,377.0
North Caucasus	5,944.4	2,912.5	3,120.7	3,813.3	3,674.0	4,357.4	4,278.1
Transcaucasia	3,882.9	3,162.7	3,344.9	3,703.0	3,740.4	4,070.4	4,001.8
Ural	5,689.1	3,023.4	3,055.7	3,961.8	3,797.6	4,796.1	4,217.0
West Siberia	6,239.5	3,037.9	3,495.9	4,196.9	4,044.5	4,748.0	4,569.6
East Siberia	3,901.8	2,011.7	1,992.2	2,399.4	2,228.6	2,599.3	2,479.3
Far East	533.7	203.0	272.9	338.5	339.7	398.0	313.3
Kazakh	7,378.6	1,593.5	1,835.3	2,272.2	2,257.5	2,807.8	3,095.4
Central Asia	3,893.4	2,047.6	1,727.7	1,992.3	1,929.2	2,274.3	2,630.3
Total USSR	70,541.0	38,380.2	38,869.3	49,244.0	45,960.5	56,691.0	50,920.9

[1] Including cows.

U. S. Office of Foreign Agricultural Relations and official sources.

statistical data reflect the variation in the decline and recovery of livestock numbers during the 1930's. In some regions, livestock numbers declined more than in others during forced collectivization, and recovery was only partial by 1938. A glaring illustration of this failure to recover was in the important livestock region of the Kazakhstan, with its extensive grazing lands and pastoral population. By the summer of 1933 this region had only 12 percent of the horses, 22 percent of the cattle, and 10.5 percent of the sheep and goats that it had in 1928; and by 1938, livestock numbers still remained relatively small.

In general, sheep are concentrated in the North Caucasus, Transcaucasia, Middle and Lower Volga, and in the adjoining Asiatic regions of the Soviet Union. Hogs are concentrated heavily in the Ukraine, especially the northern part, and in the adjoining regions of Central Russia, White Russia, and North Caucasus. The cattle population is more evenly distributed. In the number of livestock relative to the

acreage, the northern regions of European Russia (North, Northwest, White Russia), Transcaucasia, and East Siberia stand out. Among the acquired territories, the Baltic republics lead in the number of

TABLE 48.—*Number of cows, by regions, in specified years, 1928 to 1938*

[In thousands]

Region	1928, summer	1933, summer	1935		1936		1938 winter
			Winter	Summer	Winter	Summer	
North	1,026.3	759.8	729.9	783.0	744.8	793.6	661.4
Northwest	2,376.2	1,784.2	1,611.7	1,657.5	1,584.3	1,700.1	1,631.2
White Russia (Belorussia)	1,366.0	1,041.2	915.8	950.6	935.9	995.9	1,027.2
Central Industrial	2,432.2	2,067.1	1,920.1	2,016.6	1,876.5	2,128.5	1,903.2
Central Agricultural	2,499.1	1,649.9	1,538.6	1,621.6	1,598.6	1,818.3	1,804.0
Upper Volga	1,503.2	1,162.8	1,056.6	1,092.7	1,064.0	1,173.0	1,101.9
Middle and Lower Volga	1,606.8	879.1	845.9	901.9	914.3	1,062.4	1,096.9
North Ukraine	2,568.5	1,548.2	1,496.1	1,590.5	1,604.8	1,813.8	2,110.4
South Ukraine and Crimea	1,518.3	936.0	1,035.0	1,152.0	1,143.8	1,304.2	1,460.3
North Caucasus	1,932.9	1,172.6	1,187.8	1,293.7	1,299.7	1,436.9	1,541.5
Transcaucasia	1,174.8	1,077.4	1,107.6	1,132.5	1,167.3	1,212.5	1,266.7
Ural	2,548.9	1,626.5	1,621.0	1,704.6	1,719.8	1,935.2	1,972.4
West Siberia	2,923.3	1,519.7	1,633.8	1,758.3	1,775.9	1,940.0	1,951.3
East Siberia	1,569.7	877.2	867.9	940.1	928.4	1,002.0	1,031.6
Far East	201.1	109.5	136.7	144.4	153.2	161.9	149.6
Kazakh	2,354.2	618.3	700.3	761.2	796.9	941.3	1,085.2
Central Asia	1,139.9	721.2	626.5	639.1	643.1	708.3	890.3
Total USSR	30,741.4	19,550.7	19,031.3	20,140.3	19,951.3	22,127.9	22,685.1

U. S. Office of Foreign Agricultural Relations and official sources.

TABLE 49.—*Number of sheep, by regions, 1935, 1936, and 1938*

[In thousands]

Region	1935		1936		1938, winter
	Winter	Summer	Winter	Summer	
North	998.1	1,192.3	942.2	969.1	779.6
Northwest	2,595.6	4,076.0	2,784.9	4,213.0	3,063.6
White Russia (Belorussia)	741.2	1,161.3	830.9	1,270.8	1,055.9
Central Industrial	3,152.0	4,993.4	3,313.4	5,220.3	3,921.3
Central Agricultural	2,067.0	3,318.9	2,651.0	4,481.4	3,617.9
Upper Volga	2,261.8	3,592.4	2,463.6	4,122.0	2,798.9
Middle and Lower Volga	2,046.5	3,339.7	2,758.4	4,443.5	4,259.9
North Ukraine	553.0	809.0	699.4	1,034.2	1,033.9
South Ukraine and Crimea	1,450.0	2,232.4	1,854.1	2,774.2	2,611.9
North Caucasus	4,002.9	5,829.8	4,895.7	7,037.2	6,585.2
Transcaucasia	2,956.7	3,846.1	3,497.1	4,474.7	4,274.2
Ural	2,552.8	3,959.4	3,516.1	5,205.5	4,794.2
West Siberia	3,006.8	4,480.9	3,661.8	5,326.8	5,118.7
East Siberia	1,801.2	2,524.9	2,104.2	2,764.0	2,566.1
Far East	45.8	60.9	58.6	73.3	58.4
Kazakh	2,382.7	3,705.7	3,140.7	4,634.1	4,551.4
Central Asia	3,749.1	5,117.3	4,608.3	6,265.6	6,205.2
Total USSR	36,363.2	54,240.4	43,780.4	64,309.7	57,296.3

U. S. Office of Foreign Agricultural Relations and official sources.

sheep and the Polish territories in the number of cattle and hogs (table 52 and figs. 14, 15, 16).

Commercial production of meat animals, except hogs, was concentrated, prior to collectivization, in North Caucasus, Kazakhstan,

and the Lower Volga area. The Ukraine held first place in the commercial production of hogs and hog products. However, the importance of the first three regions named in commercial meat production and trade has drastically declined since collectivization, as indicated

TABLE 50.—*Number of goats, by regions, 1935, 1936, and 1938*

[In thousands]

Region	1935		1936		1938, winter
	Winter	Summer	Winter	Summer	
North	27.4	40.0	35.9	50.0	67.0
Northwest	48.4	71.9	61.7	82.4	91.2
White Russia (Belorussia)	11.3	15.0	14.7	20.5	21.4
Central Industrial	196.9	329.7	257.9	443.6	403.0
Central Agricultural	174.3	323.8	253.8	493.7	423.1
Upper Volga	211.9	338.6	286.7	499.2	362.6
Middle and Lower Volga	215.0	404.9	343.8	607.1	540.0
North Ukraine	117.0	212.6	174.9	315.3	235.6
South Ukraine and Crimea	89.5	157.0	136.9	235.8	240.8
North Caucasus	452.9	678.4	554.9	849.8	804.1
Transcaucasia	737.4	1,021.6	974.0	1,347.3	1,316.7
Ural	237.7	413.3	405.7	608.7	586.6
West Siberia	38.6	57.5	50.6	64.5	63.1
East Siberia	170.4	224.1	214.9	263.4	270.9
Far East	4.3	5.3	6.2	7.2	8.9
Kazakh	235.4	387.3	385.5	587.8	736.4
Central Asia	1,439.4	2,142.2	1,958.6	2,870.7	3,126.9
Total USSR	4,407.8	6,823.2	6,116.7	9,347.0	9,298.3

U. S. Office of Foreign Agricultural Relations. Compiled from ZHIVOTNOVODSTVO SSSR ZA 1916–1938 GG. Moscow. 1940.

TABLE 51.—*Number of hogs, by regions, in specified years, 1928 to 1938*

[In thousands]

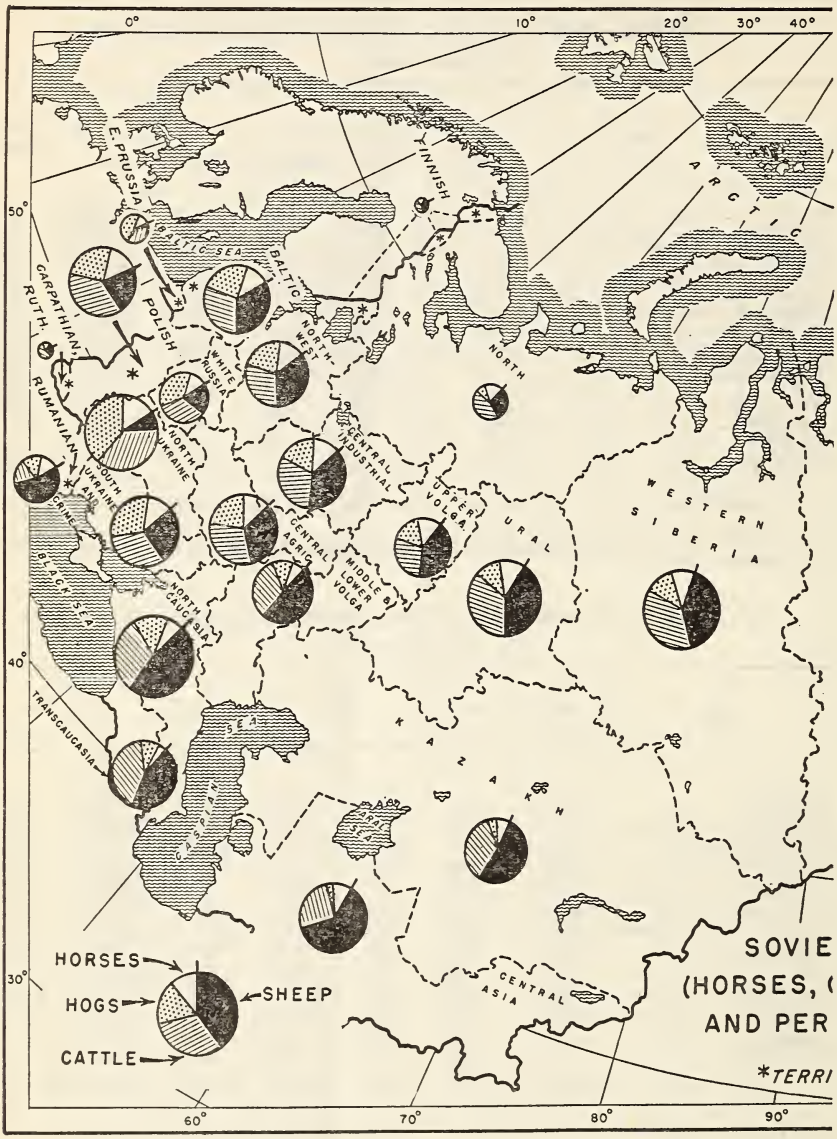
Region	1928, summer	1933, summer	1935		1936		1938, winter
			Winter	Summer	Winter	Summer	
North	214.1	164.7	229.1	254.9	270.5	278.6	220.3
Northwest	1,668.1	1,099.9	1,085.2	1,306.2	1,860.3	2,156.0	1,885.0
White Russia (Belorussia)	2,399.3	1,548.5	1,480.4	1,655.4	1,989.9	2,202.4	1,951.0
Central Industrial	1,529.4	1,143.9	1,665.1	2,143.6	2,294.0	2,585.6	1,863.2
Central Agricultural	3,011.5	1,314.7	1,625.9	2,178.7	2,841.2	3,374.8	2,471.8
Upper Volga	1,016.9	649.4	818.1	1,022.7	1,202.1	1,594.9	1,079.5
Middle and Lower Volga	1,156.4	511.6	670.1	1,085.5	1,163.2	1,496.5	965.7
North Ukraine	5,116.5	1,351.3	2,414.0	2,981.0	3,908.4	4,679.9	4,845.8
South Ukraine and Crimea	1,899.5	814.0	1,500.3	1,893.6	2,235.3	2,567.3	3,023.3
North Caucasus	1,412.2	577.7	1,409.3	1,896.1	1,855.5	2,178.5	1,989.0
Transcaucasia	596.9	377.3	653.6	907.2	991.5	1,116.0	886.8
Ural	1,258.0	671.4	878.3	1,342.1	1,649.1	2,064.3	1,356.2
West Siberia	2,422.8	951.3	1,241.7	1,718.1	1,562.3	1,844.8	1,538.9
East Siberia	1,454.2	541.8	673.8	975.1	755.6	892.3	782.8
Far East	494.1	135.9	327.3	463.7	407.3	451.8	277.7
Kazakh	304.4	138.6	276.3	448.6	557.7	632.4	367.9
Central Asia	34.7	75.6	167.7	287.6	360.2	340.9	211.0
Total USSR	25,989.0	12,067.6	17,116.2	22,560.1	25,904.1	30,457.0	25,715.9

U. S. Office of Foreign Agricultural Relations. Compiled from ZHIVOTNOVODSTVO SSSR ZA 1916–1938 GG. Moscow. 1940.

by figures of railroad shipments.[7] At the same time, the share of the central and western regions greatly increased. The principal markets for the shipped meat animals and meat products are the Moscow and

[7] NIFONTOV, V. P. PRODUKTSIYA ZHIVOTNOVODSTVA SSSR, p. 92. Moscow. 1937.

Leningrad Provinces, accounting, in 1935, for the net receipts of 74 percent of all meat animals shipped, and for 65 percent of all meats. (For data on meat production see table 53. It should be noted that



lard and other animal fats are not given separately in Russian statistics, but are included with meats. For estimates of animal fat production see table 58.)

Dairying has long been an essential component of farming in northern

and north-central European Russia. It has been favored in these regions by such factors as the abundance of natural meadows and grazing land, by the need of manure for crop production on the pod-

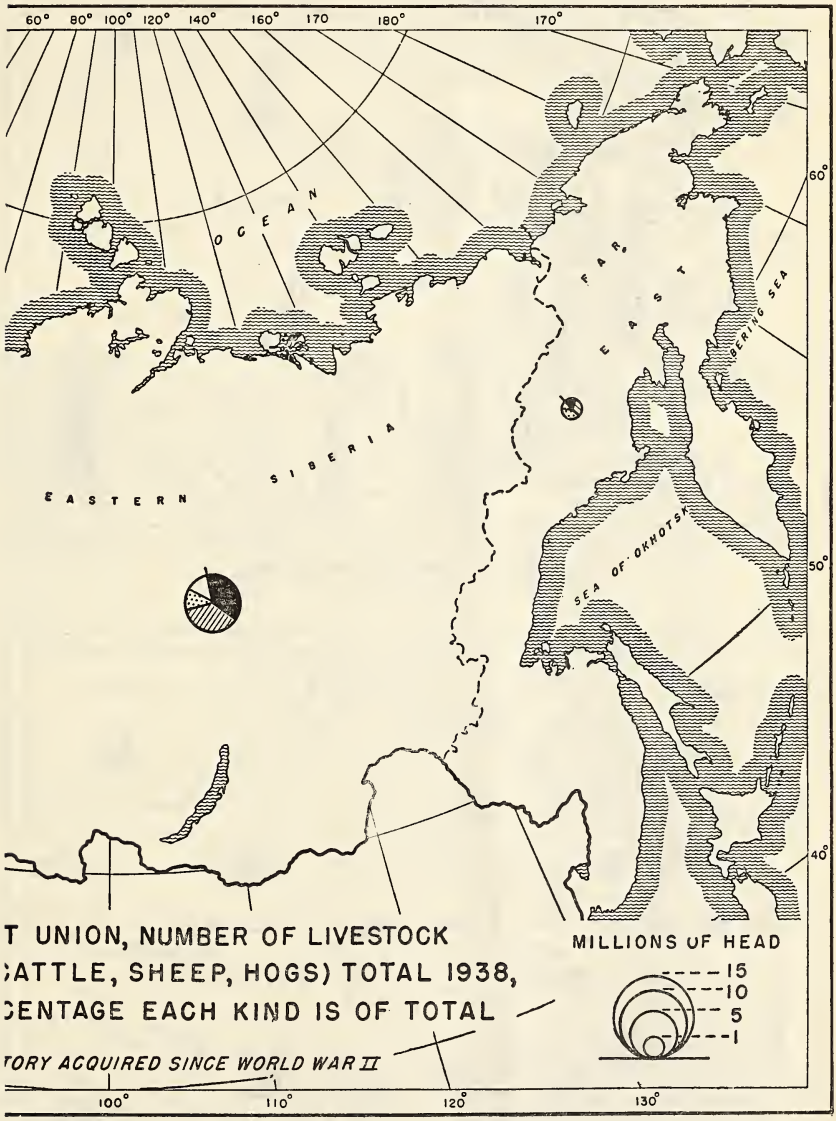


FIGURE 14.—Livestock population of the Soviet Union, by region, 1938.

zolic soils, and by the proximity of the large markets of Moscow, Leningrad, and other industrial centers. Here were developed the best known types of Russian dairy cattle: in the north, the Kholmogorskii cattle, a cross of native and imported breeds, and in the north-

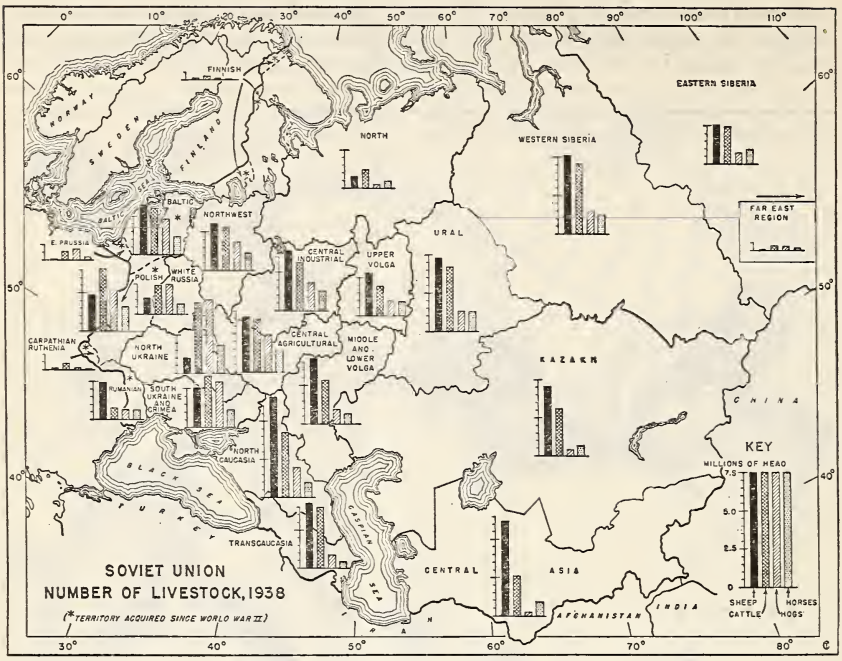


FIGURE 15.—Livestock totals, 1938.

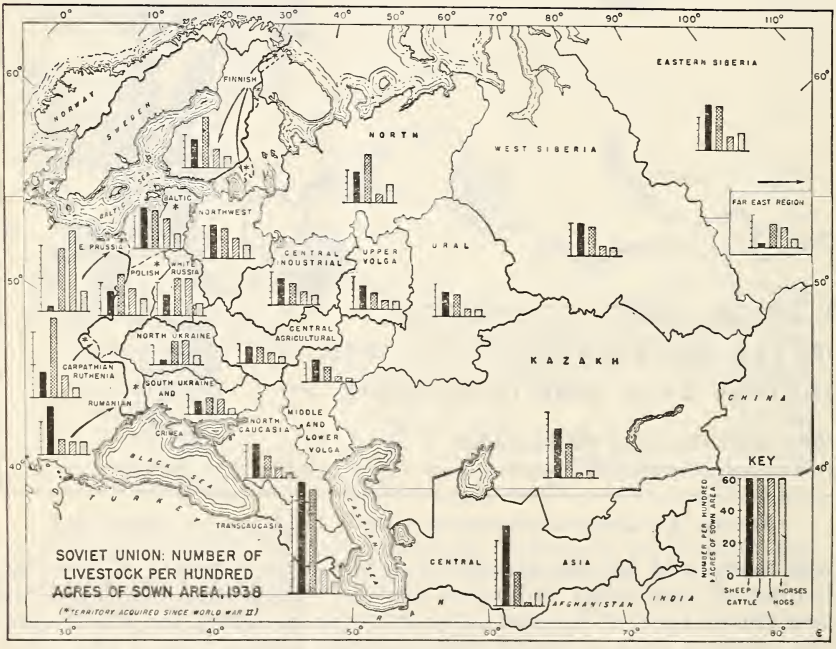


FIGURE 16.—Number of livestock per hundred acres of sown area, 1938.

central area, the Yaroslavskii cattle, an improved native breed, and, more recently, the Kostromskoi type, also a cross of foreign and native breeds.[8] Among the foreign types of dairy cattle in the Soviet Union before World War II, there must be mentioned the Simmental cattle, of which there were recorded on January 1, 1935, 643,000 head, including 30,600 purebred cattle; the Swiss Brown (213,700 head, including 9,200 purebred cattle); and the Holstein Friesian (69,900 head, including 6,900 purebred).[9]

TABLE 52.—*Number of livestock, by regions, total and per 100 acres of sown area, 1938*

Region	Horses		Cattle		Sheep		Hogs	
	Total	Per 100 acres	Total	Per 100 acres	Total	Per 100 acres	Total	Per 100 acres
	1,000 head	*Number*	*1,000 head*	*Number*	*1,000 head*	*Number*	*1,000 head*	*Number*
Soviet Union proper:								
North	460.1	11.4	1,221.4	30.2	779.6	19.3	220.3	5.4
Northwest	1,135.4	7.7	2,765.9	18.8	3,063.6	20.9	1,885.0	12.8
White Russia (Belorussia)	632.9	7.7	1,905.3	23.1	1,055.9	12.8	1,951.0	23.7
Central Industrial	1,312.8	5.5	3,144.8	13.1	3,921.3	16.3	1,863.2	7.7
Central Agricultural	1,451.4	4.0	3,480.9	9.6	3,617.9	9.9	2,471.8	6.8
Upper Volga	940.2	4.8	1,968.9	10.0	2,798.9	14.2	1,079.5	5.5
Middle and Lower Volga	603.4	1.9	2,824.1	9.0	4,259.9	13.6	965.7	3.1
North Ukraine	1,872.6	5.7	4,647.8	14.2	1,033.9	3.2	4,845.8	14.9
South Ukraine and Crimea	1,146.2	3.5	3,377.0	10.2	2,611.9	7.9	3,023.3	9.1
North Caucasus	1,000.5	3.2	4,278.1	13.6	6,585.2	21.0	1,989.0	6.3
Transcaucasia	421.2	6.8	4,001.8	64.4	4,274.2	68.8	886.8	14.3
Ural	1,296.6	4.0	4,217.0	13.1	4,794.2	14.9	1,356.2	4.2
West Siberia	1,289.1	5.1	4,569.6	17.9	5,118.7	20.1	1,538.9	6.0
East Siberia	986.8	10.8	2,479.3	27.2	2,566.1	28.2	782.8	8.6
Far East	123.7	5.6	313.3	14.1	58.4	2.6	277.7	12.5
Kazakh	638.7	4.2	3,095.4	20.5	4,551.4	30.2	367.9	2.4
Central Asia	909.3	7.3	2,630.3	21.0	6,205.2	49.6	211.0	1.7
Total	16,220.9	4.8	50,920.9	15.0	57,296.3	16.9	25,715.9	7.6
Acquired territories:								
Finnish	43.0	6.9	195.0	31.2	108.0	17.3	68.0	10.9
Baltic [1]	1,168.7	9.1	3,049.4	23.7	3,251.4	25.3	2,384.7	18.6
Kaliningrad [2]	174.0	12.2	554.0	38.9	39.0	2.7	712.0	50.0
Polish [1]	1,629.7	10.1	4,098.3	25.5	2,371.6	14.7	2,696.4	16.7
Rumanian [3]	602.8	7.6	734.3	9.2	2,400.3	30.1	610.7	7.7
Carpathian Ruthenia [4]	41.3	5.9	344.0	49.3	110.0	15.8	93.0	13.3
Total	3,659.5	9.2	8,975.0	22.6	8,280.3	20.9	6,564.8	16.6
Grand total	19,880.4	5.3	59,895.9	15.8	65,576.6	17.3	32,280.7	8.5

[1] Data are for June 1938.
[2] Former East Prussian territory. Data are for December 1936.
[3] Data are for summer 1935.
[4] Former Czechoslovakian territory. Data are for 1937.
U. S. Office of Foreign Agricultural Relations and official sources of countries concerned.

Most of the cattle in the Soviet Union, however, represent a mixture of breeds and are multipurpose rather than specialized for milk or meat production. Moreover, cows have been widely used as draft animals, especially since the war. The average milk yield is low compared with most European countries and the United States and Canada. In the late 1920's, it averaged about 2,200 pounds per cow but de-

[8] LISKUN, E. F., ed. KOLKHOZNOE ZHIVOTNOVODSTVO: RUKOVODSTVO DLYA PREDSEDATELEI KOLKHOZOV, pp. 192–193. Moscow. 1948.
[9] ITOGI VSESOYUZNOI PEREPISI SKOTA NA 1 YANVARYA, 1935 G., v. 2, issue 2, pp. VII–XI. Moscow. 1936.

creased in the early 30's. Since 1934, however, yields have been increasing. In 1935, for instance, the average yield exceeded 2,300 pounds of milk per cow.[10] However, another decline apparently took place during the war. In 1945, the average yield per cow was reported at 2,083 pounds.[11] (For data on milk production see table 54.)

A significant development in the Russian dairy industry has been the growth since the turn of the century of creamery butter production in western Siberia and the adjacent regions of the Ural and Kazakhstan. Butter is produced both for the internal market and for export. The construction of the Trans-Siberian Railroad, the introduction of the separator, foreign capital investment, and the growth of the co-

TABLE 53.—*Meat and wool production in the Soviet Union, 1928–38*

Year	Meats, carcass weight, including lard and other fats								Wool and hair (camel, sheep, and goat)	
	Beef and veal		Mutton, lamb, and goat		Pork		Total			
	1,000 Metric tons	*Million pounds*	*1,000 Metric tons*	*Million pounds*	*1,000 Metric tons*	*Million pounds*	*1,000 Metric tons*	*Million pounds*	*1,000 Metric tons*	*Million pounds*
1928	1,779	3,922	766	1,689	1,396	3,077	3,941	8,688	178	392
1929	2,287	5,042	963	2,123	1,303	2,873	4,553	10,038	179	395
1930	1,658	3,655	874	1,927	683	1,506	3,215	7,088	139	306
1931	(1)	(1)	(1)	(1)	(1)	(1)	[2] 2,580	[2] 5,688	98	216
1932	1,083	2,387	420	926	635	1,400	2,138	4,713	66	146
1933	(1)	(1)	(1)	(1)	(1)	(1)	[3] 1,450	[3] 3,197	62	137
1934	(1)	(1)	(1)	(1)	(1)	(1)	1,509	3,327	65	143
1935	657	1,449	266	586	846	1,865	1,769	3,900	79	174
1936	835	1,841	340	750	1,325	2,921	[4] 2,500	[4] 5,512	[4] 96	[4] 212
1937	1,020	2,249	350	772	1,000	2,204	2,370	5,226	106.3	234.3
1938	1,295	2,855	444	979	1,564	3,448	3,303	7,282	133	293

U. S. Office of Foreign Agricultural Relations.

[1] Not available.
[2] 1931–32 year.
[3] 1933–34 year.
[4] Preliminary.

Sources: Meats — 1928–30: NIFONTOV, V. P. ZHIVOTNOVODSTVO SSSR V TSIFRAKH, p. 155. Moscow and Leningrad. 1932.
1931, 1933, and 1935–36: NIFONTOV, V. P. PRODUKTSIYA ZHIVOTNOVODSTVA SSSR, pp. 69, 70. Moscow. 1937.
1932 and 1938: SOTSIALISTICHESKOE SEL'SKOE KHOZYAISTVO SSSR, pp. 75 and 76. Moscow and Leningrad. 1939.
1937: GOSUDARSTVENNAYA PLANOVOYA KOMISSIYA PRI SOVNARKOME SOYUZA SSR. TRETII PYATILETNII PLAN RAZVITIYA NARODNOGO KHOZYAISTVA SOYUZA SSR (1938–1942), p. 82. Moscow. 1939.
Wool — 1928–36: NIFONTOV, V. P. PRODUKTSIYA ZHIVOTNOVODSTVA SSSR, p. 76. Moscow. 1937.
1938: SOTSIALISTICHESKOE SEL'SKOE KHOZYAISTVO SSSR, p. 73. Moscow and Leningrad. 1939.
1937: See source for meats.

operative movement, all played a part in the initial stages of this development.

After a set-back during the Revolution, the Siberian industry recovered in the 1920's, only to decline in the 1930's. Railway shipments of butter from Siberia and Urals decreased from 99 million pounds in 1928 to 85.6 million in 1935. Shipments from Kazakhstan dropped slightly, while those from the northern, western, and central regions of European Russia increased considerably. As in the case of meat, the Moscow and Leningrad Provinces constituted the princi-

[10] NIFONTOV. PRODUKTSIYA . . . , p. 52.
[11] Sotsialisticheskoe Zemledelie, Jan. 17, 1948.

pal markets for the butter shipped by the producing regions—68.8 percent of the total net receipts in 1935 and 56.3 percent in 1928.[12]

The small livestock numbers, in contrast to the marked increase in human population, the low productivity of livestock, and the resulting small output of animal products, have had a detrimental effect on the standard of living of the people of the Soviet Union, especially on their diet and clothing. The situation was particularly stringent during the collectivization period of the early 30's. Meat production in 1932

TABLE 54.—*Production of milk, creamery butter, and cheese in the factories, Soviet Union, specified years*

Year	Milk[1]		Creamery butter		Cheese in factories	
	1,000 metric tons	*Million pounds*	*1,000 metric tons*	*Million pounds*	*1,000 metric tons*	*Million pounds*
1928	30,489	67,216	82.1	181.0	(2)	(2)
1929	29,335	64,672	77.8	171.5	(2)	(2)
1930	26,572	58,581	41.0	90.4	7.1	15.7
1931	[3] 21,635	[3] 47,697	82.8	182.5	14.5	32.0
1932	20,558	45,322	71.6	157.8	14.3	31.5
1933	[3] 19,200	[3] 42,328	124.4	274.3	15.6	34.4
1934	19,711	43,455	138.0	304.2	18.2	40.1
1935	20,852	45,970	159.2	351.0	26.0	57.3
1936	22,822	50,313	189.9	418.7	[4] 30.0	[4] 66.1
1937	26,100	57,540	185.2	408.3	(2)	(2)
1938	28,861	63,627	(2)	(2)	(2)	(2)
1940[5]	(2)	(2)	207.0	456.4	(2)	(2)
1947[5]	(2)	(2)	202.0	445.3	(2)	(2)
1948[5]	(2)	(2)	248.0	546.7	(2)	(2)

U. S. Office of Foreign Agricultural Relations.

[1] Gross milk production.
[2] Not available.
[3] Year beginning July 1.
[4] Plan.
[5] Not comparable to years prior to 1940 due to boundary changes.

Sources:

Milk production:
1928–30 — NIFONTOV, V, P. ZHIVOTNOVODSTVO SSSR V TSIFRAKH, p. 154. Moscow and Leningrad. 1932.
1931 and 1933 — NIFONTOV, V. P. PRODUKTSIYA ZHIVOTNOVODSTVA SSSR, p. 74. Moscow. 1937.
1932 and 1938 — SOTSIALISTICHESKOE SEL'SKOE KHOZYAISTVO SSSR, p. 73. Moscow and Leningrad. 1939.
1934–36 — Problemy Zhivotnovodstva, No. 11, 1937, p. 98.
1937 — GOSUDARSTVENNAYA PLANOVOYA KOMISSIYA PRI SOVNARKOME SOYUZA SSR. TRETII PYATILETNII PLAN RAZVITIYA NARODNOGO KHOZYAISTVA SOYUZA SSR (1938–1942), p. 82. Moscow. 1939.

Butter production:
1928–34 — SOTSIALISTICHESKOE STROITEL'STVO SSSR, p. 217. Moscow. 1936.
1935–36 — Molochno-Maslodel'naya Promyshlennost 5:5. 1937.
1937 — PLANOVOE KHOZYAISTVO 5: 161. 1939.
1940 — LOKSHIN, E. PROMYSHLENNOST SSSR V NOVOI STALINSKOI PYATILETKE, p. 43. Moscow. 1946.
1947 and 1948 — Calculated from information given in *Izvestiya*, Dec. 31, 1950.

Cheese production:
1930–34 — SOTSIALISTICHESKOE STROITEL'STVO SSSR, 1936, p. 217.
1935–36 — Molochno-Maslodel'naya Promyshlennost 5:5. 1937.

was 44 percent below that of 1928 and milk production 33 percent below. But even in 1938, when the livestock industry rallied, production was still below the precollectivization period. The per capita production of meat in 1938 was 25 percent below that of 1928 and the per capita production of milk 15 percent below. Butter, though it was exported before the outbreak of World War II, has been a high-priced luxury ever since the collectivization period. The important Russian wool industry also suffered a disastrous slump as a consequence of

[12] NIFONTOV, PRODUKTSIYA . . . , p. 93.

TABLE 55.—*Government procurement of livestock and livestock products, 1926–37*

Year	Livestock and meats [1]				Milk and butter				Wool [2]	
	Live wt. equivalent		Carcass wt. equivalent		Milk equivalent		Butter equivalent			
Beginning July 1:	*1,000 metric tons*	*1,000 short tons*	*1,000 metric tons*	*1,000 short tons*	*1,000 metric tons*	*1,000 short tons*	*1,000 metric tons*	*1,000 short tons*	*1,000 metric tons*	*1,000 short tons*
1926	520	573	266	293	1,700	1,874	70.5	77.7	—	—
1927	1,143	1,260	618	681	1,900	2,094	80.0	88.2	[2] 29.4	[2] 32.4
1928	1,820	2,006	954	1,052	2,100	2,315	87.0	95.9	[2] 41.0	[2] 45.2
1929	[3] 2,196	[3] 2,421	[3] 1,067	[3] 1,176	1,300	1,433	54.3	59.9	[2] 45.7	[2] 50.4
1930	[3] 2,343	[3] 2,583	[3] 1,039	[3] 1,145	1,200	1,323	50.8	56.0	[2] 50.5	[2] 55.7
1931	[3] 2,096	[3] 2,310	[3] 934	[3] 1,030	1,900	2,094	80.2	88.4	[2] 50.4	[2] 55.6
1932	[4] 834	[4] 919	375	413	2,000	2,205	85.2	93.9	[2] 40.6	[2] 44.8
1933	[4] 871	[4] 960	401	442	—	—	—	—	—	—
Calendar years:										
1933	—	—	—	—	3,580	3,946	159.8	176.1	[5] 38.3	[5] 42.2
1934	1,096	1,208	517	570	3,832	4,224	171.1	188.6	[5] 42.2	[5] 46.5
1935	1,056	1,164	519	572	3,983	4,390	177.8	196.0	[5] 52.8	[5] 58.2
1936	[8]	[8]	[8]	[8]	[8]	[8]	[8]	[8]	[8]	[8]
1937 [6]	906	999	—	—	[7] 4,194	[7] 4,623			54.5	60.1

U. S. Office of Foreign Agricultural Relations.

[1] Cattle, sheep, hogs, and goats. [2] Calendar years for wool.
[3] Includes livestock procured for newly organized state farms (socialist sector). [4] Soviet estimate of standard weight, not comparable to other years. [5] Including state purchases above deliveries. [6] Incomplete. Includes procurements from collective and state farms. [7] Includes other milk products as well as butter. [8] Not available.

Source: 1926–35 — NIFONTOV, V. P. PRODUKTSIYA ZHIVOTNOVODSTVA SSSR, pp. 81 and 87. Moscow. 1937.
1937 — BOL'SHAYA SOVETSKAYA ENTSIKLOPEDIYA, SOYUZ SOVETSKIKH SOTSIALISTICHESKIKH RESPUBLIK, pp. 927–928. Moscow. 1947.

the catastrophic reduction in the number of sheep and other wool-bearing animals (camels, goats). Production of wool, at its low point in 1933, was 65 percent below 1928 and, though it rapidly increased during the next 5 years, it was, in 1938, still 25 percent below 1928 (table 53). The shortage of domestically produced wool was not remedied by increased imports, though the USSR had been on an import basis long before collectivization. (For details on foreign trade, see Chapter X.) While an improvement in the animal products situation occurred in the late 30's, considerable deterioration took place again during World War II, and recovery has been slow during the postwar years.

Among the territories acquired since World War II, the Baltic Republics, especially Latvia, had a significant dairy industry. Before the war the three Baltic Republics, Latvia, Lithuania, and Estonia, produced on the average about 104 million pounds of creamery butter and about 8 million pounds of cheese. While the output has doubtless decreased since the war, it probably helped to inflate the total post-war Soviet figures of creamery butter production.

An extensive program of construction of new creameries, cheese factories, plants for the production of dried milk, and refrigeration, storage, and shipping facilities for dairy products and meat was announced by a Government decree published in the Soviet press on May 26, 1949. The program called for the construction during the years 1949–51 of 1,750 creameries, 450 cheese factories, and 400 plants for the production of dried milk with a total capacity of 88 million pounds of dried milk a year. In addition, 15 plants for the production of 32 million cans of condensed milk and 19 million pounds of dried milk a year were to be constructed during the 3-year period. The same decree, after critically reviewing various aspects of procurement and processing of animal products, sharply stepped up compulsory deliveries of livestock products, thus adding to the heavy tax burden on the Russian farmers (table 55).

IX

DISTRIBUTION AND CONSUMPTION OF AGRICULTURAL PRODUCTS

Basic to collective and state farming in the USSR is the predominance of the state in the distribution of farm products. As a matter of fact, significant participation of the Soviet state in marketing of agricultural products long antedates agricultural collectivization. Even during the period of the NEP, in the 1920's, when private trade was tolerated much more than it has been since the collectivization of agriculture, the Soviet Government was the most important factor in the market for agricultural products, especially for grain, continuously expanding its operations and tending more and more to assume a monopolistic position. For instance, the estimated share of Government-acquired grain in the total grain marketed by the peasants increased consistently from 61 percent in 1925-26 to 83 percent in 1928–29.[1]

Since collectivization the Government has been a direct recipient of farm produce in four ways. First, all collective and individual farms are required to deliver to the state, at low fixed prices, a part of their crops and livestock products based on the size of their land; second, the state, as owner-manager of the machine-tractor stations, receives the produce paid to these stations by collective farms which they service. The proportion of the collective farm produce delivered to the state in these two ways varies. In 1937, for instance, compulsory deliveries of the grain crop of kolkhozy amounted to 12.2 percent, and payments in kind to MTS, 13.9 percent. In 1939, the respective shares of a smaller crop increased to 14.3 and 19.2 percent of the crop (see table on page 188).

The third direct means by which the state obtains agricultural commodities is by sale to the Government, by kolkhozy and their members, in excess of their quotas, at prices somewhat higher than those paid for compulsory deliveries, sometimes accompanied by priorities in purchasing of deficit manufactured goods. Finally, the supplies produced by the state farms are at the disposal of the Government.

There is also limited private trade in foodstuffs. However, as far as grain is concerned, no private trading is usually permitted until Government grain collections are completed for the whole province or republic.

Kolkhozy have restricted outlets for their produce—on the free, open markets and bazaars in cities, towns, and villages. Likewise, members of collective farms and the few remaining independent farmers may sell the produce from their own gardens, or the surplus from their wages in kind, in such markets. The private trade is

[1] MIKHAILOVSKII, A. *In* Statisticheskoe Obozrenie 1928 (12): 59. 1928.

necessarily limited by such factors as restrictions on transportation (railroads cannot be used for private food shipment, except by passengers carrying it as their personal baggage); by the prohibition of the services of middlemen, labeled in Soviet parlance as "speculators"; and by the State ownership of most processing plants. Prices in these open markets are largely the result of the working of supply and demand, although the Government exercises some control indirectly by the competition of its own stores. For the most part, retail distribution of foodstuffs in the cities is in the hands of the Government, which owns stores and also closely controls the so-called consumers' cooperative stores. However, the kolkhoz-bazaar trade accounted, in 1940, for nearly one-fifth of the total retail trade turn-over of the USSR and, doubtless, for a larger proportion of the volume of retail trade in foodstuffs alone.[2] There are, thus, two parallel systems of retail distribution and prices in the Soviet Union: (1) A dominant state system including Government-controlled cooperative stores, with prices fixed by the Government; (2) a private free market system with uncontrolled prices, which plays as a rule a secondary though by no means unimportant role in the Soviet economy.

As could be expected of a country the size of the Soviet Union, with its variety of natural and economic conditions, there are considerable regional differences in the matter of food supply. The construction of the railway network during the second half of the nineteenth century tended to increase agricultural specialization and to diminish the self-sufficiency of different regions.

Thus, toward the close of the last century an important dairy industry developed in western Siberia, largely on a cooperative basis; and, thanks to the construction of the Great Siberian Railway and the development of refrigeration, Siberian butter appeared not only in the large cities of European Russia but also on the world market. Likewise, other regions have developed specialties for shipping: Crimea and parts of the Caucasus, fruit and tobacco; North Caucasus and the steppes east of the Volga, cattle and sheep; the Ukraine and the adjoining provinces of Central Russia, sugar beets; northwestern Russia, flax fiber; and Central Asia, cotton.

The geographical pattern in the degree of self-sufficiency has been most definitely established for grain, which is the chief Russian food. In this respect the country is divided into two broad areas: (1) A grain-deficit area that roughly corresponds to the zone of non-black soils in the European part of the Union, including the two largest cities (Moscow and Leningrad) and often referred to as the consuming area, as well as the cotton-growing regions of Central Asia, the Transcaucasian Republics, and the Far East; (2) a grain-surplus area embracing the black-soil zone of the European USSR, including the Ukraine and North Caucasus, much of the inhabited part of western Siberia, and Kazakhstan. Grain from the surplus area is normally either exported or shipped to the deficit domestic regions, mainly by rail and partly by inland waterways.

It is true that the Soviet Government, in the 1930's, encouraged increased grain self-sufficiency of the deficit area, yet that area required shipments of grain before World War II. In 1937, for instance,

[2] LIFITS, M. M. SOVETSKAYA TORGOVLYA, p. 33. Moscow. 1948.

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TABLE 56.—*Annual per capita food consumption, USSR, average 1925–27*

Commodity	Rural population		Urban population		Total USSR	
	Deficit area [1]	Surplus area [1]	Manual labor [1]	Office, trade, etc. [1]	Per year [2]	Per day [3]
	Kilograms					Calories
Rye flour [4]	159.5	78.6	58.8	43.8	87.8	770
Wheat flour [4]	14.2	106.0	117.0	111.9	91.8	880
Other flour [4]	16.7	24.5	4.1	3.7	19.5	175
Total flour [4]	190.4	209.1	179.9	159.4	199.1	1,825
Groats, beans, etc. [4]	24.7	23.4	14.5	13.1	21.9	195
Potatoes	245.4	151.5	97.5	77.5	156.4	300
Vegetables and fruits	60.8	72.1	59.3	61.3	68.0	50
Sugar and sugar products	5.1	4.3	13.3	17.4	6.3	65
Meat	37.9	35.8	54.9	63.4	[5] 40.2	195
Fish	8.5	6.4	9.1	8.7	7.2	10
Lard	3.7	3.7	3.0	2.4	[5] 3.5	85
Butter	1.5	2.1	3.4	6.4	2.5	50
Vegetable oils	2.3	3.1	3.7	2.5	3.0	75
Milk and milk products	113.6	90.0	67.2	89.3	91.6	125
Eggs	1.0	2.3	2.3	3.9	2.2	85
Total						[5] 3,060
	Pounds					
Rye flour [4]	351.6	173.3	129.6	96.5	193.5	770
Wheat flour [4]	31.3	233.7	258.0	246.7	202.4	880
Other flour [4]	36.8	54.0	9.0	8.2	43.0	175
Total flour [4]	419.7	461.0	396.6	351.4	438.9	1,825
Groats, beans, etc. [4]	54.5	51.6	32.0	28.9	48.3	195
Potatoes	541.0	334.0	214.9	170.9	344.8	300
Vegetables and fruits	134.0	159.0	130.7	135.1	149.9	50
Sugar and sugar products	11.2	9.5	29.3	38.4	13.9	65
Meat	83.6	78.9	121.0	139.8	[5] 88.6	195
Fish	18.7	14.1	20.1	19.2	15.9	10
Lard	8.2	8.2	6.6	5.3	[5] 7.7	85
Butter	3.3	4.6	7.5	14.1	5.5	50
Vegetable oils	5.1	6.8	8.2	5.5	6.6	75
Milk and milk products	250.4	198.4	148.1	196.9	201.9	125
Eggs	2.2	5.1	5.1	8.6	4.9	85
Total						[5] 3,060

U. S. Office of Foreign Agricultural Relations.

[1] Based on daily consumption during the months of October and February as given in STATISTICHESKII SPRAVOCHNIK SSSR ZA 1928, pp. 850–851 and 856–857. Moscow. 1929.

[2] Estimated by weighting population for each group on the basis of the census of Dec. 17, 1926. Total USSR population: 147,000,000.

[3] Caloric conversions based on factors established by Food and Agricultural Organization of the United Nations.

[4] The figures for the rural consumption of flour and groats, beans, etc. were reduced by 5 percent and those for urban population increased by 3 percent to correct unrepresentativeness of the sample. *See* LOSITSKII, A. [DYNAMICS OF GRAIN CONSUMPTION IN THE USSR.] Statisticheskoe Obozrenie 12:17. 1927.

[5] The meat figure appears to be too high and out of line with production figures. According to V. P. Nifontov (ZHIVOTNOVODSTVO SSSR V TSIFRAKH, pp. 220–221,

the southern surplus areas shipped more than 5 million short tons (about 170 million bushels of 60 pounds each) of all kinds of grain (net) to other regions.[3]

The ultimate end of all distribution and marketing of foodstuffs and other agricultural products is, of course, consumption. Some references have already been made to low consumption of farm products in the Soviet Union. Historically, Russia is known as a surplus-producing country, but the standard of living of its population has always been so low that one could hardly speak of true surpluses.

The outstanding feature of the Russian diet is the predominance of breadstuffs. Grain has always been the crux of the Russian food problem, and its importance in the Russian standard of living cannot be overemphasized. An analysis of peasant budgets before World War I indicates that vegetable foods, on the average, accounted for 85 percent of the caloric intake, and grain alone for 63 percent.[4] A comparative study of national diets by the Food Research Institute places Russia among the countries with the highest proportion of cereals and potatoes in the caloric intake, ahead even of the rice-eating Japanese.[5] Among European countries, only Rumania is in the same class with Russia in this respect. It is true that there are important differences in the consumption of grain even among the rural population of different regions of Russia, and the rapidly increasing urban population as a rule consumed smaller quantities of grain products. But despite these variations, the dominant role of grain in the Russian diet cannot be gainsaid.

Information on Russia's food consumption was formerly provided by special food budget surveys but no such data have been available since 1928. The pattern of food consumption revealed by the food surveys is presented in table 56. There were significant differences in food consumption not only between the urban and rural population, as is usually the case, but also between the rural people in different regions.

The figures on rural consumption are given for the two main areas into which the country is usually divided for such purposes: the northern and western grain-deficient, rye-growing regions known as the deficit or consuming area, and the surplus-producing eastern and southern regions. Breadstuffs consumption in terms of flour was about 10 percent higher in the surplus than in the deficit area, but the composition of this most important food item was markedly different. Whereas in the deficit area, rye predominated and little wheat was used, in the surplus area wheat was the largest item. But there was also considerable consumption of rye in the surplus area, and more of other grains (corn in the Caucasus, for instance) were used than in the

[3] GALITSKII, A. [INTERREGIONAL SHIPMENTS OF USSR.] Planovoe Khozyaistvo 1938 (7): 27. 1938.

[4] KLEPIKOV, S. A. PITANIE RUSSKOGO KRESTIANSTVA, pt. 1, p. 12. Moscow. 1920.

[5] BENNETT, M. K. WHEAT IN NATIONAL DIETS. Food Res. Inst., Stanford Univ., Wheat Studies, v. 18, No. 2, p. 61. 1941.

Moscow-Leningrad, 1932), the average annual per capita consumption of meats including fats, for the years 1926–27 and 1927–28 was 18.5 kilograms (40.8 pounds) for the rural population, 45.94 kilograms (101.3 pounds) for the urban population. On this basis, average per capita consumption of meat including fats for the total population amounted to 23.5 kilograms (51.8 pounds) instead of 43.7 kilograms (96.3 pounds, meat plus lard) shown in this table. This would also reduce the total caloric value to 2930–2975 per day.

deficit area. The latter, however, had a considerably larger consumption of potatoes and also used more sugar, meat, fish, and dairy products exclusive of butter than the surplus area. On the other hand, larger consumption of vegetables and fruits, butter, vegetable oils, and eggs was characteristic of the surplus area.

TABLE 57.—*Total and per capita production of specified livestock products in the Soviet Union and the United States, 1928, 1937, and 1938*

Commodity	Soviet Union		United States	
	Total	Per capita	Total	Per capita
	Million pounds	*Pounds*	*Million pounds*	*Pounds*
Meat, including lard and other animal fats:[1]				
1928	8,688	57.4	18,706	154.2
1937	5,225	31.6	17,140	132.3
1938	7,282	43.2	18,207	139.3
Milk:				
1928	67,216	444.0	99,367	819.2
1937	57,540	348.5	104,734	808.1
1938	63,627	377.4	108,633	831.2
Wool (raw, actual weight):[2]				
1928	392	2.6	383	3.2
1937	234	1.4	439	3.4
1938	293	1.7	441	3.4

[1] Figures for the Soviet Union include beef, veal, lamb, mutton, and goat meat; for the United States, the same except goat meat.

[2] Includes wool and similar animal fibers. Both the Soviet Union and the United States have been on an import basis for wool. The per capita supply (actual weight from domestic production and net imports) amounted in the Soviet Union to 3.2, 1.8, and 2.1 pounds, respectively, during the years 1928, 1937, and 1938, and in the United States to 5.1, 5.9, and 4.2 pounds, respectively, during the same years. In addition the United States had net imports of woolen manufactures of 27 million pounds in 1937 and 13 million pounds in 1938, while the Soviet Union in 1937, the last year for which such data are available, had net exports of 183,000 pounds.

Soviet Union: Production figures—1928, from NIFONTOV, V. P., ZHIVOTNOVODSTVO SSSR V TSIFRAKH, p. 154, Moscow and Leningrad, 1932; 1937, from GOSUDARSTVENNAYA PLANOVAYA KOMISSIYA PRI SOVNARKOME SOYUZA SSR TRETII PYATILETNII PLAN RAZVITIYA NARODNOGO KHOZYAISTVA SOYUZA SSR (1938–1942), p. 82, Moscow, 1939; 1938, from SOTSIALISTICHESKOE SEL'SKOE KHOZYAISTVO SSSR, STATISTICHESKII SBORNIK, p. 73, Moscow and Leningrad, 1939. Population based on figures given by LORIMER, FRANK, THE POPULATION OF THE SOVIET UNION: HISTORY AND PROSPECTS, p. 135, League of Nations, Geneva, 1946.

United States: U. S. Bur. of Agr. Econ., CONSUMPTION OF FOOD IN THE UNITED STATES, 1909–48, Misc. Pub. No. 691, Aug. 1949, pp. 145, 157–158, 195; U. S. Bur. Agr. Econ., WOOL STATISTICS, INCLUDING MOHAIR AND OTHER ANIMAL FIBERS, CS 37, 1949, pp. 5 and 25.

Data for the urban population, which are given separately for manual workers (labor) and office workers and similar occupations, showed a much smaller consumption of breadstuffs as compared with the rural population. Wheat was the principal bread-grain used by the city population, but it should be borne in mind that consumption during the period for which the figures are available was not restricted, as was the case later, by high prices of wheat bread, or by other curbs.

Considerably higher consumption of sugar, meat, and fish was characteristic of the urban population but consumption of milk and milk products apart from butter was lower than that of the rural people.

The period to which the above data apply was one of good harvests, relatively low food prices and general availability of foodstuffs, and absence of artificial restrictions on consumption. The food consumption pattern that emerges, with a caloric intake of 2,930 to 3,060 calories, therefore must be considered as a very favorable one under Russian conditions. In fact, certain figures, such as those for meat consumption in food budgets, which seem very high for the Soviet Union, even raise some question as to the reliability of the statistical data. It should also be borne in mind that the continuously growing proportion of urban population (18 percent of total according to the census of 1926 and 33 percent in the 1939 census) should normally reduce the average caloric level, because of lower consumption of breadstuffs in the cities. But in the Soviet Union, the situation was complicated in the 1930's and 1940's by two factors pulling in diametrically opposite directions. On the one hand, the high retail price of bread fixed by the Government,[6] although it paid a very low price to farmers, tended to restrict consumption. On the other hand, the scarcity and high cost to the consumer of most nongrain foods tended to increase the reliance on bread in the diet.

Actually, no reliable statistical data on food consumption or use were published in the 30's. Production statistics and reports of observers, however, indicate definitely that the Russian diet has deteriorated and the caloric intake declined. This deterioration was especially great during the collectivization campaign of the early 1930's, when starvation prevailed over large rural areas. But even late in the decade, conditions were less satisfactory than they had been in the middle 1920's, especially as far as meat and dairy products were concerned, for the country still felt the adverse effect of agricultural collectivization on the livestock industry. Per capita production and, consequently, consumption of meat and milk were low (table 57). The estimated 1938 per capita consumption of fats and oils for food—a little more than 16 pounds—was among the lowest in Europe (table 58).

A further deterioration of the Russian diet, especially in the nonbread components, has taken place since the beginning of World War II, which was characterized by severe food stringency. Rationing was introduced during the war, with considerable variation in rations for different strata of the population. However, except for bread in the larger cities, the sparse official rations were rarely met in full for any considerable period of time. It was necessary, therefore, for most families to supplement their ration allotments by purchases in the free market, which existed legally, at prices many times higher than those charged for rationed goods in the Government stores. Many people who were unable to pay the extremely high prices in cash re-

[6] In the early 30's, a rationing system maintained a low price of bread for the industrial population and producers of certain industrial crops, such as flax and cotton. But when the Government decided to deration, beginning with 1935, the retail prices of breadstuffs were increased several times over, while prices paid to producers by the Government for compulsory delivery of grain were increased only by 10 percent and for grain purchased on a voluntary basis, by 20 percent. *See* VOLIN, LAZAR. THE ABOLITION OF THE BREAD CARD SYSTEM IN THE SOVIET UNION. Foreign Crops and Markets 30:77–81. 1935.

TABLE 58.—*Fats and oils balance, 1938*

Item	1,000 quintals [1]	Million pounds
Oilseeds:		
Production [2]	46,600	10,273
Amount used as seed (20 percent) [3]	9,320	2,055
Amount available for crushing	37,280	8,218
Production of fats and oils:		
Vegetable oil (22 percent extraction) [4]	8,202	1,808
Hog fat [5]	3,128	690
Beef fat [6]	609	134
Mutton fat [7]	311	69
Butter [8]	3,600	794
Whale oil [9]	32	7
Total production	15,882	3,502
Net exports of fats and oils	53	12
Total consumption	15,829	3,490
Industrial consumption:		
Soap (5.5 million quintals with 40 percent fat content) [10]	2,179	480
Other industrial uses:		
Vegetable oils [10]	1,253	276
Animal fats [11]	125	28
Total industrial consumption	3,557	784
Food consumption (total consumption minus industrial consumption)	12,272	2,706
Per capita consumption: [12]		
Industrial uses:	*Kilograms*	*Pounds*
Soap	1.3	2.8
Other	.8	1.8
For food [13]	7.3	16.1

[1] One quintal equals 0.1 metric ton, or 220.46 pounds.

[2] Stalin's report to the 18th Communist Party Congress in 1939. Planovoe Khozyaistvo 1939 (4): 17.

[3] The average proportion of the total oilseed crop, exclusive of cottonseed, used as seed for all purposes was estimated at 19 percent, according to data given in STATISTICHESKII SPRAVOCHNIK SSSR ZA 1928 G, p. 252. Moscow. 1929. On this basis a figure of 20 percent for over-all seed use, including waste, appears reasonable.

[4] Weighted rate of extraction of the large-scale industry in 1936. Production of vegetable oils by the large-scale industry was given as 4,441,000 quintals in 1936 (SEL'SKOKHOZYAISTVENNAYA ENTSIKLOPEDIYA, ed. 2, v. 3, p. 114. Moscow and Leningrad. 1938.) A figure of total production of vegetable oils by large and small mills is available only for 1928–29, when it was given at 6,666,000 quintals and the production of large-scale industry alone at 2,995,000 quintals (TEKHNICHESKAYA ENTSIKLOPEDIYA, v. 16, p. 498. Moscow. 1932. *Also* SEL'SKOKHOZYAISTVENNAYA ENTSIKLOPEDIYA, p. 114). On this basis the 1928–29 production of the small mills was 3,671,000 quintals. It is probably safe to assume that the output of small mills had not increased much during the ensuing decade and was about 3,700,000 quintals. Subtracting this figure from our total 1938 production figure of 8,202,000 quintals, we obtain 4,502,000 quintals for large mills, compared with 4,441,000 quintals produced in 1936.

[5] Since no data of total fat production were published and it is for the most part included in the figures of meat production, it was assumed to be equivalent to 20 percent of 1938 pork production of 15,640,000 quintals as given by SOTSIA-

sorted to bartering their possessions for foodstuffs. See table 59 for official food rations during 1942 and 1943. Rationing of foodstuffs was formally abolished in December 1947, coincidental with a drastic devaluation of the Soviet currency. The food situation in Moscow and some other large cities was improved in 1948–51, as compared with the severe stringency that had prevailed during the

TABLE 59.—*Official food rations in Moscow, December 1942 and 1943*

Month and category	Bread per day		Groats per month		Meat and fish per month		Fats per month		Sugar per month	
December 1942:	*grams*	*pounds*	*grams*	*pounds*	*grams*	*pounds*	*grams*	*pounds*	*grams*	*pounds*
1st	[1] 800	[1] 1.8	2,000	4.4	2,200	4.9	800	1.8	500	1.1
2nd	600	1.3	2,000	4.4	2,200	4.9	800	1.8	500	1.1
3rd	500	1.1	1,500	3.3	1,200	2.6	400	.9	300	.7
4th	400	.9	1,000	2.2	600	1.3	200	.4	200	.4
5th	400	.9	1,200	2.6	600	1.3	400	.9	300	.7
December 1943 [2]:										
1st	650	1.4	2,000	4.4	2,200	4.9	800	1.8	500	1.1
2nd	550	1.2	2,000	4.4	2,200	4.9	800	1.8	500	1.1
3rd	450	1.0	1,500	3.3	1,200	2.6	400	.9	300	.7
4th	300	.7	1,000	2.2	600	1.3	200	.4	200	.4
5th	300	.7	1,200	2.6	600	1.3	400	.9	300	.7

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[1] In March 1943 the bread ration for category 1 worker was reduced to 700 grams (1.5 pounds) per day.
[2] There was apparently a larger supply of potatoes available than during the preceding year.

war and early postwar years. The availability of different foods was greater, and with successive reductions of prices the gap between prices in the Government-controlled outlets and the private free market had diminished. Despite the reductions, however, the price of rye bread, the staple of the Russian diet, in the spring of 1951 was double the cost in 1940, and the price of wheat bread, more than

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LISTICHESKOE SEL'SKOE KHOZYAISTVO SSSR, STATISTICHESKII SBORNIK, p. 73. Moscow and Leningrad. 1939.

[6] Estimated by applying average 1932–1934 proportion of fat in live-weight (4.7 percent) of commercially slaughtered animals to the 1938 beef production of 12,949,000 quintals. SOTSIALISTICHESKOE STROITEL'STVO SSSR, STATISTICHESKII EZHEGODNIK, p. 216. Moscow. 1936. *And* SOTSIALISTICHESKOE SEL'SKOE KHOZYAISTVO SSSR, pp. 73–74.

[7] Estimated by applying 1932–1934 average proportion of fat in live-weight (7.0 percent) to 1938 mutton production of 4,436,610 quintals. For sources see preceding note.

[8] Estimated by applying 1925–26 to 1927–28 average proportion of milk processed (29.7 percent) and butter yield (4.2 percent) to 1938 total milk production of 288,610,000 quintals. SOTSIALISTICHESKOE SEL'SKOE KHOZYAISTVO SSSR, p. 73; and STATISTICHESKII SPRAVOCHNIK SSSR ZA 1928, p. 268.

[9] INTERNATIONAL WHALING STATISTICS, 1938–39. Edited by the Committee for Whaling Statistics appointed by the Norwegian Government. Oslo. 1939.

[10] Production in 1936, SEL'SKOKHOZYAISTVENNAYA ENTSIKLOPEDIYA, p. 114.

[11] In 1928–29, the large-scale industry used 103,346 quintals of beef, mutton, and hog fat. (Masloboino-Zhirovoe Delo 1930 (2): 72. 1930.)

[12] Population based on figures given by LORIMER, FRANK. THE POPULATION OF THE SOVIET UNION: HISTORY AND PROSPECTS, p. 135. League of Nations, Geneva. 1946.

[13] Food budget studies in the late 1920's indicated an average per capita consumption of edible fats at about 20 pounds (STATISTICHESKII SPRAVOCHNIK SSSR ZA 1928, pp. 836–837 and 854–855).

double (table 60).[7] Any statement on the over-all food situation of the Soviet Union must be qualified further by the fact that under

TABLE 60.—*Moscow food prices before and after World War II*

[In rubles]

Item	1940 Jan. 1	1946 [1]		Dec. 1947–Jan. 1948	1949 Mar.–Apr.	1950 Mar. 1	1951 Mar. 1
		Sept. 1	Oct. 1				
Beef, 1st quality---kilogram--	10.50	14.00	30.00	30.00	27.00	20.50	16.00
Butter (sweet)---do----	21.00	28.00	66.00	64.00	57.60	40.30	35.00
Bread (black)---do----	.85	1.00	3.40	3.00	2.70	2.00	1.70
Bread (white)---do----	1.70	3.80	11.25	7.00	6.30	4.40	3.75
Fish (perch)-----do----	5.40	[2]	[2]	12.00	10.80	9.70	8.75
Flour, 1st grade--do----	4.60	4.60	13.00	8.00	7.20	5.05	4.30
Milk----------liter--	2.10	2.50	8.00	4.00	4.00	3.60	3.25
Pork, 1st quality---kilogram--	[3]10.60	12.00	34.00	[2]	65.00	49.40	42.00
Potatoes--------do----	.50	.90	4.00	1.00	1.00	.90	.90
Rice----------do----	[3] 6.50	6.50	19.00	17.10	15.40	13.50	11.50
Sausage--------do----	10.00	19.00	48.00	[2]	32.00	24.30	20.65
Sugar (lump)----do----	4.10	5.50	15.00	15.00	15.00	13.20	13.20

(1 kilogram = 2.2 pounds; 1 liter = 1.1 quarts.)

[1] Ration prices.
[2] Data not available.
[3] Jan. 1, 1936 price.

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present-day conditions reliable information on the food supply in many important regions is lacking.

[7] *See also* KRAVIS, IRVING B., and MINTZES, JOSEPH. FOOD PRICES IN THE SOVIET UNION, 1936–50. The Review of Economics and Statistics 32:164–168. 1950. The authors constructed, on the basis of available limited materials, indices of food prices in Moscow state stores that indicate that "in the spring of 1950 these prices were approximately 2.25 to 2.5 times higher than in 1936 although 35 to 40 per cent lower than in October 1946 and about 30 per cent lower than in January 1948, and 20 to 25 per cent lower than in March 1949."

X

FOREIGN TRADE

All foreign trade, both export and import, has been a monopoly of the Soviet Government since 1918. It is essential to bear in mind at the outset that with such a monopoly, buttressed by pervasive state ownership and control, exports usually do not represent genuine surpluses as the term is understood in the United States. Exports are decided upon by the Government in the light of the general economic, financial, and political situation, and often take place even when serious shortages exist within the country.

With but few exceptions, such as rice, tea, and small quantities of other food products, the Soviet Union is normally self-sufficient or is on an export basis in foodstuffs (tables 61 and 62). Before World War I, Russia was an important exporter of a number of agricultural products, such as flax fiber, butter, oilseeds and oil cake, and especially small grains. In fact, Russia was the leading world exporter of small grains (wheat, rye, barley, and oats).[1] The agricultural export trade of the USSR seriously declined during the interwar period, when it was adversely affected by revolutionary changes in the agricultural, industrial, and international trade patterns and in the territory and population of the country.

The slump in Russian grain exports that loomed so large in the foreign trade of Russia and in the competition with United States wheat in the world markets before World War I deserves particular emphasis. During the interwar period Russian grain exports were small in years of good harvest and dwindled to insignificant proportions during poor crop years. Exports of the 5 principal grains during the interwar years averaged 1.3 million to 2.7 million short tons as compared with about 12 million short tons during the 5-year period preceding World War I (tables 63 and 64).

In 1947–48, when there was a strong demand for Russian grain because of the poor crop situation in a number of countries, the USSR exported nearly 2.8 million short tons, an amount considerably above the average exports for the interwar years, but far below the average before World War I. More than half of the 1947–48 Soviet grain exports went to the satellite countries, many of which had previously been drained of foodstuffs by the Soviets. With the improved world grain situation in 1948–49 and 1949–50, Russian grain exports were again smaller, judging from reported sales and commitments.

A number of factors were responsible for the decline of Russian grain exports during the interwar period. Division of estates and large peasant holdings that supplied grain for the market, Government price policies unfavorable to commercial agriculture, the growth of population, especially of urban population, collectivization diffi-

[1] TIMOSHENKO, op. cit., pp. 470–486.

culties of the early 30's, the policy of building up war stocks in the late 30's, and the Soviet Government's changing international economic relations and policies, all have affected the volume of Russian

TABLE 61.—*Foreign trade in principal agricultural commodities exported by the Soviet Union, average, 1934–38*

Commodity	Exports		Imports	
	Metric tons	1,000 bushels	Metric tons	1,000 bushels
Wheat	622,132	22,859	36,371	1,366
Rye	161,801	6,370		
Barley	300,265	13,791	7	(1)
Oats	71,845	4,950	219	15
Corn	34,780	1,369	17	1
Other grains	1,760		129	
Total grains, except rice and wheat flour	1,192,583		36,743	
		Short tons[2]		*Short tons*[2]
Flour, wheat	49,160	54,189	6,576	7,249
Legumes (dry)	77,441	85,363	53	58
Cotton seed	11,071	12,204		
Vegetable oils:				
Sunflower [3]	6,195	6,829		
Cotton seed [3]	5,365	5,914		
Oilcake:				
Sunflower [3]	109,546	120,753		
Flax [3]	42,956	47,350	3	3
Cotton [3]	68,870	75,915		
Other [3]	2,305	2,541	20	22
Total oilcake [3]	223,677	246,559	23	25
Sugar [3 4]	105,510	116,304	3,027	3,337
Tobacco [3]	3,194	3,521	2,030	2,238
Makhorka [3]	1,338	1,475		
Flax	52,873	58,282		
Hemp	293	323		
Butter	21,086	23,243	182	201
Eggs	500	551	55	61
Poultry meat	1,676	1,847	813	896
Casings	1,694	1,867	227	250
Bristles	508	560	11	12

[1] Less than 500 bushels.
[2] Short ton equals 2,000 pounds.
[3] 4-year average, 1934–37.
[4] Exports are beet sugar and imports are cane sugar.

U. S. Office of Foreign Agricultural Relations. Compiled from official sources.

grain exports. As to territorial changes, the loss of territory after World War I had affected but little Russian grain export capabilities. The lost area, which included an important industrial section of

TABLE 62.—*Foreign trade in principal agricultural commodities imported by the Soviet Union, average, 1934–38*

Commodity	Exports		Imports	
	Metric tons	*Short tons*	*Metric tons*	*Short tons*
Rice	1,651	1,820	39,213	43,224
Soybeans	33	36	6,521	7,188
Cocoa and cocoa products	35	39	7,834	8,635
Tea	5,469	6,028	18,728	20,644
Cotton	15,388	[2]16,962	24,864	[3]27,408
Jute [1]	----------	----------	19,836	21,865
Manila hemp [1]	----------	----------	2,640	2,910
Sisal [1]	----------	----------	16,418	18,098
Rubber [4]	1	1	31,959	35,228
Livestock:	*Number*		*Number*	
Horses [1]	13	----------	6,036	----------
Cattle [1]	37	----------	121,120	----------
Sheep and goats [1]	196	----------	865,212	----------
Hogs [1]	----------	----------	108,628	----------
	Metric tons		*Metric tons*	
Meat and offals	2,112	2,328	3,937	4,340
Lard	----------	----------	226	249
Cheese	38	42	370	408
Hides	4,134	4,557	17,495	19,285
Wool (sheep) [1]	----------	----------	27,937	30,795

[1] 4-year average, 1934–37.
[2] Equivalent to 71,000 bales of 478 lbs.
[3] Equivalent to 115,000 bales of 478 lbs.
[4] 4-year average, 1935–38.

U. S. Office of Foreign Agricultural Relations. Compiled from official sources.

TABLE 63.—*Exports of specified grains and flour, 5-year averages, 1904–37, annual, 1947–48*

[In thousands of metric tons]

Year beginning July 1	Wheat (including flour)	Rye (including flour)	Oats	Barley	Corn	Total grain and flour
Average:						
1904–08	3,408	983	1,054	2,487	516	8,448
1909–13	4,507	876	1,027	3,752	721	10,883
1923–27	560	439	28	328	147	1,502
1928–32	1,153	452	158	556	119	2,438
1933–37	628	137	84	323	28	1,200
Annual: 1947–48 [1]	1,006	663	309	291	274	2,543

[1] Preliminary estimate.

U. S. Office of Foreign Agricultural Relations and official sources. Data for boundaries of the year indicated.

Poland, was, on the whole, deficient with respect to wheat, rye, and oats, though it had a surplus of barley.[2]

TABLE 64.—*Exports of specified grains and flour, 1904–05 to 1937–38 and 1947–48*

Year (July 1 to June 30)	Wheat, including flour	Rye, including flour	Barley	Oats	Corn	Total grain and flour
	Million bushels	*Million bushels*	*Million bushels*	*Million bushels*	*Million bushels*	*Thousand short tons*
1904–05	190.7	47.1	110.5	120.5	9.2	11,874
1905–06	169.9	47.0	107.3	109.9	7.8	10,962
1906–07	102.6	42.7	98.3	44.7	26.8	8,095
1907–08	67.1	38.0	106.1	30.2	31.6	6,693
1908–09	96.4	18.8	150.8	58.1	25.9	8,693
Ave., 1904–05 to 1908–09	125.3	38.7	114.6	72.7	20.3	9,323
1909–10	233.9	31.6	171.1	84.0	19.8	13,907
1910–11	233.6	53.0	198.8	112.6	37.8	16,123
1911–12	83.7	23.8	146.2	64.4	44.9	8,975
1912–13	106.6	26.5	144.8	53.3	19.0	8,800
1913–14	170.7	37.4	203.3	39.6	20.7	12,261
Ave., 1909–10 to 1913–14	165.7	34.5	172.9	70.8	28.4	12,013
1914–15	14.1	10.0	15.1	5.8	1.8	1,212
1915–16	12.8	12.6	0.3	(1)	.1	747
1916–17	10.1	8.2	0.1	(1)	.1	539
1922–23	0.6	16.9	3.3	1.8	.4	608
1923–24	21.4	53.8	14.1	.7	5.3	2,790
1924–25	0.4	2.7	3.3	.2	6.9	360
1925–26	26.6	7.2	36.2	1.4	7.5	2,101
1926–27	49.3	16.7	20.5	3.7	8.2	2,726
1927–28	5.4	6.0	1.4	3.3	1.0	443
1928–29	(1)	(1)	0	(1)	0	(2)
Ave., 1924–25 to 1928–29	16.3	6.5	12.3	1.7	4.7	1,126
1929–30	8.7	7.2	24.0	4.3	1.4	1,142
1930–31	111.8	29.1	49.8	33.8	2.5	5,972
1931–32	71.8	43.3	37.5	14.6	10.9	4,806
1932–33	19.7	9.6	16.6	1.7	8.5	1,519
1933–34	33.8	5.8	25.9	8.7	5.1	2,080
Ave., 1929–30 to 1933–34	49.1	19.0	30.8	12.6	5.7	3,104
1934–35	4.3	1.2	6.6	9.1	(1)	470
1935–36	29.7	2.8	29.2	10.4	0.3	1,845
1936–37	4.5	4.2	1.7	.4	0	301
1937–38	43.3	12.8	10.9	.2	0	1,923
Ave., 1934–35 to 1937–38	20.4	5.2	12.1	5.0	.1	1,135
1947–48 [3]	37.0	26.1	13.4	21.3	10.8	2,803

See footnotes at end of table.

[2] GROMAN, V. G. KHLEBNAYA PRODUKTSIYA I KLEBNYI EKSPORT SSSR. *In* Entsiklopediya Sovetskogo Eksporta, ed. 2. 1:230–239. Berlin. 1928.

TABLE 64.—*Exports of specified grains and flour, 1904–05 to 1937–38 and 1947–48—Continued*

Year (July 1 to June 30)	Wheat, including flour	Rye, including flour	Barley	Oats	Corn	Total grain and flour
	Percentage of total					
Average:	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
1904–05 to 1908–09	40.3	11.6	29.5	12.5	6.1	100.0
1909–10 to 1913–14	41.4	8.1	34.5	9.4	6.6	100.0
1924–25 to 1928–29	43.4	16.2	26.3	2.4	11.7	100.0
1929–30 to 1933–34	47.5	17.1	23.8	6.5	5.1	100.0
1934–35 to 1937–38	53.9	12.8	25.6	7.0	.7	100.0
Annual, 1947–48 [3]	39.6	26.0	11.4	12.2	10.8	100.0

[1] Less than 50,000 bushels.
[2] Less than 500 tons.
[3] Preliminary estimate.

Compiled from official sources. 1904–05 to 1916–17 and 1925–26 to 1928–29, exports over European frontier including the Caucasian ports of the Black Sea; other years, over all frontiers. Data for boundaries of the years indicated.

U. S. Office of Foreign Agricultural Relations.

The territory regained or gained as a consequence of World War II, which includes the surplus-producing regions of Bessarabia, Western Ukraine, and also the small surplus-producing Eastern Baltic states, but which does not include the industrial section of former Russian Poland, had surpluses of grain of roughly 800,000 short tons. However, any genuine surpluses from this area may have been eliminated since World War II by changes in land tenure, population, and various other factors.

During World War II, when about 40 percent of the Russian cropland was in the occupied or war zones and the capacity to produce food was seriously impaired, the USSR imported under lend-lease arrangements large quantities of fats and oils, meat products, and other concentrated foods (table 65). After World War II, just as after World War I,[3] the USSR was aided in its difficult food situation by the United States, which supplied foodstuffs through UNRRA. It is believed also that sizable quantities of food were acquired by the USSR during the early postwar years in the various occupied and satellite countries in the West and Far East. Some fats were imported by the Soviet Union from Denmark and Norway. A trade agreement with Manchuria was reported in *Pravda*, July 31, 1949, whereby the USSR was to import in 1949–50 unspecified quantities of soybeans, vegetable oil, corn, and rice.

[3] FISHER, H. H. THE FAMINE IN SOVIET RUSSIA, 1919–23—THE OPERATION OF THE AMERICAN RELIEF ADMINISTRATION. New York. 1927. In a resolution passed by the Sovnarkom (Soviet Council of Peoples Commissars) it was stated that: "Thanks to the tremendous, utterly unselfish efforts of the A. R. A., [American Relief Association] millions of people of all ages were saved from death, and whole villages and even cities were saved from the terrible catastrophe that was threatening them."

TABLE 65.—*United States shipments of agricultural products and specified foodstuffs to the Soviet Union under lend-lease, 1941–46, and UNRRA, 1945–46*

Item	Lend-lease	UNRRA [1]
Meat and meat products:		
Pork—1,000 pounds	1,089,924	85,695
Beef and veal—do	7,389	40,743
Other—do	1,055,568	138,451
Total meat and meat products—do	2,152,881	264,889
Gelatin, edible—do	6	----------
Fats and oils, edible and inedible:		
Lard, including neutral lard—do	642,111	27,832
Butter and butter products—do	222,556	4,172
Vegetable oils—do	871,947	20,420
Oleomargarine, vegetable and animal—do	102,979	1,336
Other fats and oils, including fish oils—do	44,913	----------
Total fats and oils—do	1,884,506	53,760
Essential oils—do	78	----------
Milk, processed—do	218,769	89,856
Cheese, processed and other—do	69,814	12,063
Eggs and egg products, dried—do	242,458	[2]
Fish, salted, pickled, and canned—do	290	4,375
Grains and grain products:		
Wheat, including wh. flour and semolina as wheat—1,000 bushels	25,047	----------
Rye—do	10	----------
Barley—do	474	----------
Oats, including oatmeal as oats—do	3,725	----------
Corn, including hominy, grits, cornstarch, and flour as corn—do	132	9
Buckwheat—do	6	----------
Rice, milled, including rough rice and flour as milled—1,000 pounds	135,808	3,983
Grain cereals and other products—do	17,612	301
Soy flour—do	52,453	400
Pulses—do	567,186	30,415
Vegetables and vegetable products—do	53,970	33,159
Fruit and fruit preparations:		
Fresh or frozen fruit—do	254	----------
Canned fruit—do	129	[2]
Dried and evaporated fruit—do	4,728	----------
Fruit preparations—do	25	27,707
Fruit juices—1,000 gallons	369	992
Nuts and nut preparations—1,000 pounds	5,604	7,884
Soybeans and other oil seeds—do	1,768	213
Grass and field seeds, including clover—do	19,692	11,705
Vegetable seeds—do	13,230	7,105
Feeds—long tons	26	----------
Hops—1,000 pounds	40	----------
Sugar, refined—do	1,035,265	2
Table beverages:		
Coffee, green and roasted (in terms of green)—do	2,543	1
Tea—do	265	----------
Cocoa, powdered—do	5	----------
Other table beverage materials—do	16	117
Chocolate—do	30	----------
Candy—do	939	1,468

See footnotes at end of table.

TABLE 65.—*United States shipments of agricultural products and specified foodstuffs to the Soviet Union under lend-lease, 1941–46, and UNRRA, 1945–46—Continued*

Item	Lend-lease	UNRRA [1]
Spices and imitations ---- do	607	24
Glucose, dry and liquid ---- do	35	60
Salt ---- do	4,550	----
Yeast ---- do	450	----
Fish oil, medicinal; vitamins; and viasterols ---- do	3,026	82
Vinegar ---- 1,000 gallons	129	----

[1] United Nations Relief and Rehabilitation Adm. figures have not been published since December 1946. However, shipments had begun to fall off at that time, and the period covered contains the bulk of the shipments. Does not include shipments of foreign merchandise.

[2] Less than 500 pounds.

Compiled from U. S. Dept. of Commerce publications and from records of U. S. Office of Foreign Agricultural Relations.

Of usually greater significance were imports of industrial raw materials of agricultural origin, such as wool, hides, rubber, sisal, and jute. In cotton, however, which was formerly the most important Russian agricultural import and the most important export from the United States to Russia, the USSR practically achieved self-sufficiency in the 1930's. Only small quantities of cotton were imported in the years just before World War II by the Soviet Union, mostly from the neighboring Near East countries. The Soviet Union even exported small quantities of cotton sporadically. There were no other important agricultural exports from the United States to the Soviet Union before the extensive lend-lease and UNRRA shipments of food and other agricultural products during and just after World War II. Exports of foodstuffs from the United States to the USSR ceased with the discontinuation of lend-lease and UNRRA activities, but small quantities of American tobacco and cotton were shipped in 1949.

XI

WORLD WAR II AND POSTWAR RECONSTRUCTION PROGRAM

An analysis of the wartime agricultural position of the Soviet Union is still made difficult by the meagerness and fragmentary character of available statistics and other relevant information, a situation greatly aggravated by the war though not originating with it. It has been clear, however, that the crux of the difficult war food problem was the huge loss of agricultural resources due to German invasion and occupation.

A comparison with World War I, which was no small affair so far as Russia was concerned, may help to drive the point home. After 2 years of hostilities, including the disastrous retreat of the Russian army in the summer of 1915, less than 10 percent of the prewar crop area was in the territory overrun by the enemy.[1] The famous Russian "bread basket"—the area that produced surpluses of grain, oilseeds, and sugar both for export and for domestic consumption in deficient regions—was hardly touched by the war except on its southwestern fringe. A considerable reduction took place in the crop area of large estates during World War I, which, of course, had a serious effect on commercial production of foodstuffs. But the small peasant holdings, which predominated then in Russian agriculture, manifested a contrary tendency to increase or, at any rate, to maintain the acreage.[2]

How different was the picture during World War II! At the time of the farthest advance of the German army in the autumn of 1942, a territory comprising something like 40 percent of prewar crop area was overrun by the enemy. This included some of the most productive land, in such fertile regions as the Ukraine, Crimea, most of the Central Black Soil, and the Don-North Caucasus areas. Since the yields of crops per acre were relatively high in these regions and a large proportion of crops high in food value, such as sugar beets and oilseeds, were grown, the loss of agricultural production was even greater than acreage figures indicate.

About 60 percent of the hog population was in the invaded territory as against less than 40 percent of cattle and about 25 percent of sheep and goats. Again, the Russian livestock industry which hardly recovered from the ravages of collectivization was to experience painful losses due to the war (table 45.)

Much has been said about agricultural expansion in the uninvaded area before the war though less has been heard about the growing population that had to be fed. This eastern granary, which extends from the Middle and Lower Volga into western Siberia and the

[1] KONDRAT'EV, N. D. RYNOK KHLEBOV I EGO REGULIROVANIE VO VREMYA VOINY I REVOLUTSII, p. 38. Moscow. 1922.

[2] Ibid., pp. 40–44. *Also* ANTSIFEROV AND OTHERS, op. cit., pp. 143–145.

Kazakh-Kirghiz steppes and was invaded only on the fringes, increased its share in the total grain production, according to a Soviet authority, from 30.2 percent in 1913 to 36.8 percent in 1940.[3] Although the share of the Ukraine and North Caucasus decreased from 37.6 to 33.6 percent during that same period, these two areas still held a place of great importance in the national grain supply.

Transportation statistics show that for a long time the whole vast area of uninvaded USSR, though it included some important surplus-producing regions, nevertheless has been normally deficient in grain and dependent on shipments from the invaded surplus-producing regions of the Ukraine, Don-North Caucasus, and Central Black Soil. Though the direction of such movement of grain does not change readily, the volume of shipments varies from year to year. It is governed by fluctuations of crops in the surplus and deficit regions and by other factors, including the policy of the Soviet Government, which has a monopolistic control of all but purely local petty trade.

Thus, according to transportation statistics during the years 1932–34, the Ukraine, North Caucasus, and the Central Agricultural area shipped out, on the average, more than 3 million tons of grain and flour. The next and the last prewar year for which similar data are available is the very good crop year of 1937, when the Ukraine, Crimea, and North Caucasus alone shipped a total of more than 5 million tons. Some of this grain went into the northern invaded regions, such as White Russia and Smolensk, which are also deficient in grain. But most of it was destined for uninvaded Russia, though not all of the grain shipped in large crop years like 1937 was for immediate consumption. Some of it was probably used to build up stocks.

During the war, uninvaded Russia not only was deprived of these grain supplies but also had to help feed the people in the reconquered regions in addition to its own population, the army, and a host of refugees.

With the wartime drain on manpower, the shortage of fertilizer, the scarcity of draft power that resulted from the mobilization of horses and tractors, and the lack of spare parts, fuel, and skilled operators for the tractors, the sown area and especially the crop yields decreased even in the uninvaded zone of the Soviet Union. By 1943, the total sown area when compared with 1938 decreased by 7.5 percent and the grain area by 8.3 percent. But the acreages under potatoes, vegetables, and sugar beets increased considerably (table 66).

In subsequent years a slow recovery began, which was spurred by the fourth 5-year plan, promulgated in 1946.

The plan aimed at an expansion of agricultural production to levels considerably above prewar, despite the fact that the ravages of war reduced crop acreages and yields and livestock numbers. By 1950, total agricultural production was to increase by 27 percent over what it was in 1940. This expansion was to be accomplished to only a small extent through increasing the crop acreage but primarily through the raising of crop yields and increased efficiency of livestock production. The 1950 area planted to crops in the present territory of the

[3] VOZNESENSKII, N. VOENNAYA EKONOMIKA SSSR V PERIOD OTECHESTVENNOI VOINY, p. 91. Moscow. 1948. (Translated into English by Gregory Grossman as ECONOMY OF THE USSR DURING WORLD WAR II. Washington. 1948.)

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Soviet Union was to be 13.7 million acres higher than in 1938, or an increase of about 4 percent.

This latest 5-year plan called for changes in the crop pattern, varying from region to region, but generally aimed at an over-all increase in acreage under forage crops, potatoes, and vegetables, and at an increase in grain acreage but to less than it was before the war. The

TABLE 66.—*Estimates of crop acreages in unoccupied areas of the USSR, 1916, 1938, and 1943*

Commodity	1916 [1]	1938 [2]	1943		
			Area [3]	Percent of—	
				1916	1938
	1,000 acres	*1,000 acres*	*1,000 acres*		
Grain	141,309	183,408	168,157	119.0	91.7
Crops other than grain:					
Potatoes	3,092	9,862	12,677	410.0	128.5
Vegetables	1,190	3,035	5,594	470.0	184.3
Sunflower seed	2,631	5,892	6,261	238.0	106.3
Flax for fiber	1,224	2,045	1,604	131.0	78.4
Cotton	1,718	4,458	2,921	170.0	65.5
Sugar beets	49	464	939	1,916.3	202.4
Other crops	5,032	25,597	19,028	378.1	74.3
Total	14,937	51,353	49,024	328.2	95.5
Total sown area	156,246	234,761	217,181	139.0	92.5

[1] Data for territory comparable with that for 1943 include the Provinces of Ryazan, Simbirsk, Tambov, Penza, Kazan, Nizhni-Novgorod, Ufa, Samara, Orenburg, Saratov, Astrakhan, Vladimir, Yaroslav, Kostroma, Tula, Moscow, Kaluga, and Voronezh from: RESULTATS PRELIMINAIRES DU RECENSEMENT AGRICOLE DE TOUTE LA RUSSIE POUR 1916; data for the Northern, Vyatka, Ural, Kazakh, Kirgiz, Siberia, Buryat-Mongol, Far East, Transcaucasia, Uzbek, Turkman, North Caucasus, and Dagestan regions from: OSNOVNYE ELEMENTY SEL'SKO-KHOZYAISTVENNOGO PROIZVODSTVA SSSR, 1916 I 1923–27. Moscow. 1930.

[2] Based on data in POSEVNYE PLOSHCHADI SSSR (DINAMIKA ZA 1928 . . .), STATISTICHESKII SPRAVOCHNIK. Moscow and Leningrad. 1939. (Covers the same territory as in footnote 3.)

[3] 1943: Based on article by I. BENEDIKTOV, in Bol'shevik, No. 5, 1944. The author gave only percentage increases from 1916 (and 1913 for grain and the total sown area) to 1943, but did not define the territory to which his figures apply. It was assumed that the entirely uninvaded regions were included, plus Moscow, Tula, Voronezh, Stalingrad, Kalmyk, and the Don North Caucasus area.

chief emphasis in the plan, however, is on the increase in yields through improved farm practices, which deteriorated during the war.

Past experience teaches, however, that wholesale raising of yields has proved, when correctly estimated statistically, to be a difficult task for the collectivized agricultural economy of the Soviet Union, even when recovery from terrific war devastation was not involved.

While reliable statistical data have been scanty, indications are that the postwar recovery of Russian agriculture has been at a considerably slower pace than was contemplated in the ambitious goals of the Soviet reconstruction program.

The total 1950 crop area is estimated at around 363 million acres compared with the plan goal of 392 million and the estimated 1938 figure of 378 million acres for the present territory of the USSR. Livestock numbers at the end of 1950 were also below the official goals, and the estimated barn production of principal grains in 1949 and 1950 was below the prewar average.

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TABLE 67.—*Percentage distribution of grain crops of collective farms, 1937, 1938, and 1939*

Item	1937	1938	1939
Deliveries to the state:	*Percent*	*Percent*	*Percent*
Compulsory procurements	12.2	15.0	14.3
Payments in kind to MTS	13.9	16.0	19.2
Return of seed loans	1.5	2.0	4.0
Total	27.6	33.0	37.5
Collective requirements and reserves:			
For seed	16.3	18.6	18.2
For feed	12.7	13.6	13.9
For aiding those in need	1.1	.8	.8
For other expenditures	1.6	2.0	2.7
Total	31.7	35.0	35.6
Sales to the state and in free market	4.8	[1]5.1	4.0
Distribution to collective farmers on the basis of workdays worked	35.9	26.9	22.9
Grand total	100.0	100.0	100.0

U.S. Office of Foreign Agricultural Relations.

[1] A statement was made that 1.9 percent designated for sale was unsold at "beginning of the year," presumably of 1939.

Sources: 1937: SOTSIALISTICHESKOE SEL'SKOE KHOZYAISTVO (11–12):30, 1940.
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