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THE NEW LANDS PROGRAM IN THE USSR

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(ORR Project 20.827)

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THE NEW LANDS PROGRAM IN THE USSR*

Summary

The "new lands" program in the USSR involves great amounts of capital investment and manpower and a vast area of land. In less than 2 years, 30 million hectares,** an area 25 percent larger than the acreage sown to wheat in the US in 1955, have been brought into cultivation, and eventually 40 million hectares may be reclaimed. The new lands program has been developed without major dislocations in the Soviet economy. A large part of the necessary total investment has been made, and in the future the program will impose no major strains on the economy.

On the basis of soil and climate, the major area of the new lands program may be divided into three zones.*** The Northern Zone includes the territory between the Ural and the Altay Mountains extending from the boundary of Kazakh SSR to the bogs and forests north of the Trans-Siberian Railroad. This zone is the northern part of the Asiatic spring wheat belt. The Southern Zone, the southern part of the Asiatic spring wheat belt, extends from the northern boundary of Kazakh SSR southward into the arid steppe. The Western Zone, the northeastern part of the Asiatic spring wheat belt, is largely in the European USSR and includes the southern Ural region, the northwest Kazakh SSR, and a part of the middle Volga region. The new lands program is also operative in several other relatively small areas of virgin and long-fallow land, chiefly in the southern regions of the European USSR, East Siberia, and southern Kazakh SSR.

The soils in much of the area covered by the three major zones are suitable for the production of grain. From north to south the soils are similar to those in the prairie provinces of Canada, one of the world's greatest wheat producing regions. In the new lands area of the USSR, gray-brown soils in the north merge with black soils to the south. Farther to the south are dark chestnut soils, merging with light chestnut soils in the extreme south.

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* The estimates and conclusions contained in this report represent the best judgment of ORR as of 1 November 1956.

** One hectare equals 2.471 acres; 30 million hectares, therefore, equal about 74 million acres.

*** See Figure 1, following p. 2, below.

Virtually all of the more suitable soils in the new lands probably were under cultivation in 1953. There had been unsuccessful attempts at farming, and large acreages were abandoned because of excessive salinity and alkalinity. Much of the land reclaimed in 1955, when 30 million hectares were plowed for planting in 1956, was very poor.

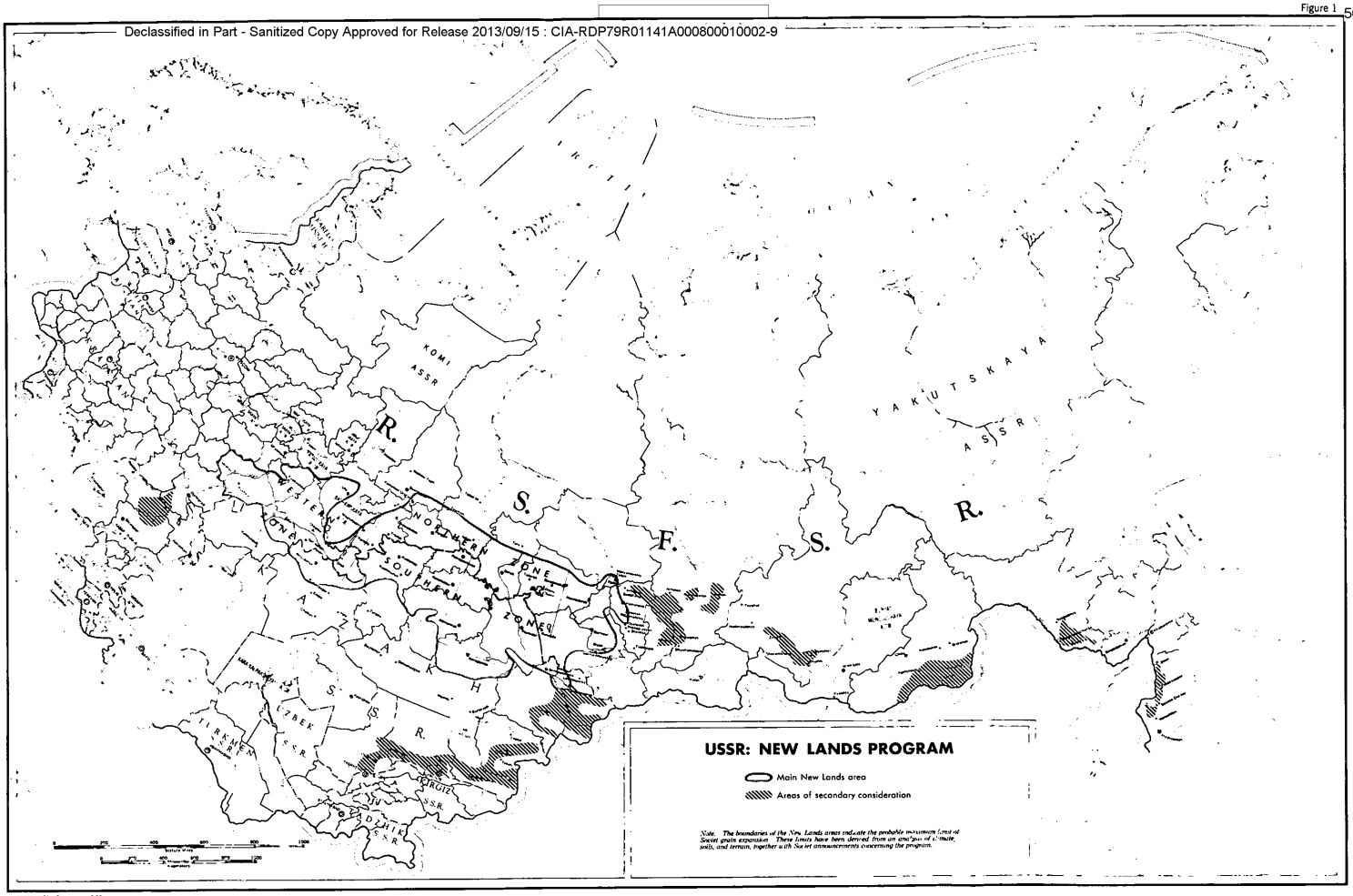
More important than the poor quality of much of the soil in the new lands are the hazards of climate, particularly in the Southern Zone, where a major part of the reclamation is taking place. Rainfall is the most critical factor. In the Northern Zone, average rainfall is about the same as that in the Canadian spring wheat belt. Annual rainfall in the Southern Zone averages less than 12 inches, a minimum below which the cultivation of crops is hazardous. The absence of mountain barriers between the three major zones and the Central Asian deserts to the south and the Arctic to the north exposes the new lands to the drying desert winds, which may cause severe droughts, and to the Arctic winds, which may bring snow as early as August.

The new lands area of the USSR is a spring crop region in which grain -- mainly wheat -- is the major crop. Available data do not permit an estimate of the acreages and yields of specific grain crops in the new lands, but it may be assumed that yields of wheat are indicative, within a reasonable margin of error, of the yields of all grain crops.

On the basis of a 16-year series of yield data for wheat grown in the areas now affected by the new lands program, a long-term average yield, weighted by the distribution of acreages in the new lands in 1954, has been estimated. The estimate indicates that with an average distribution similar to that of 1954 an average yield of 6.6 centners* per hectare may be expected in the new lands. On the basis of the 1955 distribution of acreage, however, the long-term average yield which may be expected in the new lands is slightly lower, 6.2 centners per hectare; a larger percentage of the new lands brought into cultivation in 1955 was in the Southern and Western Zones, which have poorer soils and climate.

* One centner equals 220.46 pounds. A yield of 6.6 centners per hectare is equal to a yield of about 588 pounds -- 9.8 bushels -- per acre.

Figure 1



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Wide annual variability in yields is to be expected in the new lands, particularly in the Southern and Western Zones, because of the extreme fluctuation from year to year in the amount and distribution of rainfall. This variability in yields is well illustrated by the yields obtained during the first 2 years of the program.

Almost all of the 4.3 million hectares of new land sown in 1954 was sown to wheat. Growing conditions were unusually favorable in 1954, and there was a very good grain crop. The yield is estimated at 10.5 centners per hectare, 60 percent above the long-term average yield of 6.6 centners per hectare and about 35 percent above the estimated 1954 average yield per hectare in the USSR as a whole. The average yield of 10.5 centners per hectare, when applied to the 4.3 million hectares sown to grain in the new lands in 1954, indicates gross production of about 4.5 million metric tons,* about 5 percent of the estimated total Soviet production in 1954.

During the 1955 crop year, most of the new lands suffered from a drought, and the estimated yield of 4.3 centners per hectare was less than one-half of the yield obtained in the extraordinarily good year of 1954. The yield in 1955 is about 70 percent of the long-term average yield of 6.2 centners per hectare and is about 55 percent of the estimated 1955 average yield per hectare in the USSR as a whole.

When applied to the 18.5 million hectares sown to grain in the new lands in 1955, the average yield of 4.3 centners per hectare indicates an estimated gross production of almost 8 million tons, about 8 percent of the estimated total Soviet production in 1955. Because of the much larger area sown in 1955, production of grain in the new lands in that year -- in spite of unfavorable weather -- was substantially greater than in 1954.

Soviet planners know that continued productivity of the new lands depends on a system of crop rotation, including fallow. Present plans call for the introduction of rotation systems after an initial period of 2 to 6 years of continuous cultivation. In the majority of these systems, grain crops in any one year will occupy three-fourths of the land in rotation, and fallow and perennial grasses will occupy the remaining one-fourth.

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* Tonnages throughout this report are given in metric tons.

The proposed Soviet systems of crop rotation appear to include an exceptionally high proportion of land sown to grain. In Canadian practice, only one-third to one-half of the land in rotation is sown to grain, and the remainder is fallow or sown to perennial grasses. Canadian experience indicates that the Soviet systems may deplete the soil of the new lands if abnormally heavy cropping to grain is continued for many years. It is possible, however, that Soviet agricultural planners may not press exploitation of the soil to the point of depletion before they modify the proposed systems of rotation; there is evidence that the systems of rotation to be used have not been determined finally.

Official Soviet statements about expected successes in the new lands seem to be unrealistically optimistic. The statements about expected production, for example, imply an average yield over a period of years of 10 to 11 centners per hectare, a yield which is about one-third higher than the estimated 1950-55 average yield for the USSR as a whole. On the basis of the historical yield series for the area, 6 centners per hectare would be a more reasonable estimate of the long-term average yield that can be expected in the new lands.

Khrushchev has stated that he expects the annual average production of the new lands to be not less than 33 million tons (implying a yield of 11 centners per hectare on an area of 30 million hectares). Canadian experience in crop rotation indicates that to have 30 million hectares continuously sown to grain requires that there be 60 million to 90 million hectares in the rotation system, but no program of acreage expansion of this magnitude has been implied by Soviet officials. At the end of 1955, only about 30 million hectares had been reclaimed.

Recent Soviet statements provide a basis for a more realistic estimate of potential production in the new lands. These statements indicate that the current intention is to reclaim about 40 million hectares. Experience in Canada shows that of these 40 million hectares, 13 million to 20 million could be sown to grain. With a yield of 6 centners per hectare, an average production from the new lands of 8 million to 12 million tons could be expected. This production would represent about 10 to 15 percent of the estimated average production in the USSR for the period for 1950 through 1953, the 4-year period before the inauguration of the new lands program. A gross production of 8 million to 12 million tons of grain -- after deduction for seed and waste -- indicates a net availability for direct human consumption of 6 million to 9 million tons. This quantity would supply the grain requirements of 30 million to 40 million people.

A part of the new lands program is the development of the livestock industry. The Soviet government plans to use the large areas of pasture and the increased production of straw, chaff, hay, and corn as food for great flocks and herds on each of the newly established state grain farms and state livestock farms and on the expanded collective farms. Each new state grain farm is to have between 2,500 and 5,000 head of cattle, up to 15,000 head of sheep, and 1,000 head of swine. As of 1 October 1955 the new state farms of Kazakh SSR, almost entirely within the Southern Zone of the new lands, had 89,500 head of cattle, 243,500 head of sheep, and "many pigs." These figures represent an average of about 265 head of cattle and 722 head of sheep per new state farm. Although the stocking of state grain farms has been progressing, as of 1 October 1955 livestock numbers were far short of ultimate goals.

The immediate source of livestock for stocking new state farms is apparently the privately owned livestock of collective farm households and the herds of existing livestock farms. As private ownership in animal husbandry decreases, state farms may replace collective farms as the centers of animal husbandry in the new lands. The completion of this transition, however, will depend on great improvement in the food base and heavy investment in water supplies and in shelter -- requirements which it will take many years to complete.

The new lands program is being implemented with the participation of about 10,660 collective farms, 1,740 machine tractor stations (MTS's), and an undetermined number of state farms, including 425 new state farms organized during 1954-55. In the initial phase of the new lands program the larger share of the reclamation tasks fell to existing MTS's and collective farms, which could most easily exploit the readily accessible land near them. These farm units have been relatively more important in the RSFSR, where 1,457 MTS's and about 8,960 collective farms are engaged in the program.

In establishing the 425 new state farms for the exploitation of virgin and long-fallow land in the remote areas of the new lands the Soviet authorities not only have been influenced by the suitability of the land for large-scale grain farming and by the inadequate labor resources in the region but also have been motivated by the desire to expand the state sector of agriculture. Their success in approaching

this goal is indicated by the doubling of the grain acreages of state farms in the USSR between 1954 and 1956 as a result of the disproportionately large role assigned to state farms in the new lands program. The creation of new state farms in the isolated areas of the new lands also assured the channeling of a larger share of agricultural products through the state distribution system.

Agriculture in the new lands is to be highly mechanized. Initial requirements for machinery have been met by heavy allocations of agricultural machinery to the new lands at the expense of deliveries to established agricultural areas and by loans of machinery from those areas. Loans of equipment were particularly important in facilitating the harvesting and delivery of grain to points of concentration.

The high priority assigned to the new lands is shown by the fact that deliveries of tractors to the established agricultural areas in 1954 dropped to one-half of the annual average delivery in the 3 preceding years. In 1955, however, deliveries of tractors to the established areas increased to 85 percent of this 3-year average in spite of the continuing priority accorded the new lands. Present plans call for the delivery to state farms in Kazakh SSR during 1956 of more than two-thirds as many tractors and combines as were delivered to them during 1954 and 1955.

The major effect of deliveries of agricultural machinery to the new lands probably has been a delay in the reequipment of agriculture in the established areas, particularly the grain areas, and therefore to impose temporarily a greater workload on the existing machinery park in those areas. After 1956 the mechanization problem of the new lands program will be largely one of replacement.

The tractors, combines, trucks, and other farm machinery operating in the new lands require large quantities of diesel fuel, gasoline, and lubricants. The percentage of the total Soviet production of petroleum products required for the exploitation of the new lands in 1955 is estimated to have been as follows: diesel fuel, 4.8 percent; gasoline, 4.8 percent; and lubricants, 1.9 percent. Although these quantities of petroleum products are large, they do not impose a serious strain on the resources of the USSR.

The agricultural manpower requirements of the new lands program are estimated to be 1.33 million workers, about 2.4 percent of the total agricultural labor force in the USSR. In addition, about 400,000 workers are required for the construction and maintenance of ancillary service facilities associated with the program. The manpower requirements of the new lands, therefore, are relatively small. In fulfilling these requirements, however, some specialists and skilled workers have been recruited from industry, a reversal of the usual procedure in the USSR.

Barring major changes in the new lands acreage goals the program will not be a continuing drain on the national supply of manpower, and once the initial requirements for manpower are met, maintenance of the labor force should not be a major problem.

Announced and estimated requirements for carrying out the new lands program include housing and communal facilities for about 2.8 million persons; almost 2,300 kilometers of rail line (to be completed in 1957); more than 6,000 kilometers of motor roads; granary capacity of more than 773,000 tons; and nonresidential farm buildings for 425 new state farms, new and expanded MTS's, and expanded collective farms.

It is estimated that the total cost of state construction required for the new lands program in 1954-56 is about 13 billion rubles. In addition, the cost of construction of collective farms is estimated to be 5 billion to 15 billion rubles and the cost of construction of private housing to be about 5 billion rubles.

Although expenditures for construction have been large in the new lands, they do not appear to have had a serious impact on construction in other sectors of the Soviet economy. There have been many lags in agricultural construction, and a shortage of storage facilities and elevators caused some losses of grain after the harvest of 1954. It does not appear, however, that the underfulfillment of construction plans has seriously hindered the new lands program.

At the beginning of the new lands program in 1954 the new lands, particularly the Southern Zone, had very few railroads, and most motor roads were not suited to year-round use. It was inevitable that there would be serious transport problems until the transportation system was expanded and improved. In 1954 a high volume of construction materials, fuel, and machines congested the rail system, and in September

and October, outbound traffic was snarled by the increased load resulting from the very large grain crop. During 1955 the transportation problems were not so severe, because of the opening for temporary service of several new rail lines in the new lands.

The present program of transportation construction appears to be adequate to meet the eventual needs of the new lands program. Although there were confusion and delays during the harvest season of 1956, the transportation system probably will be adequate in the future.

The new lands program has increased allocations from the Soviet state budget to the agricultural sector of the economy, but there have been no consequent reductions in the allocations to other major sectors. In relation to total allocations to agriculture and to total state investment the budget expenditures on the new lands appear to be large but not excessive. The most costly year of the new lands program probably was 1955, when the planned allocations to the new lands were approximately 20 percent of total planned allocations to agriculture. In the same year, investment in the new lands probably was less than 5 percent of total planned state investment (in terms of fixed capital) in the national economy and less than 40 percent of the 1955 total state investment in agriculture.

The development of the new lands program exemplifies some of the major strengths and weaknesses of the Soviet system. Strength is indicated by the speed with which resources were marshalled and the initial objectives attained. An important weakness of the new lands program is that it appears to have been initiated and developed without a sound preliminary analysis of the best ways to proceed and without a realistic estimate of the production of grain that could be expected. Suitable systems of crop rotation and the total area that is to be reclaimed apparently have not yet been determined.

Khrushchev's expectation of obtaining 33 million tons of grain annually cannot be realized. Over a long period the new lands probably will not yield much more than one-third of this amount. The evidence indicates that an annual yield of only 8 million to 12 million tons, 10 to 15 percent of the annual average production of grain in the USSR in 1950-53, can be expected.

Speed was apparently of great importance to the USSR in the development of the new lands. The program was initiated and implemented very rapidly. Although the USSR will need more grain in the future to feed an expanded population and although an increase in agricultural production is necessary if levels of living are to rise substantially, there was no immediate food crisis in 1954, and the haste of the program cannot be explained on economic grounds. The new lands program was dramatic and, with the probability of initial success, was well designed to win popular approval. The decision to embark on the program may have been influenced greatly by the uneasy internal Soviet political situation in 1954.

The production of grain in the new lands is dependent on the weather and other natural factors, and it may fluctuate widely. In any one year, production may be considerably above or below average. In order to maintain yields, the USSR will have to develop systems of crop rotation more suitable than those that have been discussed publicly. If the stated intention to sow three-fourths of the area to grain each year is put into practice, declining yields and large-scale wind erosion may eventually result.

Although the new lands can produce, on a long-term basis, only about one-third of the target quantity mentioned by Khrushchev, it is likely that the program will not be abandoned unless production falls to a very low level.

I. Introduction.

A. General.

In spite of the continual, optimistic claims of the USSR that socialized agriculture is the most advanced type of agriculture in the world, the Soviet government, since the inception of collectivization in 1928, has been unable to provide a satisfactory diet for an increasing population. At times, especially in the early years of collectivization and during World War II, the USSR has even been plagued by severe shortages of food.

The continued discrimination of the Soviet government against the peasantry and the low priority given to agriculture in the development of the national economy had combined to stagnate agricultural production. The harsh discriminatory policies of the Stalinist regime after World War II had acted as a deterrent to agricultural production. The situation in animal husbandry was particularly bad, with the prospect of becoming worse. From 1940 to 1952, according to Khrushchev, agricultural production had increased only 10 percent, whereas industrial production had increased 2.3 times. In 1953 the Soviet leaders began to take extraordinary measures aimed at substantially increasing the lagging agricultural production.

At the time of the pronouncements of Khrushchev in September 1953, it was apparently the Soviet intention to increase the availability of farm products within the framework of the existing farm economy. Although allusions were made to the expansion of acreage, increased farm production was to result primarily from increasing yields through improved varieties and techniques and from providing greater incentives to the peasants. It is possible that the poor harvest of 1953 may have had some influence in prompting Soviet leaders to take immediate steps to provide the needed increase in food supplies -- not only in grain but also in livestock products. On 28 March 1954 a joint Party-government decree called for a minimum expansion of 13 million hectares in the grain-growing districts of Kazakh SSR, Siberia, the Urals, the Trans-Volga area, and the North Caucasus. Immediately after this decree, in the spring of 1954, 4.3 million hectares, largely on the peripheries of existing farms, were plowed and sown. By 10 August 1954, more than 14 million hectares of virgin and long-fallow land* had been plowed for sowing in 1955, 1 million hectares more than planned.

The Central Committee of the Communist Party and the Council of Ministers of the USSR "viewed these successes ... as the beginning of a great national cause for increasing the production of grain ... ." They more than doubled the original goal for the reclamation of virgin and long-fallow land and increased the ultimate acreage to be plowed for sowing in 1956 to from 28 million to 30 million hectares. More recently it has been stated that in the whole new lands area of Kazakh SSR and the RSFSR the government planned to reclaim approximately 40 million hectares, of which about 10 million hectares were to lie fallow each year.

* Virgin land is defined as land that has not been plowed for 25 years, and long-fallow land is defined as land that has lain idle from 2 to 25 years. 1/ [redacted] 50X1

The new lands program essentially involves an increase in the production of wheat and millet for human consumption. Although more fodder crops may be sown in the area in the future, the present pattern of land use in the new lands is not oriented to the needs of animal husbandry. The development of animal husbandry in the USSR is to be facilitated primarily by the expansion of corn acreage in the European USSR. The successful exploitation of the new lands as one of the primary grain surplus areas in the USSR is expected to permit this shift to corn chiefly in the Ukraine and in the southern European USSR.

B. Basic Agricultural Problems.

The basic agricultural problems facing the Soviet leaders are the control of production, procurement, and distribution of agricultural products. As Khrushchev stated, "A Communist Society cannot be built without an abundance of bread, milk, meat, butter, vegetables, and other produce." 2/ Not only must the abundance be produced, but also, under the Soviet system, a large share of this production must be procured by government agencies for distribution to the rapidly increasing group of nonproducers. If this system fails, the USSR, whether socialist or Communist, must resort to imports.

Procurement of farm products has been a major problem in the USSR since the beginning of the Bolshevik regime. From the government point of view the ideal solution would have been a system of state farms owned and operated by the government with all of the production made available to the distribution agencies. A few hundred such state farms were established, including the giant "grain factory" in the semiarid steppe of the North Caucasus and the giant swine farm near Khar'kov in the Ukraine. State farms have continued to the present and have even been increased in numbers, but the gigantic grain factory and swine farm proved to be impractical.*

The major effort of the USSR to facilitate procurement of agricultural products and to gain more effective control over the countryside was centered in the establishment of a system of collective farms and MTS's. In the early 1930's, about 25.6 million individual peasant

* There may have been other such farms established on the semiarid steppe of the new lands, but if they were established, they probably have been abandoned. 3/

households were consolidated into a few hundred thousand collective farms. 4/ MTS's, which are in essence state-owned pools of agricultural machinery, were set up to effect the mechanization of farm operations and, in addition, to exercise certain control functions.

On the whole, the socialized sector of Soviet agriculture (state farms, collective farms, and MTS's) -- up to the outbreak of World War II -- had failed to achieve the results in production and procurement hoped for by the Soviet planners. This situation became worse during the war, and after the war recuperation was slow. It was not until the favorable 1952 harvest that the production of grain regained the 1938 level. 5/

Nonproducers had not been able to obtain required subsistence from state-operated stores and had had to purchase a considerable part of their food at the open or collective farm markets. A large part of the produce available at these markets was produced by the nonsocialized sector -- by the private gardens and the privately owned livestock herds of the collective farm households. The USSR has succeeded in improving somewhat the production of breadgrain, particularly wheat for human consumption, but has done it by reduction in the acreages to coarse grains for feeding livestock. By 1953, however, the total grain acreage was still below that estimated for 1938 (present boundaries). 6/

Attempts also had been made to build up the production and procurement of meat, milk, butter, and eggs; but these attempts were handicapped not only by reduced numbers of livestock but also by insufficient supplies of feedstuffs, particularly grain. Primarily to facilitate procurement, steps were taken both before World War II and during the 1949-51 period 7/ to increase socialized flocks and herds by inducing collective farm households to turn over privately owned livestock to the communal herds of the collective farms. By 1953, as a result, a considerable percentage of the peasant households were left without cattle, with an increasingly bitter attitude toward collectivization, and with an apathy toward working on the communal fields and in the livestock brigades of the collective farms.

The acreage and production of potatoes not only was less than before the war but also, considering the USSR as a whole, had decreased from 1950 to 1953. 8/ The collective farm households were more interested in producing surpluses on their own private garden plots for sale on the free market than they were in working on the communal fields of the collective farms.

The collective farm management, furthermore, was unable to cope with the apathetic attitude of farm workers and the consequent decreasing production. Most farm chairmen were incapable of handling large-scale agriculture, and a chairman often maintained his position for less than 1 year. Some farms changed chairmen 2 or 3 times a year. 9/ More often than not, work was performed in neither a timely nor an adequate way.

Even the activities of the government-owned-and-operated MTS's were unsatisfactory. The overwhelming majority of the directors, chief engineers, and even the agronomists of the MTS's were without adequate higher education. The machines rented by the MTS's to the collective farms usually were operated inefficiently by the all-too-hastily trained collective farmers. According to Khrushchev, a boy might spend 2 to 3 months attending courses. He would be told the salient points about operating a machine and then be put behind the wheel. 10/ He usually could not plow a straight furrow or seed in a straight line. He did not always know how to keep a tractor or combine in adjustment. To perform his norm, he might plow too shallow or he might leave unseeded gaps between rows.

C. Agricultural Decrees of 1953.

Before 1953, Soviet leaders repeatedly stated that an increase in agricultural production and procurement could be created by a reorganization of the administration of farm operations, by improving the effectiveness of mechanical and other techniques, and by increasing the availability of the means of production. They also believed that in coping with the capitalistically minded, apathetic farm workers "the vital task /in the improvement of agriculture/ is to increase the importance of the Party" -- that is, to strengthen Party control over the countryside. 11/

To consolidate Party control over the countryside and at the same time to facilitate the procurement of farm products,* in 1950 the government rescinded the charter guaranteeing the inviolability of each collective farm boundary. By 1953, about 254,000 separate collective farms had been consolidated into 94,000 large farming enterprises, 13/ each of which included 2 or more former collective farms.

* Other reasons such as facilitating mechanization and crop rotation have been given. 12/

In 1951 the Soviet government attempted to go even further and began to take steps toward consolidating two or more villages on each of the large farming enterprises into a single population center, which Khrushchev, the sponsor of this plan, called a collective farm settlement. 14/ This consolidation meant the loss to the collective farm households of the ancestral private garden plots that had been cultivated by their families for generations. Although other conveniently located garden plots were promised, the villagers, already bitter over the loss of their privately owned livestock, threatened to create a crisis in the collective farm economy. The plan of the collective farm settlement had to be abandoned temporarily. 15/ The morale of the collective farm households, some of whom had entertained hopes that the whole system of collective farms might be abandoned, was low; and the incentive to work in the socialized sector was feeble.

There was little improvement in the general situation during 1951 and 1952. Although favorable weather conditions in 1952 somewhat increased the production of certain field crops, animal husbandry was in bad condition and was likely to become worse. 16/ From 1940 to 1952, while industrial production increased 2.3 times, the total production of agriculture, according to Khrushchev, rose only 10 percent. 17/ Against this background, the agricultural decrees advocated by the Soviet Communist Party were announced toward the end of 1953. In spite of promises and plans, no appreciable change in the quality of the diet of the inhabitants of the USSR had been effected by 1953.

As indicated above, moreover, the collective farm household with its private garden plot and its privately owned livestock was essentially "capitalistic" and thus at variance with a government-controlled economy. The use of pressure to weaken the position of the household economy had not produced the desired result of forcing the peasants to work harder in the socialized economy of the collective farms. Concessions therefore had to be made.

In Khrushchev's pronouncements on 3 September 1953 18/ the government reiterated the right of the collective farm household to retain "its small personal plot to satisfy its consumer needs" and forbade "the practice of infringing the interests of collective farmers with regard to livestock in their private possession." The norms for required deliveries for both collective farms and collective farm households were reduced, and the prices paid for both required deliveries and such surpluses as might be sold to the government were increased. At the same time, prices charged to nonproducers of foodstuffs in government stores were decreased.

The Soviet government decreed the cancellation of arrears in collective farm deliveries of livestock products and proposed that a similar action be taken for collective farm households. The government temporarily reduced certain taxes and offered bonuses and advance payments. The availability of consumer goods was to be advanced.

All of these measures to stimulate collective farm households to perform more and better work, not only in the sector of the socialized economy but also in the private household economy, were designed to create an "upsurge" in agricultural production.

The pronouncements of 3 September 1953, however, left no doubt that in producing this "upsurge" in agriculture, the MTS's would become the "decisive force in agricultural production." Given control over the operations of the collective farms, the MTS's were charged with the following tasks: (1) increasing yields of crops, (2) obtaining an increase in the socialized herds of livestock with a simultaneous rise in productivity, (3) completing mechanization of field crop production, (4) increasing the total production as well as the production for the market of farm and animal products in the collective farms they serve, (5) extending the mechanization of labor-consuming processes in animal husbandry as well as in the production of potatoes and vegetables, (6) introducing into collective farm production the achievements of science and the best agricultural practices, (7) insuring the further organizational and economic consolidation of collective farms, and (8) improving the material well-being of the collective farmer.

To insure the position of the MTS's as "the decisive force in agricultural production," the number of MTS's was to be increased, and thousands of engineers from industry and technical institutes were to become directors and other officials. Tens of thousands of agronomists and technicians were to be attached to the staffs of the MTS's. Other tens of thousands of tractor drivers, combine and excavator operators, assistants, recordkeepers, and mechanics were to be permanently employed, and other thousands were to work on a seasonal basis. Appropriate additions of equipment, of all kinds of machines, and of fuel for motors were to be provided, and proper storage and repair facilities were to be built.

Never forgetting that "the vital task in the improvement of agriculture is to increase the importance of the party," the government proposed to send some 50,000 tested Communists to the countryside "to direct them to the strengthening of the villages."

With the exception of the resolution of the government to expand the potato acreage by 4,128,000 hectares and the vegetable acreage by 1,300,400 hectares in 1954, little was said in all these plans about increasing acreages. It appears that in creating an "upsurge" in production, the Soviet leaders were placing emphasis on reorganization and on increasing yields through better breeds, better and more mechanized techniques, and the use of more mineral fertilizer.

D. Formulation of the New Lands Program.

Although Khrushchev, in his speech of 3 September 1953, emphasized building up production by increasing yields, the Central Committee of the Party in its Resolution on Agriculture took a further step. The Committee first stated that it was considered necessary to develop "the raising of winter and spring wheat ... by increasing the yield further in the major regions where it is grown as well as in the regions of the central black soil belt and the districts on the right /west/ bank of the Volga." These regions are all in the European USSR. Forecasting developments in the new lands, the Committee further stated: "The production of hard wheat in the regions of the South East, Kazakhstan, and Siberia must be increased." 19/ This statement may be construed as implying increases in acreage. The "corn program" was also forecast: "Considerably more corn must be sown in the southern, southeastern, central black-soil belt and the non black-soil regions." 20/ These statements, incidentally, put an end to the myth propagated by Malenkov that the grain problem had been solved "definitely and finally." 21/ It is possible that the poor crop of 1953 may have had some influence in prompting the USSR to embark on the so-called "new lands program" at this time.

Newspaper references to the reclaiming of virgin and long-fallow lands began to appear in December 1953 and continued to appear in increasing numbers during early 1954. Tentative outlines of the program were announced piecemeal in a series of forums held in Moscow during January and February. These forums, convened by the Central Committee to propagandize the new lands program, included conferences of academicians, MTS workers, state farm workers, "leading agricultural workers," and Komsomols of the Moscow area. 22/ A Party call for volunteers appeared in Izvestiya on 23 February 1954.

The formal basis for the development of the new lands program, the joint Party-government decree of 28 March 1954 (which was presaged by Khrushchev's address to the Central Committee Plenum and the Plenum's decision on the subject), called for a minimum expansion of 13 million hectares in the grain-growing districts of Kazakh SSR, Siberia, the Urals, the Trans-Volga area, and the North Caucasus. This expansion was to take place by the reclamation of virgin and long-fallow lands during 1954 for planting in 1955. Of this acreage, 4.3 million hectares were to be reclaimed by state farms and 8.7 million hectares, by collective farms.

In 1954 the state farms were to reclaim and sow 500,000 hectares, and the collective farms, 1.8 million hectares, a total of 2.3 million hectares.* The remainder was to be sown for the first time in 1955. In addition to the goal of 13 million hectares, the decree "approved the initiative" of local organs which had volunteered to reclaim a total of more than 1 million hectares over the plan. 24/ Both the plan for sowing virgin and long-fallow land in 1954 and the plowing of land in 1954 to be sown in 1955 were overfulfilled by 10 August 1954. 25/ A total of 14.1 million hectares had been plowed by this date (including 719,000 hectares in districts not included in the original plan) against the goal of 13 million hectares.

The Central Committee of the Party and the Council of Ministers "viewed these successes ... as the beginning of a great national cause for increasing the production of grain in the country by the reclamation of unutilized fertile land." Accordingly the program was more than doubled by a joint decree published on 17 August 1954 26/ entitled "Further Reclamation of Virgin and Idle Land for Increasing the Production of Grain." This decree raised the original goal for total sowing on new lands from 13 million hectares in 1955 to from 28 million to 30 million hectares in 1956. It was later stated that in the whole area (Kazakh SSR and the RSFSR) it is planned to reclaim approximately 40 million hectares of land, of which about 10 million hectares will lie fallow each year. 27/

The new lands program involves essentially an increase in the production of wheat and millet. The reason for expanding the production of the food grains (wheat and millet) was, in the first instance,

* It was initially reported that 3.6 million hectares of new lands were plowed and sown in 1954. More recent evidence, however, indicates that the 1954 acreage reached 4.3 million hectares. 23/

to provide sufficient additional bread to take care of the annual population increase. Khrushchev gave certain additional reasons for the program: (1) to provide a continuing increase in the standard of living, (2) to feed the increasing number of nonproducers created by the shift of population from the rural areas to the urban centers, (3) to supply more grain to the rural areas engaged in growing technical and other nonfood crops, (4) to provide reserves to meet any eventuality, and (5) to export grain.

At a later date, Khrushchev stated: "The main reason behind the need for an additional quantity of grain is that we must sharply increase the production of fodder to meet the requirements of the livestock husbandry." 28/ The necessity of further increasing the grain supply to meet the additional requirements of planned expansion of animal husbandry brought the Soviet leaders to the so-called "corn program." This program parallels the new lands program and is essentially part of a single program the purpose of which is to establish an adequate grain base as a decisive prerequisite for an "upsurge" not only of husbandry but of all agriculture as well. In Khrushchev's words, to obtain a "successful solution of the tasks of Communist building, it is necessary to have alongside a powerful industry a comprehensively developed agriculture able to produce as much foodstuffs and agricultural raw materials as are required for an uninterrupted supply to the population and to cover other needs of the country." 29/ The acreages devoted to grains for feeding livestock in the USSR were not sufficient to produce the quantities planned by the Soviet leaders. A decree of February 1955 provided, therefore, that the 3.5 million hectares of corn seeded in 1953 be expanded to not less than 28 million hectares in 1960. 30/ This expansion was to take place largely in the European USSR.

It is not the purpose of this report to analyze the corn program, which will be discussed in detail in a forthcoming report. A brief comparison of the new lands program and the corn program, however, is given.

E. Comparison of the New Lands Program with the Corn Program.

The decree issued by the Soviet government in February 1955 planned the expansion of the corn acreage from 3.5 million hectares seeded in 1953 to 28 million hectares in 1960. 31/ Other than a

relatively small acreage in the Georgian SSR (Region V,* Transcaucasus), the area seeded to corn for the production of grain was almost exclusively restricted to the European USSR. Except for a few thousand hectares in southern Voronezhskaya Oblast (Region VII, Central), practically no corn for the production of grain had normally been seeded above 50 degrees north latitude, which is the latitude of the city of Khar'kov in the northern Ukraine.

About one-fourth of the 3.5 million hectares of corn seeded in 1953 was concentrated in the territories acquired from Rumania at the close of World War II, almost exclusively in the Moldavian SSR. Another one-fourth of this acreage was seeded in the areas adjacent to the Caucasus Mountains, chiefly in Krasnodarskiy Kray and the Georgian SSR. The remaining one-half of this acreage was scattered throughout the Ukraine and in the valley of the Don River. None of these areas is remotely comparable to the Illinois and Iowa corn belt in the US. Except for a few thousand acres in Minnesota and North Dakota, no corn in the US is grown for the production of grain, and little is grown for silage, north of the 45th parallel, which passes through Minneapolis. 32/

In launching the corn program the Soviet government stated that corn was to be seeded wherever it would grow and regardless of whether or not it would mature. The European USSR has an area in which corn will produce ears that normally ripen enough to be garnered as grain. To the north of this area is a belt of considerable latitude in which corn plants produce immature ears with a high moisture content. This corn can be conserved in the form of silage. Soviet officials claim that this corn-ear silage can be fed to swine and chickens in place of sound (dry) grain and that the rest of the plant can be ensiled as feed for other livestock, particularly dairy cattle. 33/ The northern and southern boundaries of this belt will fluctuate with the yearly fluctuations of climate and will be determined to some extent by the earliest frost. It is the further intention of the USSR to seed corn for use as green fodder and silage in the European USSR and in the Asiatic USSR as far north as corn will grow. Moderate acreages of corn for grain, silage, and green fodder have invaded even the new lands.

50X1

Although collective farms theoretically are to formulate their own plans as to where and to what extent they are to seed corn, they have received a mandate to expand corn acreage "by as much as is required to maximize grain production." Under this mandate, the corn acreage, chiefly in the European USSR, was expanded to 17.9 million hectares in 1955. 34/

As indicated above, the corn program is to be largely restricted to the European USSR. The crop not only is to use lands not otherwise sown to grain but also is to replace other grains, particularly oats and barley, which may not give such profitable returns. Some corn was seeded on fallow lands and even on small acreages of virgin lands. In general, however, the corn program contrasts sharply with the new lands program in which expansion of acreage is to be chiefly in the Asiatic USSR and which is largely directed toward the use of virgin and long-fallow lands.

There are other sharp contrasts between the two programs. Corn is an intensively cultivated crop which can use hand labor. Acreage is to be expanded in land-poor regions -- in regions, that is, where arable land per able-bodied worker may be as little as 1 hectare (Zakarpatskaya Oblast in the western Ukraine) and 4.2 hectares (Gor'kovskaya Oblast in the north of the non-black-soil region). 35/ Although the government plans to produce special machinery for seeding, cultivating, harvesting, drying, and ensiling corn, its expenditures on the program up to 1955 have been moderate, and much of the work has been performed by hand. The burden of "maximizing grain production" has been left on the shoulders of the collective farm workers themselves. On the other hand, the new lands program involves extensive, as contrasted with intensive, cultivation of the land and is being carried out in land-rich regions where arable land per able-bodied worker ranges from 14.8 hectares (Novosibirskaya Oblast in West Siberia) to 34 hectares (Pavlodarskaya Oblast in Kazakh SSR). The government is making heavy expenditures to supply tractors, seeders, combines, dryers, storage capacity, other means of production, housing, and transportation to implement the program.

The corn program is associated with plans to increase livestock numbers and to make available more meat, fats, milk, and other high-quality foods to improve the domestic diet. The program is being developed near large centers of consumer demand. In contrast, the new lands program is being developed in areas far from centers of use and is associated with increasing the wheat and millet supply, primarily for human consumption.

The two programs, which are being developed simultaneously, have the common purpose of supplying an abundance of food for building up a Communist society. Although the two programs are common in ultimate purpose, they are not without elements of competition, and they may tend to handicap each other.

The corn program is being carried out in areas where the conditions of soil and climate are not particularly propitious for the production of corn as dry grain. On the other hand, the physical factors affecting production in the major regions where the new lands program is being developed are positively hazardous.

II. Physical Factors Affecting Production.

A. General.

When the USSR began to outline plans for expanding acreages into virgin lands and into lands which had long been fallow, areas widely scattered throughout the European USSR and the Asiatic USSR were marked for development.* Many of these areas are relatively small, and exploitation of them will involve no real problems of administration or organization. The major problem facing the USSR is the successful exploitation of a large and more or less continuous area which includes the northern rayons of Stalingradskaya Oblast and most of Saratovskaya and Kuybyshevskaya Oblasts in Region VI (Volga) 36/; Chkalovskaya Oblast, the western rayons of Bashkirskaya ASSR, southeastern Sverdlovskaya Oblast, and most of Helyabinskaya Oblast in Region VIII (Urals) 37/; all of Region IX (West Siberia) lying south of a line from the city of Tyumen', passing just south of Tara to the Ob' River, and thence northeast to the city of Tomsk 38/; and the northern part of Kazakh SSR in Region Xa (Kazakhstan).** 39/ This is the area that for the purposes of this report is called the "new lands."

On the basis of soil and climate and other factors affecting agricultural production,*** the new lands may be divided into three major geographic zones:

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* See Figure 2, following p. 22.
** See Figure 3, following p. 22.
*** See Figures 4, 5, 6, and 7, following p. 22.

The Northern Zone consists of the southern part of Sverdlovskaya Oblast and most of Chelyabinskaya Oblast in Region VIII and the southern part of Tyumenskaya and Tomskaya Oblasts; most of Altayskiy Kray and Omskaya, Novosibirskaya, and Kemerovskaya Oblasts; and all of Kurganskaya Oblast in Region IX. This zone is the northern part of the Asiatic spring wheat belt.

The Southern Zone consists of all of Severo-Kazakhstanskaya, Kokchetavskaya, and Pavlodarskaya Oblasts and the northern parts of Aktyubinskaya, Kustanayskaya, Akmolinskaya, Karagandinskaya, Semipalatinskaya, and Vostochno-Kazakhstanskaya Oblasts in Region Xa (Kazakhstan). This zone is the southern part of the Asiatic spring wheat belt.

The Western Zone consists of Chkalovskaya Oblast and part of Bashkirskaya ASSR in Region VIII; most of Kuybyshevskaya and Saratovskaya Oblasts and the northern part of Stalingradskaya Oblast in Region VI; and the northern part of Zapadno-Kazakhstanskaya Oblast in Region Xa. This zone is the northeastern part of the Volga spring wheat belt.

B. Northern Zone.

1. General.

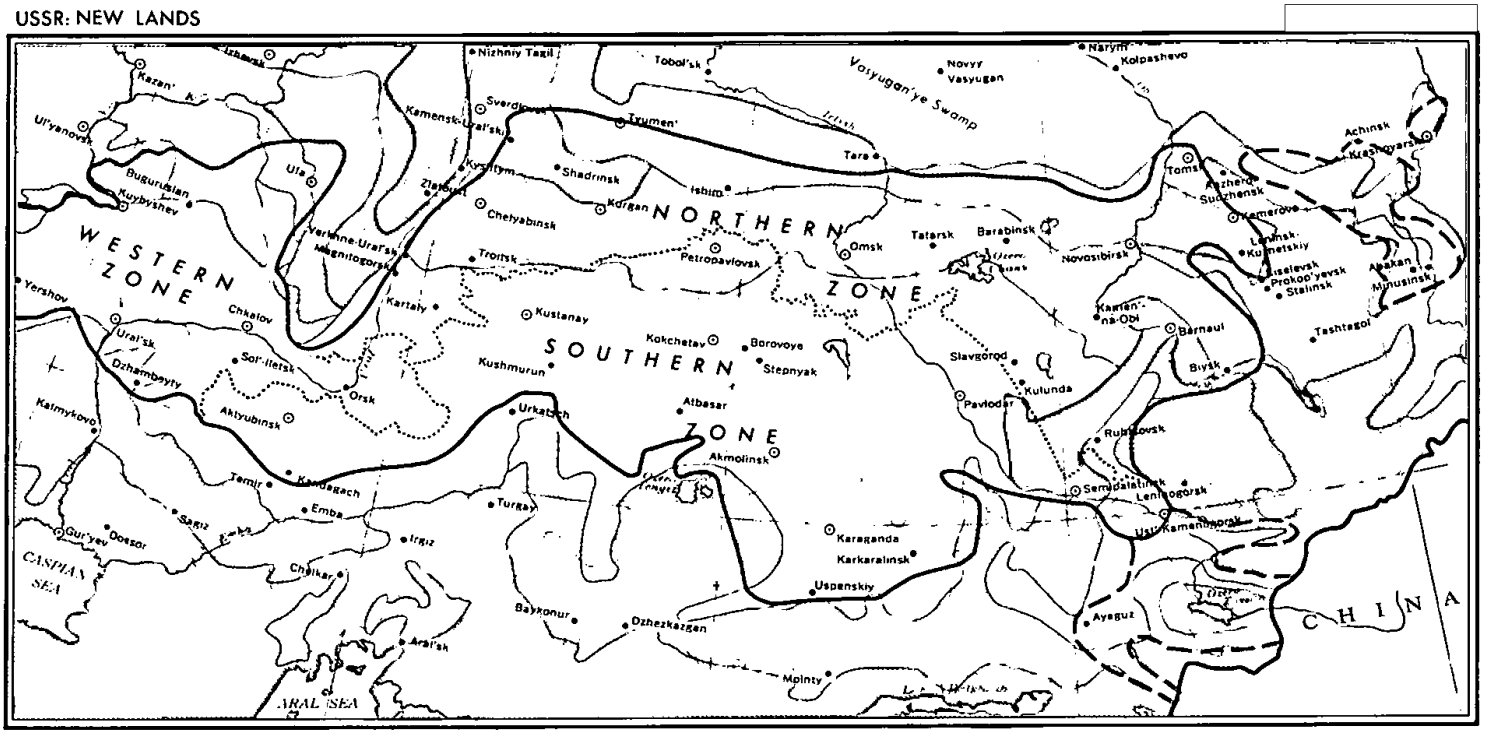
The greater part of the Northern Zone of the new lands is a plain. The water table is high and may be no more than 1 or 2 meters below the surface. 40/ The drainage of much of this zone is poor, marsh lands are frequent, and potholes -- often large ones -- are scattered over the area. The water in the potholes may be fresh in the north, but in the south it is often saline.

Largely because of the proximity of ground water but also because of the character of the soil, meadows and pastures parallel certain of the river bottoms and border the lakes and undrained water holes on the ridges. Wooded areas are dense in the north and scattered in the south. Also scattered throughout the zone are soils unsuitable for cultivation -- saline soils, meadow swamp soils, leached soils in the birch forests, sandy soils on the piney terraces, and stony soils and eroded soils on the steep slopes. 41/ Among those soils that grow only grass weeds or sedges are areas where cultivation of crops is practical, and level stretches are well suited to mechanized agriculture. From the time in the nineteenth century when political offenders from

50X1

Figure 2

USSR: NEW LANDS



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NATURAL REGIONS

based on climate and natural vegetation

- Union Republic boundary (SSR)
- Oblast, Kray or Autonomous Republic (ASSR) boundary
- ⊙ Administrative center (Oblast, Kray or ASSR)

- Taiga
- Deciduous forest
- Wooded steppe
- Steppe
- Dry steppe and semi-desert
- Desert
- Mountain vegetation
- Limit of main New Lands area
- General limit of secondary areas

50X1

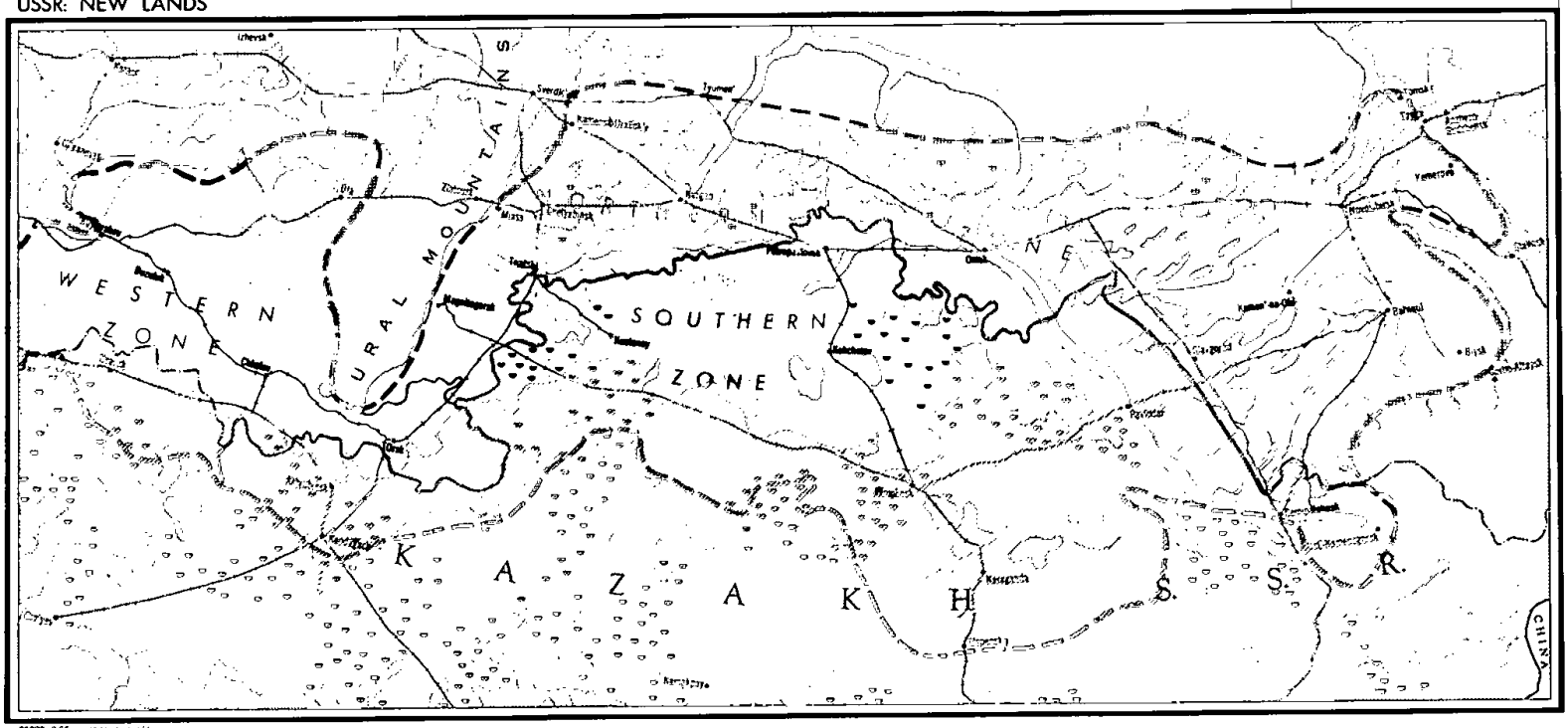
0 100 200 300 Miles

0 100 200 300 Kilometers

50X1

Figure 3

USSR: NEW LANDS



SOIL TYPES

- General limit of the main New Lands area
- Northern boundary of Kazakh SSR
- Principal railroad
- Podzol and bog soils
- Gray-brown podzolic soil
- Alluvial flood-plain soil
- Chernozem
- Degraded chernozem
- Meadow-chernozem
- Dark chestnut soil
- Light chestnut soil
- Desert soils
- Sands
- Mountain or highland soil
- Solonchak (saline soil)
- Solonetz (alkali soil)
  - Extensive areas
  - Scattered patches

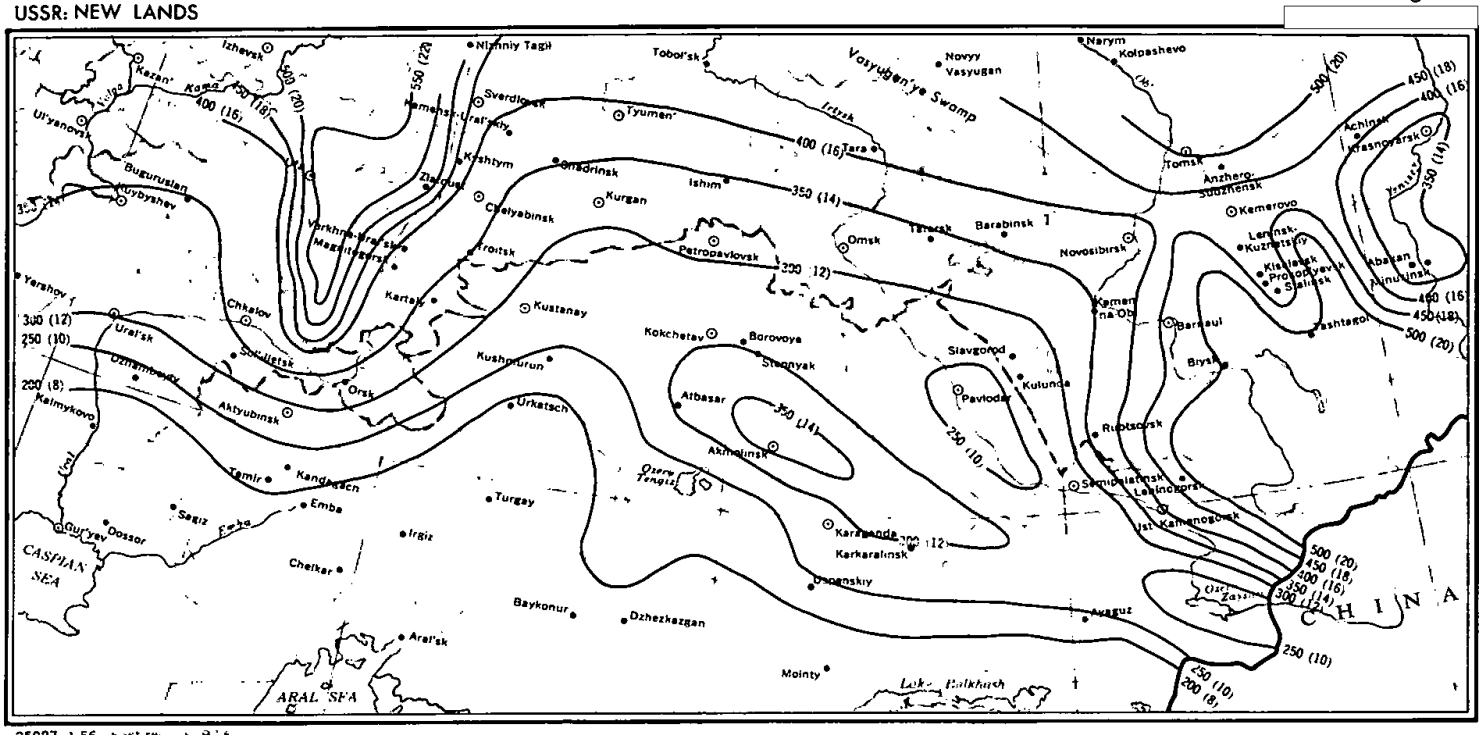
50X1

0 100 200 300 Miles
0 100 200 300 Kilometers

50X1

Figure 4

USSR: NEW LANDS



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AVERAGE ANNUAL PRECIPITATION

(in millimeters)

(approximate inch equivalents are shown in parentheses)

— Union Republic boundary (SSR)

Oblast, Kray or Autonomous Republic (ASSR) boundary

⊙ Administrative center (Oblast, Kray or ASSR)

Main New Lands area

[redacted] 50X1

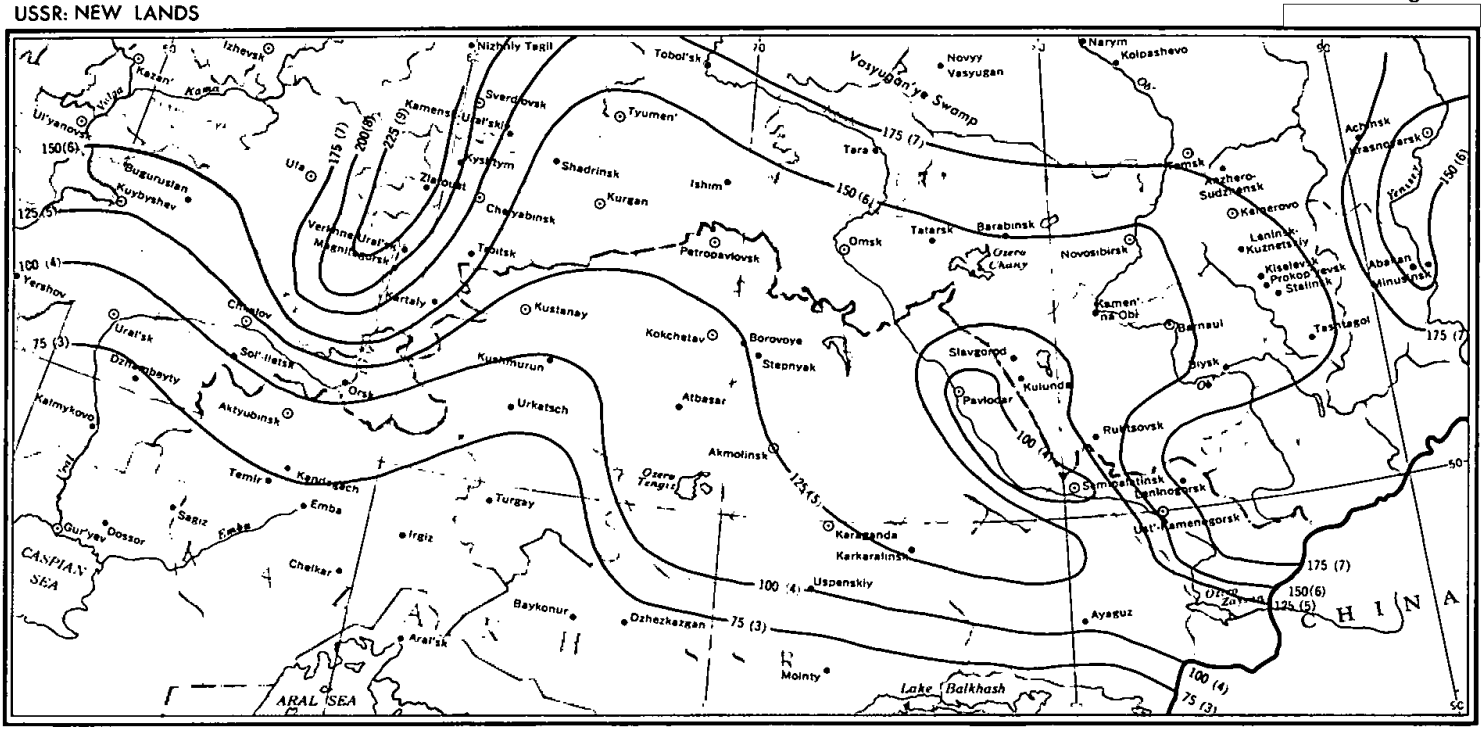
0 100 200 300 Miles

0 100 200 300 Kilometers

50X1

Figure 5

USSR: NEW LANDS



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AVERAGE TOTAL PRECIPITATION FOR MAY-JUNE-JULY

(in millimeters)

(approximate inch equivalents are shown in parentheses)

— — Union Republic boundary (SSR)

— Oblast, Kray or Autonomous Republic (ASSR) boundary

⊙ Administrative center (Oblast, Kray or ASSR)

Ma : New Lands area

0 100 200 300 Miles

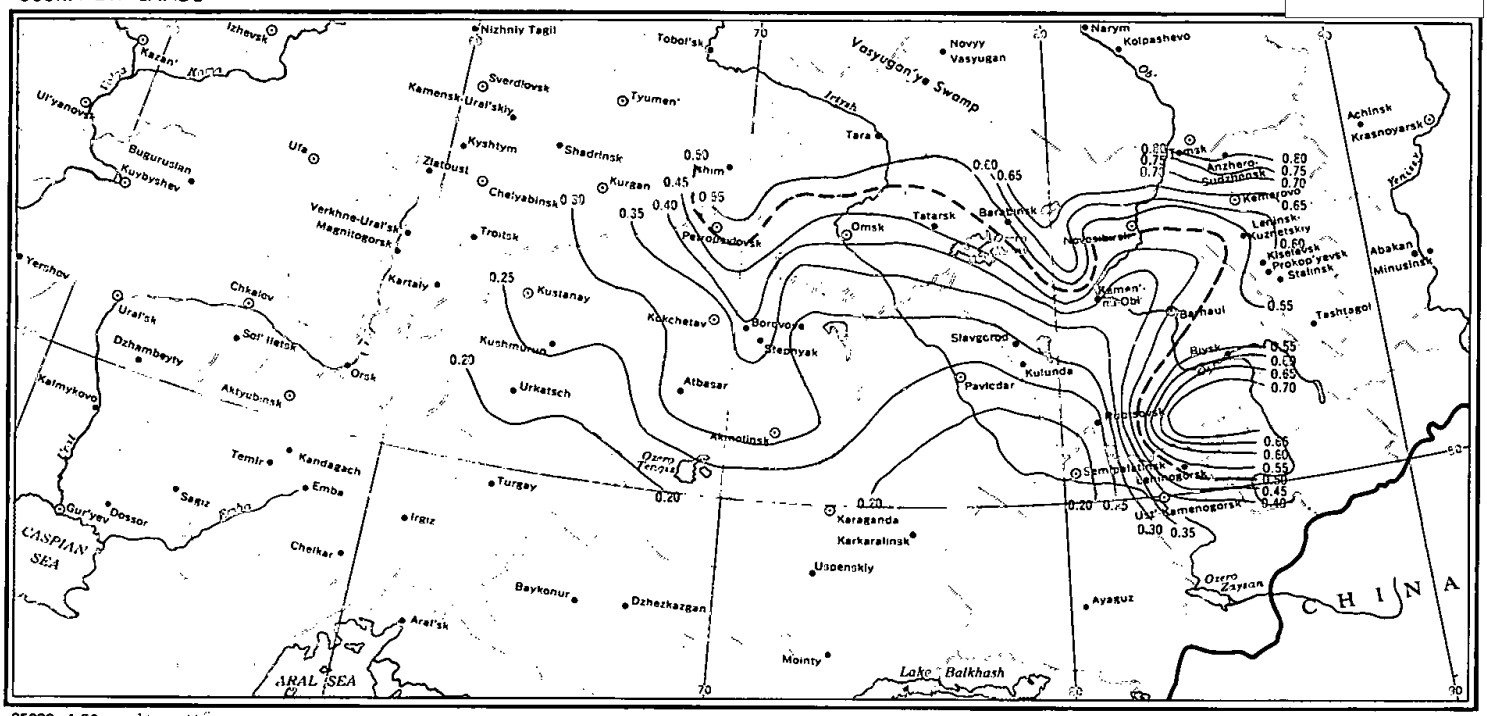
0 100 200 300 Kilometers

50X1

50X1

Figure 6

USSR: NEW LANDS



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MOISTURE ZONES*

0.5 and above ..... Sufficient moisture
0.2 — 0.5 ..... Deficient moisture
Less than 0.2 ..... Meager moisture

Union Republic boundary (SSR)
Oblast, Kray or Autonomous Republic (ASSR) boundary
Administrative center (Oblast, Kray or ASSR)

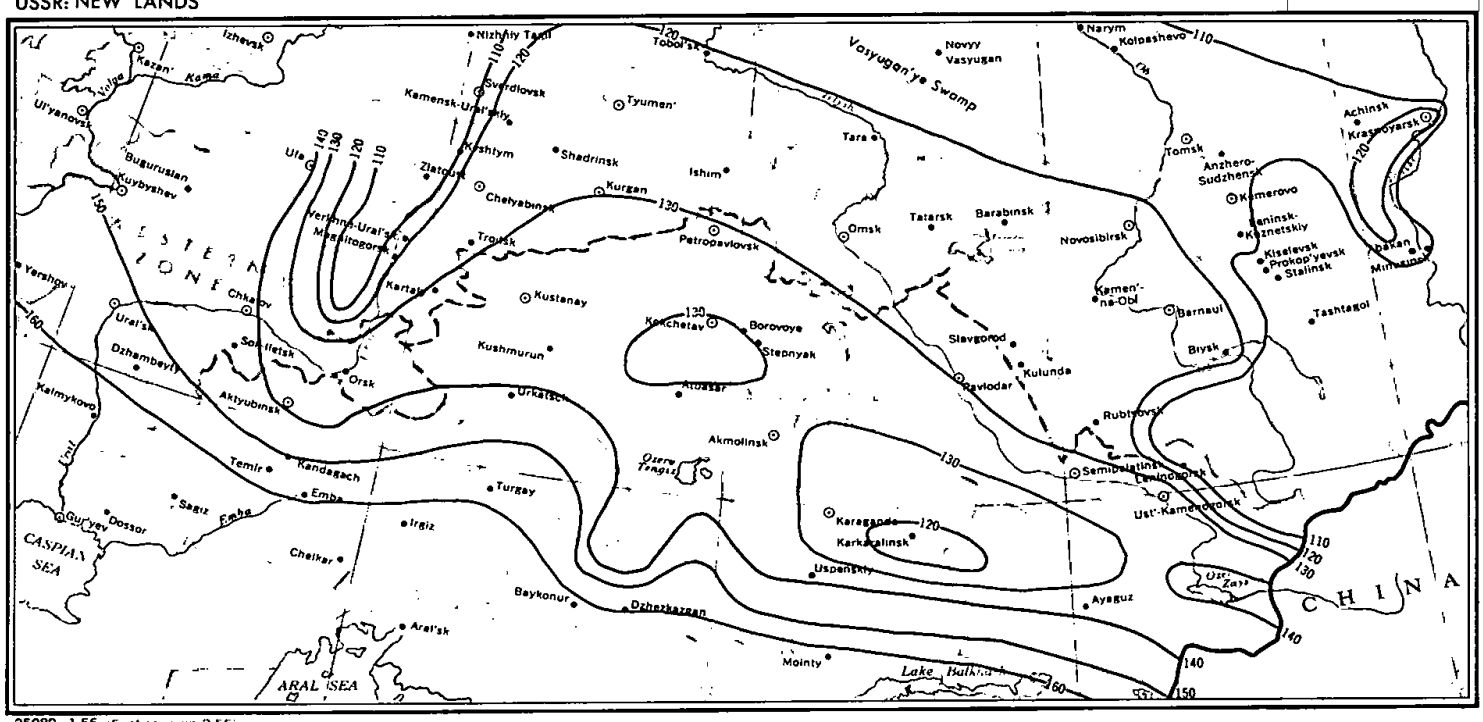
*by coefficients of moisture based on relation of precipitation to maximum potential evaporation. (according to Soviet Geographer N. N. Ivanov).

50X1

50X1

Figure 7

USSR: NEW LANDS



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AVERAGE DURATION OF THE FROST-FREE SEASON

(number of days)

— — Union Republic boundary (SSR)

Oblast, Kray or Autonomous Republic (ASSR) boundary

⊙ Administrative center (Oblast, Kray or ASSR)

Main New Lands area

0 100 200 300 Miles

0 100 200 300 Kilometers

50X1

European Russia were herded into farming groups and scattered along the "exile trail" from Novosibirsk to Barnaul, the suitability of different soil types for production of field crops has been tried out. After such experiments, many potential farm sites were abandoned. Marginal lands were left fallow for many years and became overgrown with weeds and grass. For the most part, however, where the water table is not too high, the soil not too saline, and the climate not too inclement, the better soils were being exploited in 1953 as collective and state farms. The new lands program provides for the reclamation of much of this virgin and long-fallow land. The USSR planned to plow 4,481,000 hectares of such lands in the Northern Zone in 1954 for sowing in 1955. Of this acreage, 51.6 percent, 2,310,000 hectares, were to be reclaimed in Altayskiy Kray. 42/

2. Altayskiy Kray.

Altayskiy Kray 43/ is in the southeastern corner of Region IX and is by far the most important district in the new lands. In the drainage basin of the Ob' River, at the foot of the forested Salair Ridge and Altay Mountains, are large areas of virgin and long-fallow lands comprising four natural belts. The lower foothills are wooded steppe country which has a variety of good farming soils, but the possibility of erosion must always be considered. Climatic conditions are most favorable for the cultivation of grain crops. Between the foothills and the Ob' River is a rolling steppe with rich black soil (chernozem)* similar to the wheat soils of eastern Kansas and Nebraska. West of the Ob' River on the Priobskiy plateau, soils are lighter, merging into semiarid steppe and arid steppe toward the south. In the flat depressions the soils are saline.

3. Novosibirskaya, Kemerovskaya, and Tomskaya Oblasts.

North of Altayskiy Kray, in the drainage basin of the Ob' River, lie Novosibirskaya, Kemerovskaya, and Tomskaya Oblasts. 44/ In general, this area is not as good farming country as is Altayskiy

* There are 10 types of black soils (chernozems) in the USSR. Such black soils have been formed in various areas throughout the world on lands that were covered with grass for thousands of years. The grasses have brought the mineral plant nutrients up toward the surface of the soil. Through the centuries the grasses have added organic matter to the soil. The organic matter and the available mineral nutrients make the soil highly productive.

Kray. Along the Ob' River there are large massifs of sand and pine forests. Kemerovskaya Oblast is divided by a forest-covered mountain massif (Kuznetskiy Ala-Tau). Toward the north there are alluvial and bog soils, which increase in extent northward toward Tomsk. There is, however, a considerable area of good black soil in southern Novosibirskaya Oblast and somewhat less fertile black soils in southern Kemerovskaya Oblast. North of the black soils there are a variety of soils, some of which are good for farming. The USSR planned to plow 490,000 hectares in Novosibirskaya Oblast and 151,000 hectares in Kemerovskaya Oblast in the fall of 1954 for sowing in 1955. No land was to be plowed in Tomskaya Oblast. Actually, 660,000 hectares were plowed in Novosibirskaya Oblast, and 160,000 hectares in Kemerovskaya Oblast. 45/

4. Omskaya, Kurganskaya, Tyumenskaya, and Sverdlovskaya Oblasts.

West of the drainage basin of the Ob' River are Omskaya, Kurganskaya, Tyumenskaya, and Sverdlovskaya Oblasts, in the drainage basin of the Irtysh River and its tributaries, the Tobol and Ishim Rivers. This region is a plain sloping gently toward the north, reaching its lowest elevation, 61 meters, at Tara on the northern margin of the new lands. The plains region below the altitude of 300 meters (784 feet), including the drainage basin of the Ob' River and parts of the northern oblasts of Kazakh SSR, is part of the vast West Siberian lowland which continues northward to the shores of the Kara Sea above the Arctic Circle.*

The greater part of this group of oblasts is wooded steppe. South of the Trans-Siberian Railroad in Omskaya Oblast and along the southern boundary of Kurganskaya Oblast are fertile, black soils similar to those in eastern Kansas. Along the rivers there are alluvial soils bordered by belts of good farming land, and on the ridges between the rivers are soils that are marginal in fertility. There are many areas of clay soils, which may drop out of cultivation in wet years. In some areas, these soils are impregnated with alkali and saline salts to the degree that cultivation of them is impractical. Along the northern margin of the new lands there are grey-brown soils, similar to those in central Wisconsin, which have developed under deciduous forests. 47/

50X1

The USSR planned to plow 1,125,000 hectares in Omskaya, Kurganskaya, and Tyumenskaya Oblasts in the fall of 1954 for sowing in 1955. There were actually 1,517,000 hectares plowed, of which 1,017,000 hectares, 67 percent, were in Omskaya Oblast. No acreage was planned to be plowed in Sverdlovskaya Oblast. 48/

5. Chelyabinskaya Oblast.

Chelyabinskaya Oblast lies on the east slope of the Ural Mountains. From north to south the foothills, and a fairly level strip to the east, are classed as wooded steppe, steppe, and arid steppe. Areas of fertile black soils alternate with those that are less fertile. Most of the land in the steppe area is under cultivation. The bulk of the virgin land was covered with a variety of grasses and weeds and was used for pasture. Many of these areas are not cultivated, because the soils are alkaline, saline, or rocky 49/; but the USSR planned to plow 405,000 hectares in the fall of 1954 for sowing in 1955. Actually, 504,000 hectares were plowed. 50/

[redacted] before 1953, the farm lands of the Northern Zone appeared as islands of cultivation surrounded by marshes, forests, sandy stretches, low-lying grasslands, sparsely vegetated pastures, and toward the south, saline wastes. To a considerable extent, it is into such surroundings that cultivated fields are being extended by the new lands program. 50X1

6. Climate.

The crops to be cultivated on the collective and state farms of the Northern Zone of the new lands have been determined, as they were in the areas of better soils, largely by trial and error, to be those that have given the best returns under the prevailing climatic conditions.

The Northern Zone of the new lands has a relatively short frost-free growing season -- less than 120 days in the east but somewhat more than 130 days in the west of the zone. At Omsk the average growing season is from 16 May to 19 September -- about 125 days, 51/ which is similar to the season in central South Dakota. 52/ Within this season, grain and other crops must be sown and must mature sufficiently

to be harvested. During the severe winter the temperature may drop to 49 degrees below zero centigrade (C) (56.2 degrees below zero Fahrenheit (F)),* and in the low lands the ground may freeze to a depth of from 1.5 to 2 meters. 54/ As late as April the mean daily temperature at Omsk ranges from 6 degrees below zero C (21.2 degrees F) to 3 degrees C (37.4 degrees F). The bulk of the planting is done in May but sometimes earlier, as it was in 1934 when 13 percent of the grain was sown in late April. 55/ The summers are moderately warm, the mean daily temperature at Omsk ranging from 13 degrees C (55.4 degrees F) to 23 degrees C (72 degrees F) -- on occasion, however, the temperature may run up to 39 degrees C (102 degrees F). Because of the high latitude the days are long, and sometimes -- as it did in 1934 -- harvesting can begin in late August. Usually, however, it does not get into full swing until September. 56/ The autumn is short, and the average daily October temperatures at Omsk range from 4 degrees C (39.2 degrees F) to 3 degrees below zero C (26.6 degrees F).

Experience has shown that because of the severity of the winters, winter wheat cannot be profitably grown in the Northern Zone. Out of a total of 13,044,000 hectares** of grain sown in 1938, only 42,700 hectares were sown to winter wheat. Lysenko developed a winter rye which he recommended particularly for Western Siberia. By 1938, however, only 1.2 percent of the grain acreage was sown with winter rye. The region is chiefly a spring crop area in which 99 percent of all crops are planted in the spring. Because of the shortness of the growing season, many crops are not grown, and corn is not grown for grain. Through 1938, only 100 hectares of corn had been seeded. Although corn has not been known to mature in the Northern Zone of the new lands, it may be possible, as far as the length of season is concerned, to grow the crop for silage and green fodder. The grains that have proved most satisfactory in the Northern Zone of the new lands are spring wheat and oats. Even these grains frequently have to be dried artificially because of the shortness of the growing season and untimely precipitation in late summer. There are also other factors that handicap the successful production of grains and other crops.

50X1

7. Winds.

The Northern Zone of the new lands is windy, as is all of the new lands. Southeasterly winds prevail in winter and northerly and northwesterly winds in summer. No major physical barriers prevent winds from blowing into the new lands from the Arctic regions in the north or from the Asiatic desert in the south. Winds of gale force (more than 51 kilometers per hour) 58/ from the south may bring drought, blowing the topsoil in dust clouds from the roots of grain and withering growing crops. Winds from the north may bring snow in early August before the crop is fully ripe or in September before the harvest is complete, causing heavy losses of grain suitable for milling. This happened in 1934, when more than one-third of the wheat crop at Omsk was unfit even for cattlefeed.

8. Rainfall.

The annual rainfall in the Northern Zone of the new lands is not abundant. One of the stations reporting the largest annual precipitation is Tomsk on the northeast margin of the new lands (20.9 inches), which has about the same rainfall as Huron, South Dakota, or Amarillo, in the Panhandle of Texas. 59/ Only a relatively small acreage of grain is grown in Tomskaya Oblast, however, and somewhat more rain falls at Biysk in the foothills of eastern Altayskiy Kray, where the acreage sown to grain is also relatively small. Average annual precipitation in the Northern Zone of the new lands of the USSR, by period and by weather station, is shown in Table 1.

Table 1

Average Annual Precipitation
in the Northern Zone of the New Lands of the USSR
by Period and by Weather Station a/

Inches

Period	Kurgan	Omsk	Novosibirsk	Barnaul	Biysk	Tomsk
November through February	2.1	2.5	3.9	3.4	6.0	5.5
March through April	1.0	0.8	1.3	1.2	3.3	1.8
May through July	5.3	5.3	5.5	5.1	6.9	7.2
August through October	3.7	3.7	4.8	4.2	5.9	6.4
Total	12.1	12.3	15.5	13.9	22.1	20.9

a. 60/

The grain acreage in the Northern Zone is sown almost exclusively in the latitude of Kurgan, Omsk, and southeastward through southern Novosibirskaya Oblast to Barnaul. The annual average rainfall ranges from 12.1 to 13.9 inches. These averages correspond to the rainfall belt in eastern Montana and Wyoming, 61/ where grain is produced most profitably by dry farming.

Although the average annual precipitation in the Northern Zone probably is sufficient to produce such crops as will mature during the short growing season, the distribution of rainfall throughout the year leaves much to be desired. At Omsk, for example, about 20 percent of the precipitation occurs during the November-February period, and only 6.5 percent falls during the short spring, March through April. That means that winter precipitation must be preserved by fall plowing so that the melting snow may sink into the soil and build up a reserve for early development of the plants. Precipitation during the growing season is propitious, but rain through the August-to-October period may hamper harvesting and cause grain to rot in the fields, particularly if there is an early frost.

In the Northern Zone, bringing the virgin and long-fallow lands under profitable cultivation is complicated by the hazard of fluctuation of rainfall from year to year. Soviet leaders are aware of this problem.

C. Southern Zone.

1. General.

In the Southern Zone the virgin and long-fallow lands that have been scheduled to be reclaimed are chiefly in the northern part of Kazakh SSR. Soviet plans considered the zone to be divided from north to south into four belts: a wooded steppe belt, a steppe belt, a semiarid steppe belt, and an arid steppe belt. 62/ The characteristics of these four belts are associated essentially with differentials in climate, chiefly rainfall.

2. Wooded Steppe Belt. 63/

The wooded steppe belt of the Southern Zone of the new lands is located along the northern boundary of Severo-Kazakhstanskaya Oblast and is a continuation of the wooded steppe of the Northern Zone. It is a

flat, poorly drained plain, dotted with many shallow and comparatively small hollows, potholes, and sinks. Aspen and birch grow in these hollows which are frequently swampy, on podzolic soils similar to those of northern Wisconsin and Michigan. 64/ On the higher flat sections are undrained plains where marginal black soils and scattered spots of saline soils have developed. These soils are close to ground water (3 to 5 meters). They dry slowly in the spring and must be worked within a relatively short period.

3. Steppe Belt. 65/

The steppe belt of the Southern Zone of the new lands occupies a 20- to 50-kilometer belt beginning in northern Kustanayskaya Oblast, passing through the southern part of Severo-Kazakhstanskaya Oblast and the western part of Kokchetavskaya Oblast. Most of the steppe belt lies in the West Siberian lowland. This almost-level plain is pocked with flat depressions of varying size, some of which are lakes (some fresh, some salt), swamps, and saline wastes. The characteristic soils on the level plains are typical chernozems. These are black soils like those in Omskaya Oblast and are often slightly alkaline. If the area of the swamps and saline wastes does not cover more than 20 percent of the area proposed to be reclaimed, the soils -- including the slightly alkaline, black soils -- are considered to be suitable for production of crops.

4. Semiarid Belt. 66/

The semiarid belt of the Southern Zone of the new lands occupies the plains region in northern Kustanayskaya Oblast, the southern drainage basin of the Ishim River in northern Akmolinskaya Oblast, and the eastern plateau of Kokchetavskaya Oblast. The predominant soils are clayey black soils and, less frequently, loamy* black soils. Sometimes these soils form uniform massifs, and sometimes they alternate with saline soils. If the saline soils take up more than 20 percent of an area, they should be avoided in plowing virgin lands. Some of these areas have been recently fallowed, and -- according to plan -- they were to be reclaimed first. A certain type of black soil occurs in the southeastern part of Kokchetavskaya Oblast in the vicinity of the Kazakh Volcano region. These soils are stony and are not suitable for cultivation, except in small sections between hills. By 1955, much of the existing pasture in this belt already had been plowed.

* Loamy soils are intermediate between clayey soils and sandy soils.

In general the Soviet soil scientists know where the unsuitable soils (shallow, rocky, saline, subject to flood, subject to erosion, and the like) are located. It is questionable, however, that any of the 20,000 city-bred Communists who are directing the new lands program have any practical knowledge of unsuitability of soils, and few of the managers of MTS's are skilled in soil science. In 1954-55, in any case, in both the Northern and Southern Zones a considerable acreage of unsuitable land was plowed that afterwards had to be abandoned. 67/

Along the southern margin of the Southern Zone of the new lands, to the north and east, there are barren plains dotted with white and grey alkaline sinks, and black, rocky ridges loom on the horizon. These plains are the arid steppe.

5. Arid Steppe Belt. 68/

The arid steppe belt of the Southern Zone of the new lands extends as an intermittent strip from the southern drainage basin of the Ural River in the northern part of Zapadno-Kazakhstanskaya Oblast* to the upper valley of the Irtysh River in the vicinity of the city of Semipalatinsk. The terrain is irregularly broken by plateaus, mountains, tablelands, deep valleys, and a volcanic area of ancient craters and ridges. Consequently, the soils of this belt are even less uniform than are the soils in the more northern belts. The belt of fertile dark chestnut soil of Zapadno-Kazakhstanskaya Oblast extends across the northern part of Aktyubinskaya Oblast to the Mugodzhar Mountains. These soils are similar to the chestnut soils of western Kansas. 69/ East of the mountains the soils of the Turgay tableland in the central part of Kustanayskaya Oblast are carbonaceous, dark chestnut soils of clayey composition. These soils are sticky when wet and must be worked in a very short time when conditions are suitable. There are also depressions of saline soils that should not be worked at all. In the eastern part of Akmolinskaya Oblast, the southern part of Pavlodarskaya Oblast, and the northern part of Karagandinskaya Oblast, a strip of dark chestnut soils is interrupted by a series of volcanic ridges alternating with level glens. The soils of this region may be silty. Springs are frequent, and there are meadows dotted with small volcanic formations.

* The northern part of Zapadno-Kazakhstanskaya Oblast lies in the drainage basin of the Ural River and is economically associated with the western part of Chkalovskaya Oblast of Region VIII (Urals). This oblast is therefore included in the Western Zone of the new lands.

In the northern part of Pavlodarskaya Oblast, on both banks of the Irtysh River, there are sandy loams, light loams, and sometimes sandy, dark chestnut soils. The soils that are fallow as well as those that are in pasture are scheduled for reclamation. Because of the irregularity of the terrain of the arid steppe belt, care in the selection of the areas to be reclaimed must be taken to avoid erosion.

Similar to those in the Northern Zone of the new lands, the soils in the Southern Zone best adapted to farming already had been located by 1953 and were occupied by collective and state farms clustered in the northern part of Kazakh SSR. These farms tend to be concentrated in the wooded steppe belt; the typical steppe belt; and, to a lesser extent, in the semiarid steppe belt, wherever the better soils (particularly the black soils) are found. Farms have also been established in the arid steppe belt in scattered localities possessing the most suitable soils.

6. Climate.

As in the Northern Zone of the new lands, the crops to be cultivated on the collective and state farms in the Southern Zone have been determined, by trial and error, to be those that have given the best returns under the prevailing climate.

The frost-free growing season in the Southern Zone averages about 130 days, only slightly longer than the average in the Northern Zone. The winter is severe. The absolute minimum temperature ranges from 45 degrees below zero C (49 degrees below zero F) at Kustanay to 49 degrees below zero C (56 degrees below zero F) at Akmolinsk. 70/ As in the Northern Zone, the severity of the winter makes impracticable the cultivation of winter wheat. Out of 3,493,700 hectares planted to all crops for the harvest of 1938 in those oblasts of Kazakh SSR that for the purposes of this report have been included in the Southern Zone,* only 500 hectares were sown to winter wheat and 114,700 hectares were sown to winter rye. The Southern Zone is a spring crop area, and in 1938 spring grain occupied 88.6 percent of the total sown acreage. 71/

* Statistically, the Southern Zone was considered in 1938 to include Aktyubinskaya, Karagandinskaya, Kustanayskaya, Pavlodarskaya, and Severo-Kazakhstanskaya Oblasts. After World War II the present oblasts (boundaries of 1945) were formed out of parts of those oblasts.

Spring is late, as is indicated by the mean daily temperatures in April, which range from 6 degrees C (42.8 degrees F) to 4 degrees below zero C (24.8 degrees F) at Kustanay but are somewhat lower at Akmolinsk -- from 4 degrees C (39.2 degrees F) to 5 degrees below zero C (23.0 degrees F). 72/ Because of the climate much of the planting is usually delayed until May, the bulk of the crop being planted after the 15th of the month. 73/ On the average, the summers are only slightly warmer than at Omsk. The July mean temperatures at Akmolinsk range from 13 degrees C (55.4 degrees F) to 26 degrees C (78.8 degrees F). The extreme summer maximum temperature, however, averages the same as at Omsk -- 37 degrees C (102 degrees F). The autumn is short, and during October the mean daily temperatures at Akmolinsk range from 6 degrees C (42.8 degrees F) to 3 degrees below zero C (26.2 degrees F). 74/

In Kazakh SSR, harvesting usually begins during the last half of July and continues through August, and, as in 1934, more than one-half of the grain crop may be harvested in September. 75/

Spring wheat is the most important grain grown in the Southern Zone -- 58.7 percent of the total spring grain acreage in 1938. Millet was next in importance with 14 percent followed by oats with 10.3 percent and barley with 4.9 percent; 0.7 percent of the spring grain acreage was sown to other grains. Because of the shortness of the growing season, corn was not grown for grain in this zone. It is possible, however, to grow corn for silage and green fodder, and about 1,000 hectares were seeded in 1938. 76/ Although spring wheat is the most important grain sown in the Southern Zone, it should be noted that millet, which is more drought resistant than wheat, is second in importance and that oats fall to third place in extent of acreage.

Because of the shortness of the growing season and the relatively large precipitation in late summer and early fall, the harvested grain has to be dried artificially before it can be stored safely.

7. Rainfall.

In the Southern Zone of the new lands, rainfall diminishes rapidly from north to south as the terrain approaches the Central Asiatic deserts. In Severo-Kazakhstanskaya Oblast, annual rainfall at Petropavlovsk averages 14.1 inches, about the same annual precipitation as at

Denver, Colorado. 77/ On the southern fringe of the new lands the annual precipitation averages only 8.8 inches, somewhat less than at El Paso, Texas (9.2 inches). 78/ Average annual precipitation in the Southern Zone of the new lands of the USSR, by period and by weather station, is shown in Table 2.

Table 2

Average Annual Precipitation
in the Southern Zone of the New Lands of the USSR
by Period and by Weather Station a/

Inches

Period	Petro-pavlovsk	Aktyu-binsk	Temir	Akmo-linsk	Kus-tanay	Kok-chetav	Karkara-linsk
November through February	2.3	3.0	2.8	4.0	1.8	1.7	2.0
March through April	1.1	0.9	0.8	1.3	0.5	0.6	0.8
May through July	6.2	2.8	3.1	5.1	4.8	4.7	4.2
August through October	4.5	3.9	2.1	4.2	4.4	4.0	4.1
Total	14.1	10.6	8.8	14.6	11.5	11.0	11.1

a. 79/

In the greater part of the Southern Zone, annual rainfall ranges from 10.6 to 11.5 inches, less than at Helena, Montana (11.6 inches), 80/ and in parts of Nevada. 81/ Petropavlovsk which has an annual precipitation of 14.1 inches and Akmolinsk which has a precipitation of 14.6 inches are exceptions. Also an exception is a small area in the drainage basin of the Irtysh River near the city of Pavlodar, where the annual rainfall averages less than 10 inches. 82/

Agricultural production in most of the Southern Zone is governed not only by the low annual precipitation but also by the distribution of rainfall during the year. Winter precipitation is light, and there is a shallow snow cover. As a consequence, there is a low reserve of soil moisture in the spring. There is little rainfall during March and April, and retention of the snow cover, early tillage of the

soil, and application of moisture conservation methods are of great importance. The heaviest precipitation occurs during the months in which crops are making their growth (May, June, and July). The heavy rainfall in August, September, and October, however, tends to hamper harvesting and may reduce considerably the quantity and quality of garnered grain.

As much of the virgin and long-fallow soils of the new lands as possible is plowed in the fall, primarily to decrease the work in the short spring period. In certain areas, fall plowing also may help to build up soil moisture as the foundation for the development of field crops during May, June, and July.

8. Lands to Be Reclaimed.

Initial Soviet plans called for the plowing of 5,910,000 hectares* 83/ of virgin and long-fallow land in the Southern Zone in the fall of 1954. Actually, 7,293,000 hectares** of virgin and long-fallow lands were plowed. Almost one-half of this acreage was plowed in centrally located Kokchetavskaya and Akmolinskaya Oblasts. 84/

D. Western Zone.

1. General.

The Western Zone of the new lands, as defined for the purposes of this report, includes certain of the western rayons of Bashkirskaya ASSR and Chkalovskaya Oblast of Region VIII and a certain part of Region VI lying within the boundaries of Kuybyshevskaya and Saratovskaya Oblasts and the northern part of Stalingradskaya Oblast. For the purposes of this report, the northern part of Zapadno-Kazakhstanskaya Oblast also will be included in the Western Zone.***

* This figure includes 15,000 hectares in Semipalatinskaya Oblast.
** This figure includes 186,000 hectares in Semipalatinskaya Oblast.
*** The northern part of Zapadno-Kazakhstanskaya Oblast lies in the drainage basin of the Ural River and is economically associated with the western part of Chkalovskaya Oblast. These two areas formed one of the most important surplus grain districts of Tsarist Russia.

In Bashkirskaya ASSR, in the area selected for reclamation, there is very little forest. Only in the higher reaches along the Belaya River and in the hollows and depressions in the south are there groves of oak. The soils south of the Belaya River are, for the most part, typical or leached chernozems. These fertile soils are well adapted to the production of hard spring wheat. In Bashkirskaya ASSR the USSR planned to plow 205,000 hectares of virgin and long-fallow land in the fall of 1954 for planting in 1955, giving attention to the susceptibility to erosion of the soils located on inclining terrain. Actually, 401,000 hectares were plowed. 85/

The area east of the Volga River in Region VI that has been selected for reclamation may be divided into four natural belts, as is the Southern Zone: a wooded steppe belt, a typical steppe belt, a semiarid steppe belt, and an arid steppe belt. These belts succeed each other in a north-to-south direction. 86/ This succession is based primarily on moisture conditions in Kuybyshevskaya, Saratovskaya, and Stalingradskaya Oblasts.

The northwestern rayons of Kuybyshevskaya Oblast are wooded steppe. The soils in the islands of farmlands are typical leached and carbonaceous black soils the properties of which change somewhat in relation to the peculiarities of the relief. The soils of this area are among the best adapted to production of spring wheat. 87/ These rich soils are already being fully exploited, and there is little, if any, land in Kuybyshevskaya Oblast planned to be reclaimed. The northern part of Saratovskaya Oblast east of the Volga River is a semiarid steppe. The soil is generally black but of a light composition, which is particularly well suited to the production of millet. Dark chestnut and light chestnut soils predominate in the central-southern part of Saratovskaya Oblast. Spring wheat is the predominant crop, and oats and millet are next in importance.

The extreme southern part of Saratovskaya Oblast and the northern part of Stalingradskaya Oblast (formerly the Volga-German Republic) is arid steppe. The soils are chiefly chestnut in type, and saline areas frequently are found. Planting is done largely in those depressions which store up considerable moisture in the spring. 88/ This arid steppe land is a spring wheat and millet area, and the USSR planned to reclaim 330,000 hectares in Saratovskaya Oblast in 1954 but succeeded in plowing 488,000 hectares for sowing in 1955. In Stalingradskaya Oblast, 373,000 hectares were reclaimed. 89/

The northwestern part of Chkalovskaya Oblast is a region broken by ravines, sometimes hilly and largely covered by forests. The central rayons in the valley of the Ural River form a rich farming area. The black soils of this area are particularly suited to millet, but spring wheat is the main crop. The eastern rayons of Chkalovskaya Oblast are a low, gently rolling plain in which crystalline rocks occur. Sometimes black soils overlie the rocks, but they are stony and alkaline. 90/ In Chkalovskaya Oblast, plowing in 1954 for planting in 1955 was planned at 700,000 hectares, but 1,082,000 hectares were actually plowed. 91/

The northern part of Zapadno-Kazakhstanskaya Oblast lies in the southern watershed of the Ural River. This area is a westward continuation of the arid steppe belt of the Southern Zone of the new lands. The soils are dark chestnut, well adapted to production of wheat. 92/ The USSR planned to plow 305,000 hectares in 1954 for sowing in 1955, but 534,000 hectares actually were plowed. 93/

2. Climate.

In the Western Zone of the new lands the frost-free growing season is generally more favorable for crop production than the season in the Northern and Southern Zones -- 140 days at Ufa in Bashkirskaya ASSR, 150 days at Kuybyshev, and 160 days in central Saratovskaya Oblast. 94/ The winters are less severe in the Western Zone; the absolute minimum temperature at Ufa in Bashkirskaya ASSR is 42 degrees below zero F, 95/ compared with 56 degrees below zero at Omsk in the Northern Zone. Although the absolute minimum temperature is not as low in the Western Zone as in the Northern Zone, the winter temperatures are still too low for winter wheat to survive -- except in a few sheltered spots. Spring work begins about 15 days earlier 96/ than it does in the Northern Zone -- the mean April temperature is 43 degrees F, 97/ compared with 37 degrees F at Omsk. The summers are warm; the July temperature ranges from 74 degrees F at Ufa to 81 degrees F at Ural'sk in Zapadno-Kazakhstanskaya Oblast 98/ and may reach a high of 98 degrees F at Ufa and 104 degrees F at Ural'sk. 99/ In the Western Zone, grain matures more rapidly than it does in the Northern Zone, and harvest may begin a month earlier. 100/ The Western Zone is one of the most important grain-producing areas in the USSR because soils are well adapted to wheat growing even though much of the area is subject to drought.

3. Rainfall.

Rainfall in Bashkirskaya ASSR in the Western Zone is relatively great, the annual average reaching 23.1 inches. This is about the same as precipitation in Custer County, in central Nebraska. 101/ Precipitation drops to 14.6 inches at Chkalov in the Ural River region, about the same as in Fort Laramie, Wyoming. 102/ In the arid steppe region of Zapadno-Kazakhstanskaya Oblast, annual precipitation averages 12.3 inches. This average is similar to that in parts of Carbon County in south central Wyoming, west of the Rocky Mountains. 103/ Average annual precipitation in the Western Zone of the new lands of the USSR, by period and by weather station, is shown in Table 3.

Table 3

Average Annual Precipitation
in the Western Zone of the New Lands of the USSR
by Period and by Weather Station a/

Inches

Period	Ufa	Chkalov	Ural'sk
November through February	8.0	5.1	3.3
March through April	2.2	1.9	1.2
May through July	6.8	4.8	4.1
August through October	6.1	2.8	3.7
Total	23.1	14.6	12.3

a. 104/

The distribution of precipitation in Bashkirskaya ASSR is heavy in winter, and although it is light in March and April, it is sufficient to provide good growing conditions for production of grain during May, June, and July. Harvesting, however, may be hampered by too much rainfall in late summer and early fall.

Chkalovskaya Oblast is protected by forests on the north and has good snowcover and good average rainfall during the growing season, and good production is usually assured. Extending northward from the arid steppe belt, however, there is danger of drought. Zapadno-Kazakhstanskaya, northeastern Stalingradskaya, and eastern Saratovskaya Oblasts are in less favorable positions, and precipitation in winter must be conserved so that the accumulation of soil moisture by the beginning of spring may constitute a basic source of water for the whole growing season. There is less rainfall during the May-July period than in the northern areas of the Western Zone. 105/

4. Lands to Be Reclaimed.

Of the 13 million hectares originally planned for reclamation, the new lands program allocated 1,680,000 hectares to the Western Zone for reclamation in 1954. Actually, 2,878,000 hectares were reclaimed, of which 1,616,000 hectares, 56.2 percent, were in Chkalovskaya and Zapadno-Kazakhstanskaya Oblasts. 106/

E. Precipitation-Evaporation Ratios.

Reference has been made to seasonal variations in temperatures and to the distribution of rainfall throughout the year. It is not exclusively the absolute amount of rainfall that determines plant development. Some rain runs off, carrying soil with it, and some of the water that sinks into the soil evaporates. The suitability of an area for the cultivation of a given crop bears a general relationship to what is called its "precipitation-evaporation ratio." There are several methods of computing such a ratio, but all of them take into consideration precipitation and evaporation and are intended to measure the moisture that is available for crop development.*

In the US the greater part of Wisconsin, Illinois, and Missouri lie in what might be called a wooded steppe belt. The precipitation-evaporation ratio of this belt is 0.64 or more. The ratio decreases toward the west -- through what may be called the grassy steppe, the semiarid steppe, and the arid steppe to western Utah, where the ratio of 0.16 or less indicates near-desert conditions. 108/

50X1

The USSR also computes a sort of precipitation-evaporation ratio similar to, but not identical with, that used in the US. Along the northern fringe of the Northern Zone of the new lands, this ratio is about 0.60. Roughly paralleling the Trans-Siberian Railroad the ratio is 0.50, but it decreases toward the south -- through the wooded steppe; the typical steppe; the semiarid steppe; and the arid steppe to the southern fringe of the Southern Zone of the new lands, where the ratio is roughly 0.20, 109/ decreasing southward toward the Central Asiatic desert.

In the US the line indicating a precipitation-evaporation ratio of 0.50 passes near Manhattan, Kansas, and northward near Lincoln, Nebraska, and Brookings, South Dakota, and southward it passes near Dallas, Texas. Thus the area of the Northern and Southern Zones of the new lands south of the Trans-Siberian Railroad corresponds to our western wheat and grazing lands which extend out to the desert. There is, however, a difference. The average annual rainfall at Manhattan, Kansas, and northward and southward where this corresponding area in the US would begin, is 25 inches, about twice that at Omsk (12.3 inches). Precipitation drops to 8.8 inches at Temir on the southern margin of the Southern Zone. Thus it is to be assumed that the moisture relationships would be much less favorable southward in the new lands than they are from central Kansas westward.

As far as soils are concerned, there are large areas of virgin and long-fallow land in the Northern and Southern Zones of the new lands that are satisfactory, even excellent, for production of wheat corresponding to the black soils and chestnut soils in the US. In the US, however, the Rocky Mountains intervene between the western deserts and the principal wheat areas. There is no such barrier between the Asiatic deserts and the Southern Zone, the Northern Zone, and the southern part of the Western Zone. The possibility of dust-bowl conditions and winds of gale velocity makes the long-term outlook hazardous.

F. Winds.

The Northern and Southern Zones of the new lands have no major barrier against the winds from the Arctic in the north or the winds from the Asiatic deserts in the south. These winds often are of gale velocity.

In 1954 an atmospheric high developed in the Asiatic desert attended by a clockwise movement of the air masses which drew a moisture-laden "front" down from the Arctic, dumping water onto the new lands and creating conditions that resulted in high yields of grain. A similar circulation, however, also brought snow in August into Barnaul and the areas to the north.

The clockwise movement of the air masses in 1954 brought hot, dry air from the desert across the Caspian Sea into the North Caucasus area (Region IV), the Volga Area (Region VI), and the Ukraine (Region III), creating a severe drought and reducing yields of grain.* In 1955, on the other hand, the winds blew from the south. An atmospheric pressure system developing in the Asiatic desert early in the season was attended by a counterclockwise movement of the air masses. Hot, dry air swept northward, not only across the new lands between the Altay and the Ural Mountains but also up the Volga River, and all of this vast region suffered a severe drought. There was almost a crop failure.

At the same time, air masses from the eastern Mediterranean Sea moved northward, heavily laden with moisture, and heavy rains fell over the Ukraine, which had a very large production of grain. 111/

G. Conclusions.

Largely because of its vast area the USSR has a variety of climates. Low production of grain in one part of the country may be offset by high production in another section. This fact may have played a major role in the planning and launching of the new lands program.

In plowing the vast acreage planned for the new lands, Soviet leaders are taking a chance on planting some areas that are poorly suited to farming and may have to be abandoned after the first trial and returned to growing grass. Other acreages may be submarginal soils that may prove unprofitable after a longer period and may also be abandoned eventually. The characteristics of certain of the soils are such that dust conditions are likely to develop, and climatic conditions threaten frequent droughts. After the present enthusiastic program of applying mechanization to plowing, sowing, and combining, a retrenchment is inevitable. Abandonment has already begun, and in spite of attempts in other areas to recuperate such losses the acreage of new lands ultimately retained for cultivation may be considerably less than planned by the Soviet leaders.

* The movement of the air masses was plotted from daily weather charts. 110/

III. Comparison of the New Lands with the Prairie Provinces of Canada.

In certain physical and climatic characteristics the Northern and Southern Zones of the new lands are analogous to the Prairie Provinces of Canada -- Manitoba, Saskatchewan, and Alberta. The Prairie Provinces, which constitute one of the greatest spring wheat regions in the world, lie north of 49 degrees north latitude, the latitude which approximately marks the extreme southern boundary of the Southern Zone of the new lands.* The Canadian spring wheat belt, however, is almost entirely below the parallel of 54 degrees north latitude, which bisects the new lands and forms the approximate northern boundary of the Southern Zone. 112/ Thus all of the Northern Zone of the new lands, with the exception of Altayskiy Kray, lies above the Canadian spring wheat belt.

A. Topography.

In general, the physiographies of the Prairie Provinces of Canada and of the new lands of the USSR are similar. A large part of both regions consists of level or rolling lands well suited to large-scale, mechanized agriculture. A relatively minor part of the land is suitable only for grazing or, because of topography, is totally unfit for agricultural purposes.

B. Soils.**

The major soil belts in the Canadian spring wheat region are extensions of similar belts in the US. Thus the black soil belt which passes through eastern North Dakota and South Dakota and western Minnesota extends northward into Manitoba and thence northwest into the northern part of the Canadian spring wheat belt in Saskatchewan and Alberta. The dark chestnut soils of western Nebraska extend northward through the western part of the Dakotas and into the central Saskatchewan and Alberta wheat region. The light chestnut soils of north central Montana extend well into southeastern Alberta and southwestern Saskatchewan. On the northern margin of the Canadian spring wheat belt are found the gray acid soils, similar to the soils of central Wisconsin, which developed under deciduous forest cover.

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* See the map, Figure 8, following p. 42.
** See the map, Figure 9, following p. 44.

The principal soils* of the Prairie Provinces of Canada are analogous to those in the new lands, where they occur in belts extending from the forested northern margin into the semiarid, short-grass steppe in the extreme south.** The dark chestnut, the light chestnut, the fertile black, and the less fertile black soils are the most important, comprising the chief agricultural areas. Approximately two-thirds of the total farming area in both the Prairie Provinces and the new lands have rich black and dark chestnut soils. The occurrence of alkaline and saline soils in regions of low annual rainfall is common to both the Prairie Provinces and the new lands. The proportion of these undesirable soils, however, is larger in the new lands than in Canada.

The most important area of wheat production in Canada is on the dark chestnut soils. Although the richer black soils give larger and more reliable yields, farming on these soils is diversified, and the relative acreage sown to wheat is less. 113/ Before the beginning of the Soviet new lands program in 1953, the greater part of the wheat acreage in the Northern and Southern Zones of the new lands was in the areas with a preponderance of black soil. 114/ Expansion of the sown area contemplated for the Northern and Southern Zones will take place primarily in the dark chestnut and the black soil belts. 115/

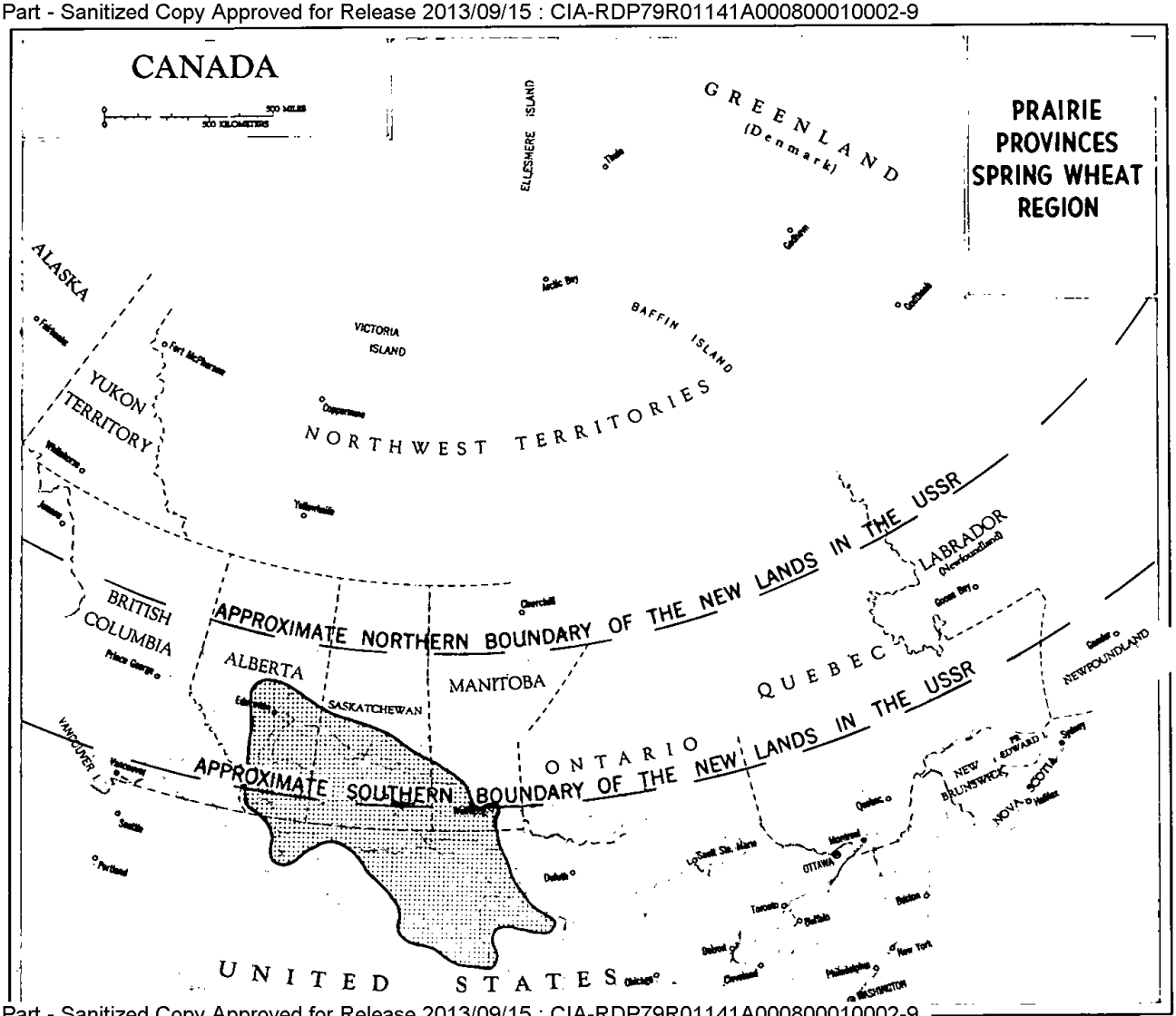
C. Climate.

By far the most critical factor in the production of wheat in both the Prairie Provinces and the new lands of the USSR is the climate. Both regions are dominated by strong, continental climates, and each is subjected to extremes in temperature and rainfall. Long cold winters and warm, sometimes hot, summers are characteristic of both Canada and the new lands. The low winter temperatures preclude the growing of winter wheat, but small acreages of winter rye are sown in both regions.

The spring season in both regions is short, and, as a rule, spring grain is sown in April and May. Summer temperatures in Canada are somewhat lower than in the new lands. Mean July temperatures range from 61.6

* The Canadian soil types, simultaneously reflecting decreased rainfall and sparser vegetation, occur in fairly well-defined belts from north to south.

** For a detailed description of the soils of the new lands, see II, p. 21, above.



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degrees F at Edmonton, Alberta, to 67 degrees F at Winnipeg, Manitoba, to 69.3 degrees F at Medicine Hat, in the semiarid steppe of Alberta. 116/ The temperatures in the new lands range from 74 degrees F at Omsk in the Northern Zone to 83 degrees F at Aktyubinsk in the semiarid steppe in the Southern Zone. 117/ Summer temperatures as high as 111 degrees F have been recorded in the Canadian spring wheat belt, 118/ and 113 degrees F has been recorded at Kokchetav in the new lands. 119/

In general, average annual temperatures throughout the new lands are higher than in the Prairie Provinces, in spite of the similarity of geographic orientation. The frost-free growing season in the Prairie Provinces, with local exceptions, is generally shorter than it is in the new lands.* Throughout the most productive Canadian wheat lands the frost-free season ranges from about 95 to 110 days. 120/ Again with local exceptions, only in the semiarid region of southeastern Alberta and southwestern Saskatchewan is the frost-free season longer than 110 days. These ranges contrast with 118 days at Tomsk and 128 days at Tyumen', at the northern edge of the new lands. 121/ Frost generally is not a limiting factor in the cultivation of grains in the Canadian wheat belt and in the new lands, but the possibility of killing frosts in the late spring and early fall is an ever-present menace to agriculture.

D. Rainfall.

The average annual rainfall in the Canadian wheat belt has certain similarities to that in the Northern Zone of the new lands of the USSR -- Winnipeg, near the wheat-growing center of Manitoba, 20.5 inches, and Tomsk, on the northern margin of the new lands, where little wheat is grown, 20.9 inches; Melfort in Northern Saskatchewan, 15.4 inches, and Novosibirsk in the east-central part of Novosibirskaya Oblast, 15.5 inches; Saskatoon, near the center of the wheat-growing area of Saskatchewan province, 13.8 inches, and Barnaul, in the important wheat-growing area of Altayskiy Kray, 13.9 inches; Medicine Hat, in the semiarid region of southeastern Alberta, 12.7 inches, and Omsk, in the center of the Asiatic spring wheat belt, 12.3 inches. Average annual precipitation in the Prairie Provinces of Canada, by period and by weather station, is shown in Table 4.**

* See the map, Figure 10, following p. 44.
** Table 4 follows on p. 44. See also the map, Figure 11, following p. 46.

Table 4

Average Annual Precipitation in the Prairie Provinces of Canada
by Period and by Weather Station a/

Inches

	Manitoba	Saskatchewan			Alberta	
Period	Winnipeg	Melfort	Saskatoon	Swift Current	Medicine Hat	Edmonton
November through February	3.7	2.6	2.2	2.6		
March through April	2.4	1.5	1.3	1.5		
May through July	8.3	6.5	6.4	6.9	5.2	8.5
August through October	6.1	4.8	4.0	3.9		
Total	20.5	15.4	13.8 b/	14.9	12.7	17.6

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b. Because of rounding, figures do not add to totals shown.

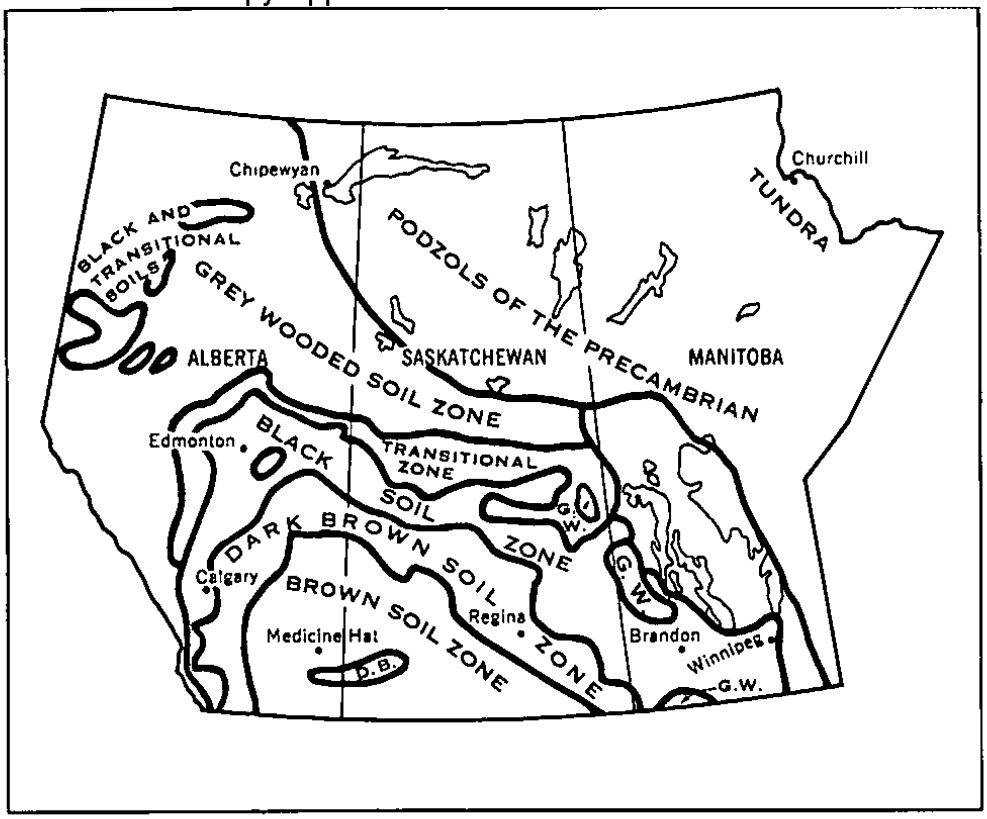

Figure 9. Canada: Prairie Provinces, Soil Types

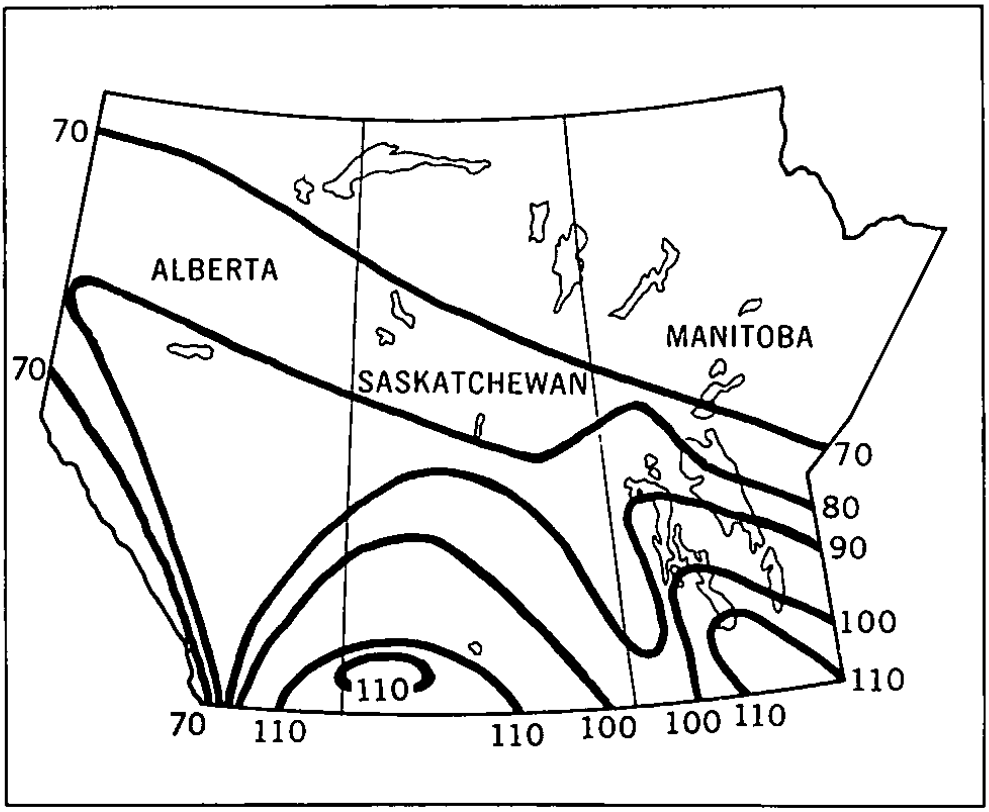

Figure 10. Canada: Prairie Provinces, Average Duration of the Frost-Free Season

In Canada it is generally recognized that crop cultivation in regions where annual rainfall averages less than 12 inches is extremely hazardous. The variability of rainfall increases as the average annual precipitation decreases, thereby introducing a considerable risk of crop failure. Relatively little wheat, therefore, is sown in Canada where the annual rainfall averages less than that at Medicine Hat (12.7 inches). Probably less than 5 percent of the total acreage of the Canadian wheat belt is sown in such areas. 123/

In sharp contrast, about 60 percent of the sown acreage of the new lands in 1955 was in areas with annual rainfall of less than 12 inches. Almost all of the acreage sown in areas with annual rainfall of less than 12 inches was located in the Southern Zone of the new lands, where the average annual rainfall is generally lower than the lowest in the Canadian spring wheat belt. In the greater part of the Southern Zone the annual rainfall ranges from 11.5 inches at Kustanay to 10.6 inches at Aktyubinsk to 8.8 inches at Temir on the southern margin of the new lands.*

As noted in the discussion of rainfall in the new lands, it is not only the total annual rainfall which influences crop production but also the distribution of rainfall throughout the year. In the new lands, as in Canada, the heaviest precipitation occurs during the growing season, May through July.** In Canada the average rainfall during these 3 months ranges from 5.2 inches in the semiarid region at Medicine Hat (relatively unimportant for wheat growing) to 8.5 inches at Edmonton, Alberta, in the center of the northwestern wheat-growing region. In the Northern Zone of the new lands the range is from 5.1 inches at Barnaul in Altayskiy Kray, in the center of the most important region of the new lands, to 7.2 inches at Tomsk, on the northern margin of the new lands, where little wheat is grown. In the Southern Zone the range is from 2.8 inches at Aktyubinsk to 6.2 inches at Petropavlovsk. In general, the rainfall during the growing season is better in Canada than in the Northern Zone of the new lands and considerably better than in the Southern Zone.

* There are, however, two localized exceptions. Petropavlovsk, on the northern margin of the Southern Zone, has an average annual rainfall of 14.1 inches, and Akmolinsk, 400 miles south on the northern slope of the Kazakh Folded Upland, has 14.6 inches.

** See the map, Figure 12, following p. 46.

Rainfall during the months of August, September, and October in both the new lands and in Canada is less than during the growing season but considerably more than the winter precipitation, in the November-through-February period. Spring rainfall is light in Canada, but it is better than it is in the Northern Zone of the new lands and considerably better than in the Southern Zone.

The precipitation-evaporation ratio, or moisture efficiency, of the rainfall received is as important as a favorable distribution of rainfall. In the new lands the precipitation-evaporation ratio along the northern margin of the Northern Zone in the area of gray-brown forest soils is about 0.60, and at Omsk in the black soil area it is about 0.50; thence it diminishes rapidly to 0.20 near the southern fringe of the Southern Zone. The precipitation-evaporation ratio pattern for the new lands is similar to that for Saskatchewan, the most important wheat producer in the Prairie Provinces of Canada. On the northern margin of the Canadian wheat belt in the area of gray-black soils at Prince Albert, the ratio is 0.59. In the area of deep black soils, it is 0.55; in the area of shallow black soils, it is 0.50 to 0.46; in the area of dark chestnut soils it is 0.47 to 0.38; and at Medicine Hat, Alberta, 214/ in the semiarid region which is under the strong influence of the desiccating "Chinook" winds from the southwest, it diminishes to 0.20.

Although the precipitation-evaporation patterns for the two areas are similar, the Prairie Provinces, with generally larger annual precipitation, are in a more advantageous position for crop production. Furthermore, it is rare that a severe drought is experienced simultaneously in all of the Prairie Provinces -- a result, in part, of the Rocky Mountains intervening between the deserts and the Canadian wheat belt. The absence of any natural barrier in the new lands exposes the area to the hot, dry winds from the Central Asiatic Desert, winds which may produce a severe drought throughout the entire Southern and Northern Zones.

E. Yields.

During the 45-year period observed (1906-50), yields of spring wheat in the Prairie Provinces averaged 15.3 bushels per acre. In relation to the extent of area sown to this crop, this yield is among the highest in the world. There is, however, no discernible cycle of good and bad years in the Canadian wheat belt, but yields may fluctuate widely from year to year -- from a high of 26.0 bushels per acre in 1915

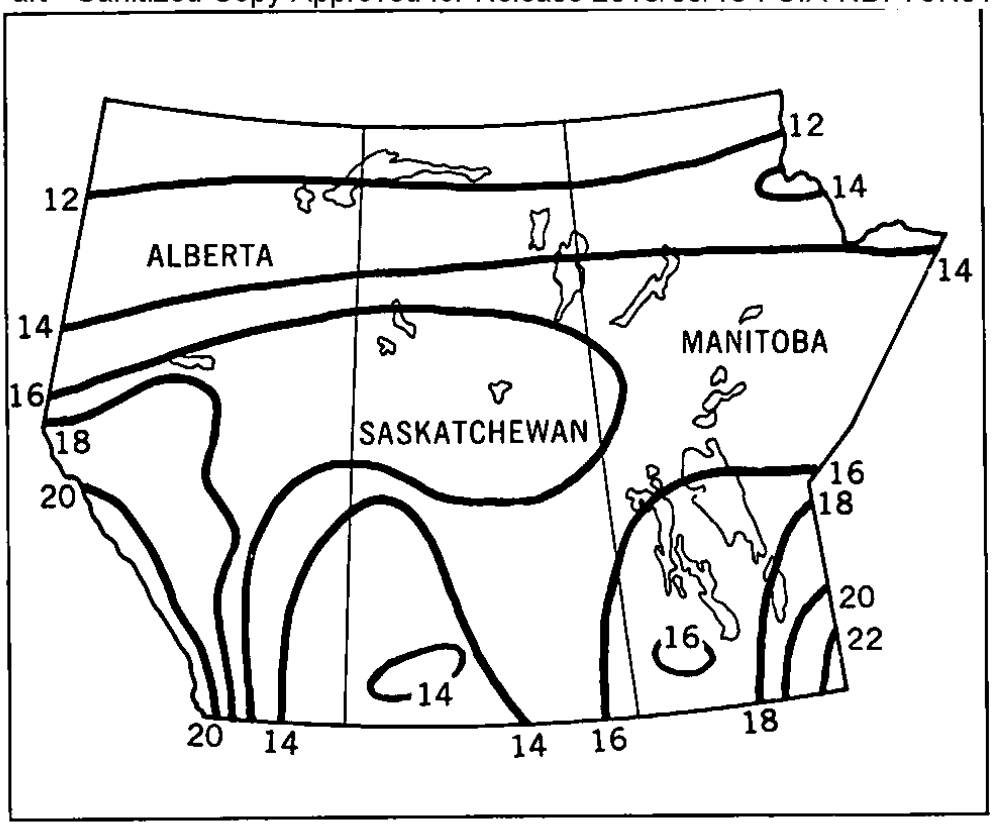

Figure 11. Canada: Prairie Provinces, Average Annual Precipitation

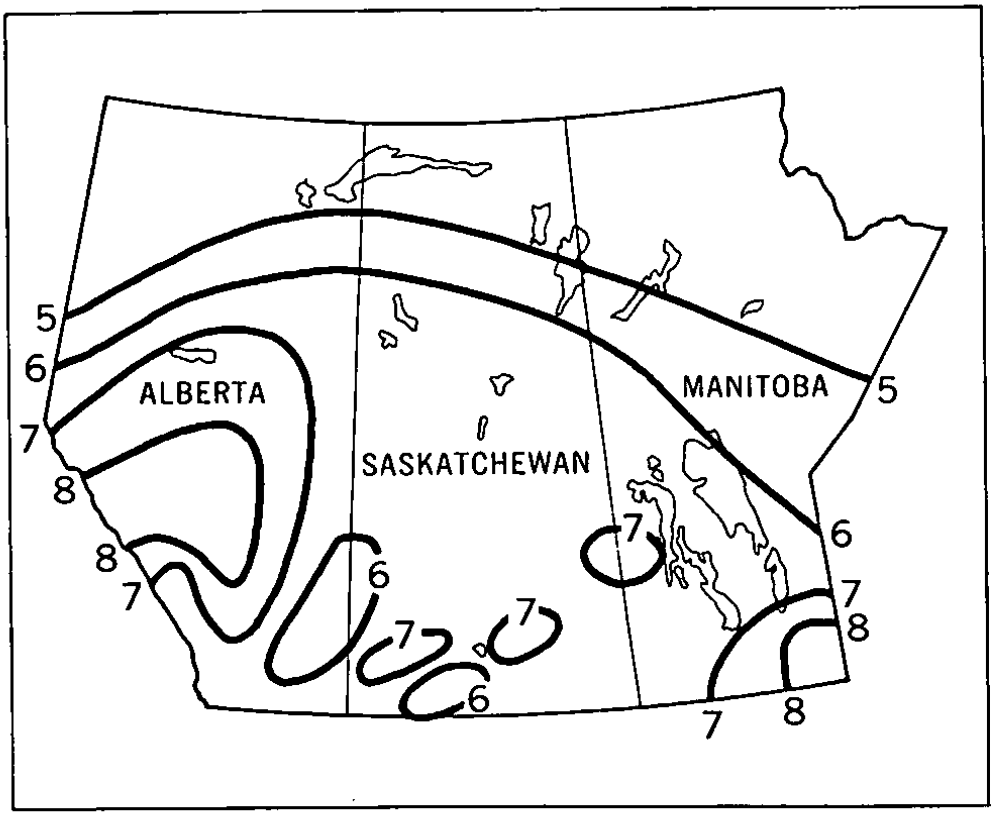

Figure 12. Canada: Prairie Provinces, Average Total Precipitation for May - June - July

to a low of 6.4 bushels per acre in 1937, for example. Prolonged periods of below-average crops have been experienced, most notable of which was the drought period from 1929 through 1938, during which yields averaged 11.7 bushels per acre. In 1930 and 1932, nevertheless, yields were above the long-time average of 15.3 bushels per acre. A complete crop failure throughout the Prairie Provinces has never been experienced. Even in 1937, the worst crop year on record, when Saskatchewan obtained a yield of only 2.6 bushels per acre, Manitoba and Alberta obtained yields of 15.7 and 9.7 bushels per acre, respectively.

A historical series on yields in the new lands comparable to that for the Canadian Prairie Provinces is not available. A 16-year series (1900-15) on yields in the new lands is available. Although a longer time series would be more desirable, this 16-year period is believed to be a normal period and therefore suitable for the purpose of comparing the 2 areas.

Yields in the Prairie Provinces are significantly higher, averaging 15.3 bushels per acre compared with 9.3 bushels per acre in the new lands. Actually, the average yield in the new lands is less than the average yield in the poorest region of the Canadian wheat belt. The Medicine Hat Crop District in the semiarid region of Alberta has an average yield of 10.3 bushels per acre. 125/ Even in the Northern Zone of the new lands, where, as a rule, the yields are highest because of the generally greater rainfall and better moisture efficiency, the average yield is only 11 bushels per acre, 28 percent less than in the Prairie Provinces.

Variability of yields in the 2 areas is surprisingly similar, annually averaging 23 percent in the Prairie Provinces and 24 percent in the new lands. Below-average yields were obtained in 20 out of 45 years in the Canadian wheat belt and in 8 out of 16 years in the new lands. The lowest yield obtained in each of the 2 areas as a whole was 6.4 bushels per acre. There is a sharp contrast, however, in the highest yields obtained. Whereas the highest yield in the new lands as a whole was only 13.5 bushels per acre, a yield of 26.0 bushels per acre has been obtained in the Prairie Provinces -- almost double that in the new lands. A comparison of yields in the new lands of the USSR and in the Prairie Provinces of Canada is shown in Table 5.*

* Table 5 follows on p. 48.

Table 5

Comparison of Yields in the New Lands of the USSR and in the Prairie Provinces of Canada
1900-1915 and 1906-50

Area	Yield (Bushels per Acre)			Variability of Yields (Percent of Average Yield)		Average Variability of Yields a/ (Percent)
	Highest	Lowest	Average	Highest	Lowest	
New lands (1900-1915) b/						
Northern Zone	15.6	5.3	11.0	142	48	25
Southern Zone	14.4	3.5	8.6	168	40	30
Western Zone	14.3	1.7	8.7	164	18	33
Total new lands	13.5	6.4	9.3	145	47	24
Prairie Provinces (1906-50) c/						
Alberta	27.4	6.0	17.1	169	35	29
Manitoba	27.5	9.0	17.4	158	52	20
Saskatchewan	25.2	2.6	15.1	167	17	27
Total Prairie Provinces	26.0	6.4	15.3	170	42	23

a. Average deviation from the mean, without regard to sign, expressed as a percent of the mean.
b. Figures for the new lands are based on the acreage distribution for 1955 as shown in Table 9, p. 61, below.

50X1

F. Conclusions.

In spite of many striking similarities to the Canadian wheat belt in geography and climate, the new lands of the USSR are less favorably disposed climatically, especially in amount of rainfall, than are the Prairie Provinces. In view of experience in the Canadian wheat belt during the past 50 years, it seems improbable that a similar success in wheat production can be achieved in the new lands. As noted above, yields in the new lands before expansion into the less productive soils not only were significantly below the average in the Prairie Provinces, as a whole, but also were below the yields of the poorest region in the Canadian wheat belt. Because about 60 percent of the area seeded in the new lands in 1955 was in regions where annual rainfall (12.7 inches) averages less than in the poorest wheat-producing region in the Prairie Provinces, yields in the long run possibly may not average as high as those obtained in the least productive regions in the Canadian wheat belt.

IV. Acreage Sown, 1954 and 1955.*

Estimates of production of grain in the new lands of the USSR depend primarily on applying to the acreages sown the estimated yields, which vary with the modifying influences of climate and with other factors affecting plant growth. These influences differ considerably in the Northern, Southern, and Western Zones. It is necessary not only to determine as far as possible the total acreage sown to grain in any given year but also to divide the total acreage into its zonal segments.

The decree of 28 March 1954 called for the sowing in 1954 of 2.3 million hectares of virgin and long-fallow land, of which 500,000 hectares were to be sown by state farms and 1.8 million hectares by collective farms. Actual performance, as indicated below in terms of thousand hectares, considerably exceeded the plan:

Region	State Farms	Collective Farms	Total
RSFSR	550	2,150	2,700
Kazakh SSR	250	1,350	1,600
Total USSR	800	3,500	4,300

* For acreage data relating to the new lands program of the USSR in 1954-56, see Appendix A.

Because the new lands program was not inaugurated until the spring of 1954, it is reasonable to believe that most of the new areas sown in 1954 were on land in the proximity of already existing state and collective farms which could reclaim such land with a minimum of effort. In all probability, most of this land had been under cultivation in recent years but had been abandoned for a sufficient length of time to be classified as virgin or long-fallow land.

During the early summer of 1954, large numbers of tractors and other agricultural machinery were sent into the new lands. The 4.3 million hectares sown in the spring are assumed to have been replowed in the late summer and fall. In addition, 13.5 million hectares of virgin and long-fallow land were plowed for the first time, making a total of 17.8 million hectares plowed in 1954 for sowing in 1955. In April 1956, it was reported 127/ that 20.5 million hectares had been sown in 1955, indicating that 2.7 million hectares probably had been plowed in the spring of 1955. The 20.5 million hectares sown in 1955 are estimated to be accounted for, in terms of thousand hectares, as follows:

Region	State Farms	Collective Farms	Total
RSFSR	4,400	5,600	10,000
Kazakh SSR	4,600	5,900	10,500
Total USSR	9,000	11,500	20,500

In 1954, less than 20 percent of the new lands were sown by state farms. By 1955, however, the program for setting up new state farms was well under way, the largest number being established in Kazakh SSR. As indicated in the tabulation above, about 44 percent of the new lands were sown by state farms.

On the basis of information appearing in the Soviet press, the 1954 acreage of 4.3 million hectares can be distributed by zones as follows: Northern Zone, 2.05 million hectares; Southern Zone, 1.32 million hectares; Western Zone, 690,000 hectares; and 240,000 hectares remain undistributed by zone.

The 18.5 million hectares reported 128/ to have been sown to grain in 1955 is similarly broken down by zones as follows: Northern Zone, 5.14 million hectares; Southern Zone, 8.65 million hectares; Western Zone, 2.6 million hectares; and 2.11 million hectares remain undistributed by zone.

Estimated acreage of grain sown in the new lands of the USSR, by zones, in 1954 and 1955 is shown in Table 6.* There is insufficient information concerning planned oblast acreages for 1956 or any later years to permit a similar breakdown by zones for years after 1955.

V. Yields of Grain.

Because of the limitations in the available data, precise estimates of grain yields in the new lands of the USSR or for the USSR as a whole cannot be made. Since 1933, all published information on yields in terms of centners per hectare and absolute data on production of grains have been distorted through the use of so-called "biological," or "on-the-root," yields instead of "barn," or "harvested," yields. This practice has inflated Soviet production figures by a significant percentage.** The only available long-term series of acreage, yield, and production data on a regional basis is a pre-World War I series. Part of this series covering the years 1900-1915 has been used in this analysis as a basis for arriving at a judgment of the yields that might be expected in the new lands.

Some comment should be made concerning the relevance of the 1900-1915 series to current yields. Two questions must be considered: first, Is the average yield for the 1900-1915 period a good estimate of the historical average yield over a long-term period or Has the average yield during the 1900-1915 period been biased by abnormal weather conditions or for other reasons, and, second, Have there been technical advances in recent years which would tend to make the 1900-1915 data inapplicable to the present day?

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* Table 6 follows on p. 52. See also the map, Figure 13, following p. 52.

** Since 1953 the Soviet government reportedly has reverted to the use of "barn" yields, but no absolute production figures have been published since that time.

Table 6

Estimated Acreage of Grain Sown in the New Lands of the USSR, by Zone
1954 and 1955

	Thousand Hectares	
	1954	1955
Northern Zone		
Chelyabinskaya Oblast	150	500
Tyumenskaya Oblast	60	210
Omskaya Oblast	350	1,020
Kurganskaya Oblast	170	280
Novosibirskaya Oblast	250	660
Kemerovskaya Oblast	70	160
Altayskiy Kray	1,000	2,310
Total	2,050	5,140
Southern Zone		
Severo-Kazakhstanskaya Oblast	100	870
Kokchetavskaya Oblast	160	1,620
Pavlodarskaya Oblast	300	1,260
Aktyubinskaya Oblast	100	460
Kustanayskaya Oblast	250	1,970
Akmolinskaya Oblast	310	1,890
Karagandinskaya Oblast	30	270
Semipalatinskaya Oblast	40	210
Vostochno-Kazakhstanskaya Oblast	30	100
Total	1,320	8,650
Western Zone		
Bashkirskaya ASSR	220	390
Chkalovskaya Oblast	270	1,110

Figure 13

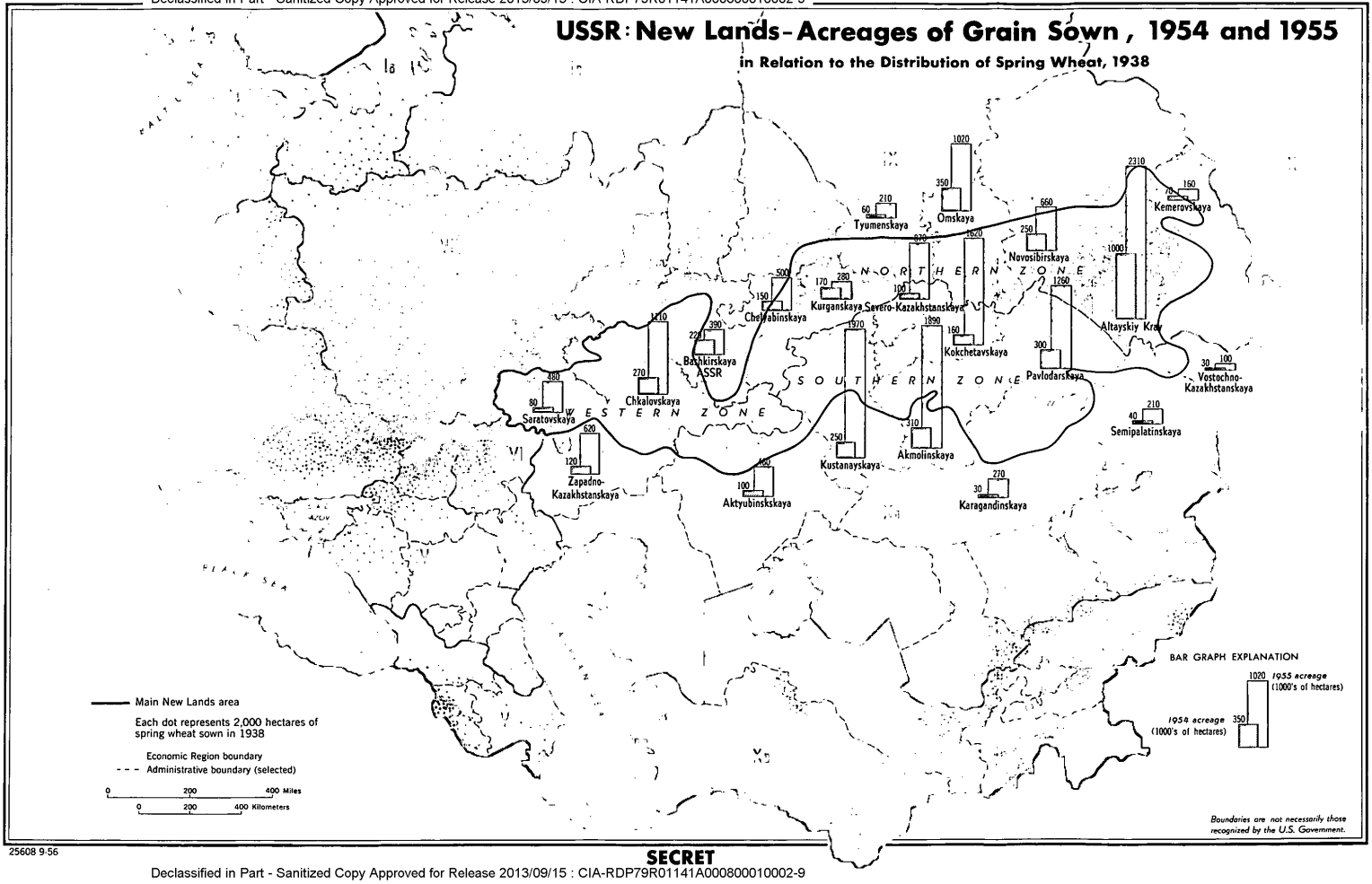

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Table 6

Estimated Acreage of Grain Sown in the New Lands of the USSR, by Zone
1954 and 1955
(Continued)

	Thousand Hectares	
	1954	1955
Western Zone (Continued)		
Saratovskaya Oblast	80	480
Zapadno-Kazakhstanskaya Oblast	120	620
Total	690	2,600
Area not distributed by zone	240	2,110
Grand total	4,300	18,500

It has not been possible to obtain conclusive evidence concerning the "normalcy" of the weather during the 1900-1915 period. A tabulation was made, however, of the average April-through-July rainfall* during the 1900-1915 period at eight stations in the new lands -- Chelyabinsk, Kurgan, Omsk, and Tomsk in the Northern Zone; Akmolinsk in the Southern Zone; and Chkalov and Ural'sk in the Western Zone. This tabulation revealed that the 1900-1915 averages for the 4-month period were very close, in most cases, to the long-term averages taken from a 26- to 70-year record. The range of variability was from 85 to 132 percent of the long-term averages.

Regarding technical advances that conceivably could have made the 1900-1915 data inapplicable to the present day, it may be argued on the one hand that some increase in yields should be expected because of improvements in mechanization and perhaps the use of better techniques

* Rainfall during the April-through-July period is a crucial factor in determining the yield of spring grains.

of cultivation in general, which would permit more timely execution of the sowing and harvesting operations. It is also reasonable to assume, on the other hand, that during the 1900-1915 period the best lands in the new lands were already under cultivation and that now, as progressively poorer lands are sown, the effect will be a decline in the average yield based on the better lands.* It is probable that the expansion into poorer lands would tend to offset possible gains in yields of small grains that might be expected from mechanization and other improvements in techniques.

A more recent series of yields are those for 1928-32, the period just before the introduction of "biological" yields. In this period the average yield of spring wheat in the then Zapadno-Sibirskiy Kray (roughly representative of the Northern Zone) was 6.2 centners per hectare. The estimated 1900-1915 average yield of spring wheat in the 8 oblasts and Altayskiy Kray which constitute the Northern Zone was 7.3 centners per hectare. Similarly, the 1928-32 average yield of spring wheat in the then Kazakhskaya** ASSR (roughly representative of the Southern Zone) was 5.6 centners per hectare. The 1900-1915 estimated average yield of spring wheat in the 9 oblasts which constitute the Southern Zone was 5.7 centners per hectare. Thus during the 1900-1915 period, yields for the Northern and Southern Zones were approximately equal to, or slightly larger than, the yields during 1928-32 for roughly comparable areas.

In the absence of any relatively recent average yield series, and on the basis of the reasoning outlined in the preceding paragraphs, the yield series for the 1900-1915 period has been used as a basis for arriving at a judgment of the yields that might be expected in the new lands. Computed yields of spring wheat in the Northern, Southern, and Western Zones of the new lands of the USSR in 1900-1915 are shown in Table 7.***

An examination of Table 7 reveals that yields of spring wheat vary considerably from year to year in the new lands. No pattern of good or bad years is discernible for the 16-year period. In the series based on the 1955 acreage distribution pattern, however, in 8 of the 16 years,

* New land when first brought into cultivation may have a better soil structure than adjoining land that has been in use for a larger number of years, and for a few years it may produce slightly larger yields, in spite of the fact that in other respects the land is inferior.

** Actually called Kazakskaya (Казакская) ASSR before 1936.

*** Table 7 follows on p. 55.

Table 7

Computed Yields of Spring Wheat in the Northern, Southern, and Western Zones of the New Lands of the USSR 1900-1915

Centners per Hectare

	Based on 1954 Acreages				Based on 1955 Acreages			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Year	Northern [a]	Southern [b]	Western [b]	Total [c]	Northern [d]	Southern [d]	Western [d]	Total [d]
1900	4.0	2.3	7.0	4.0	4.0	2.3	7.0	3.6
1901	3.4	4.4	3.1	3.7	3.5	4.8	3.2	4.1
1902	7.7	5.8	4.6	6.5	7.6	5.3	4.5	5.9
1903	10.4	9.7	4.5	9.2	10.4	9.6	4.4	9.0
1904	6.4	4.6	9.4	6.3	6.4	4.7	8.4	5.8
1905	9.6	9.5	6.5	9.0	9.7	9.4	5.9	8.9
1906	9.5	5.8	1.6	7.0	9.3	5.9	1.6	6.2
1907	8.8	7.6	5.4	7.8	8.7	8.3	5.1	8.0
1908	8.8	6.2	5.7	7.4	8.8	5.6	5.6	6.5
1909	6.8	3.4	8.6	6.0	6.9	3.6	8.0	5.2
1910	7.7	4.3	6.8	6.5	7.8	4.7	5.6	5.8
1911	5.0	2.7	1.3	3.6	4.7	2.4	1.1	2.9
1912	7.3	6.0	6.6	6.8	7.4	5.9	6.8	6.4
1913	7.4	4.9	8.7	6.9	7.5	4.9	8.3	6.2
1914	9.2	8.6	7.0	8.6	9.2	8.9	7.1	8.7
1915	5.4	5.0	9.4	6.0	5.6	5.3	9.5	6.0
Average	7.3	5.7	6.0	6.6	7.3	5.7	5.8	6.2

a. The 1900 yield in each oblast or kray in the Northern Zone was multiplied by the 1954 acreage of the oblast or kray (see Table 6, p. 52, above). The sum of these production figures was divided by the 1954 acreage for the zone, thus obtaining a 1900 zonal yield weighted on the basis of 1954 acreages. For each of the remaining years, 1901-15, a similar yield for the Northern Zone was computed, each weighted on the basis of 1954 acreages.

Table 7

Computed Yields of Spring Wheat in the Northern, Southern, and Western Zones of the New Lands of the USSR
1900-1915
(Continued)

b. The same procedure as is described in a, above, was used to obtain the yields for the Southern and Western Zones, based on 1954 acreages.
c. Each of the yields in column 4 is a weighted average of the 3 zonal yields, with the 1954 acreage for each zone being used as the basis for weighting.
d. The same procedure as is described in a, b, and c, above, was used, except that 1955 acreages rather than 1954 acreages were used as the basis for weighting.

yields for the new lands as a whole were below the average of 6.2 centners per hectare (9.3 bushels per acre). During the 1900-1915 period, yields ranged from 47 percent to 145 percent of the average yield for the whole period, with a mean deviation* of 24 percent from the average yield.

Wide annual variability in yields is to be expected in an area where there are extreme fluctuations from year to year in the amount and distribution of rainfall. In general, the variability of crop yields is greater in the drier areas. Yields not only are larger but also are less variable in the Northern Zone, where annual precipitation and moisture efficiency are higher than in the Western and Southern Zones.

In the Western Zone, yields range from 19 percent to 164 percent of the average for the 16-year period for the zone. In the Southern Zone, yields range from 40 percent to 168 percent of the zonal average, and in the Northern Zone, yields range from 48 percent to 142 percent of the zonal average. In the Northern Zone the mean deviation from the zonal average yield during the 16-year period was 25 percent, increasing to 30 and 33 percent in the Southern and Western Zones, respectively.

In general, there tends to be an inverse relationship between the year-to-year variability in yields and the size of the area for which the yields are computed. Thus there is less year-to-year variability in yields for the USSR as a whole than for the new lands alone. Similarly, there is less variability for the new lands as a whole than for any particular zone within the new lands.

On the basis of the 1955 distribution of acreage, the computed 1900-1915 average yield in the new lands as a whole was slightly smaller than the yield based on the 1954 acreage distribution (6.2 centners per hectare compared with 6.6 centners per hectare) (see Table 7**).*** This reflects the fact that in 1955 the expansion of acreage was, in general, relatively greater in oblasts having the smallest yields.

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* Average deviation from the mean, without regard to sign.

** P. 55, above.

*** In the Western Zone there was a decrease from 6 to 5.8 centners per hectare, but in the Northern and Southern Zones there was no decrease. The fact that the decrease for the new lands as a whole was greater than that for any of the component zones is explained by the fact that in 1955 the percentage increase in acreage was greater in the Southern and Western Zones than in the Northern Zone, and hence the lower yields of these two zones had greater weight than when the distribution was based on 1954 acreages.

In appraising yields for 1954 and 1955, deviations from the long-term averages given in Table 7* were estimated on the basis of weather information, travel reports by Western observers, and Soviet statements on crop conditions. These deviations applied to the long-term averages are the basis of the 1954 and 1955 yield estimates, which were applied in VI, below, to estimated acreages to determine the production of grain in the new lands.

VI. Production of Grain, 1954-55.

A. General.

The new lands of the USSR are a spring crop region, and grain (primarily wheat) is the predominant crop. Because of lack of information, it is impossible to classify the grain acreage seeded in the new lands into its components of wheat, rye, barley, oats, millet, corn, and the like. Because spring wheat is by far the preponderant grain, however, it can be assumed that yields of spring wheat indicate within a reasonable margin of error the yields of all grains.

B. 1954.

There is evidence that almost all of the area sown in 1954 (4.3 million hectares) was sown to grain. This acreage, as indicated in Table 6,** was distributed as follows (in thousand hectares): Northern Zone, 2,050; Southern Zone, 1,320; Western Zone, 690; and areas not distributed by zone, 240.

The new lands as a whole had unusually favorable weather during the 1954 growing season, and the result was a very large grain crop. Estimated acreage, yield, and production of grain in the new lands of the USSR, by zone, in 1954 are shown in Table 8.***

The yield figures shown in Table 8 are estimates based on deviations from the long-term average yields given in Table 7. In estimating the 1954 deviations from the long-term average, the following factors

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* P. 55, above.
** P. 52, above.
*** Table 8 follows on p. 59.

Table 8

Estimated Acreage, Yield, and Production of Grain in the New Lands of the USSR, by Zone
1954

Zone	Acreage (Thousand Hectares)	Yield (Centners per Hectare)	Production (Thousand Metric Tons)
Northern	2,050	12.7	2,600
Altayskiy Kray	1,000	15.0	1,500
Remainder of zone	1,050	10.5	1,100
Southern	1,320	9.0	1,200
Western	690	6.5	450
Areas not distributed by zone	240	10.5	250
Total	4,300	10.5	4,500

have been considered: available weather information, statements appearing in the Soviet press, official government statements, [redacted] 50X1
[redacted] The type of information used and the yield estimates for each of the zones are discussed below. 50X1

On the basis of weather information, Soviet press statements, [redacted] 50X1
[redacted] it is concluded that yields of grain in 1954 in the Western Zone of the new lands along the Volga River were slightly below average. Saburov, in his November anniversary speech, noted that "in many parts of the country /the south Ukraine and Volga districts/ the weather was unfavorable." 129/ Yields probably were smallest in the lower part of the Volga region, and conditions were somewhat better toward the north. [redacted] in the northern half of Kuybyshevskaya Oblast yields probably were near or slightly above average. 130/ On the basis of weather information, yields in the remainder of the Western Zone are assumed to have been somewhat above average. For the Western Zone as a whole, therefore, it is estimated that yields in 1954 were from 5 to 10 percent above average, about 6.5 centners per hectare. 50X1

Data published in the Soviet press as well as official government statements 131/ indicated that in 1954 the yield of grain in Altayskiy Kray in the Northern Zone of the new lands was about 15 centners per hectare. This yield is more than double the estimated average yield for Altayskiy Kray. Available weather information [redacted] indicate, however, that the announced yield probably is reasonable. Yields were also considerably above average in the remainder of the Northern Zone. On the basis of available weather data and the fact that there was considerably more publicity given to successes in Altayskiy Kray than in any other area, it seems likely that yields in Altayskiy Kray were substantially larger than in the remaining areas of the Northern Zone. Thus for the Northern Zone as a whole the yield is estimated at 12 to 13 centners per hectare, about 75 percent above the zonal average. Although this yield is about 20 percent larger than the largest computed yield during the 1900-1915 period for the Northern Zone (see Table 7*), this difference may be explained by the fact that the yield in the most important part of the Northern Zone, Altayskiy Kray, was exceptionally good.

50X1

Available weather information and Soviet press comments indicate that yields in the Southern Zone of the new lands were also very good but, compared with the long-term average, probably were not so good as those in the Northern Zone. In a speech in November 1954, Saburov stated that "in districts of Western Siberia /roughly representative of the Northern Zone/ twice as much grain will be harvested as last year /1953/ ... and in Kazakh SSR /roughly representative of the Southern Zone/ almost 35 percent more grain will be harvested." 132/ Even taking into consideration the fact that there was a larger percentage increase in acreage in the Northern Zone than in the Southern Zone, it seems likely that in relation to the long-term average, yields were better in the Northern Zone than in the Southern Zone. The yield in the Southern Zone has been estimated at about 60 percent above average, about 9 centners per hectare.

The yield assumed for the areas not distributed by zone was the weighted average yield of the three zones.

The weighted average yield in 1954 for the new lands as a whole, based on these zonal estimates, was about 10.5 centners per hectare. When applied to the 4.3 million hectares of grain area, this average results in an estimated production of grain in the new lands in 1955 of approximately 4.5 million tons.

* P. 55, above.

The estimated average yield in 1954 for the new lands of 10.5 centners per hectare is about 35 percent above the estimated yield in 1954 for the USSR as a whole. The estimated production of 4.5 million tons of grain in the new lands in 1954 is about 5 percent of the estimated Soviet production for that year.

C. 1955.

The acreage sown to grain in the new lands in 1955 (18.5 million hectares) was announced in the Soviet press. This acreage, as indicated in Table 7,* was distributed as follows (in thousand hectares): Northern Zone, 5,140; Southern Zone, 8,650; Western Zone, 2,600; and areas not distributed by zone, 2,110.

In contrast to 1954, most of the new lands suffered from drought in the 1955 crop year, and yields were less than one-half of those obtained in 1954. Estimated acreage, yield, and production of grain in the new lands of the USSR, by zone, in 1955 are shown in Table 9.

Table 9

Estimated Acreage, Yield, and Production of Grain in the New Lands of the USSR, by Zone
1955

Zone	Acreage (Thousand Hectares)	Yield (Centners per Hectare)	Production (Thousand Metric Tons)
Northern	5,140	5.5	2,850
Southern	8,650	3.5	3,050
Western	2,600	4.5	1,150
Areas not distributed by zone	2,110	4.3	900
Total	18,500	4.3	7,950

* P. 55, above.

The Western Zone of the new lands apparently was on the western edge of the drought area and hence was relatively* not so severely affected as were the Northern and Southern Zones. It was reported that yields in the Volga area, although below average, had not been affected by drought as much as the new lands farther to the east. 133/ Rather severe drought conditions, however, existed in Chkalovskaya Oblast and Zapadno-Kazakhstanskaya Oblast. 134/ On the basis of these reports and of available weather information, it was judged that the yield in the Western Zone in 1955 was about 4.5 centners per hectare, about 80 percent of the long-term average.

In the Northern Zone the effects of the drought, although not quite so severe as they were in the Southern Zone, were still significant. For example, available information indicated that the expected yield in 1955 in the Rubtsovsk area of Altayskiy Kray was from one-third to one-half of the very large yield obtained in 1954 in that area. 135/ In addition, in the southern part of Kurganskaya Oblast, [redacted] 50X1 [redacted] 50X1 "the plants' need for moisture from the shoot stage to the heading stage was satisfied by only 17 to 26 percent." 136/ Conditions in the central and northern parts of Kurganskaya Oblast, however, were better than in the southern part. On the basis of this information and of weather information about the Northern Zone, it was estimated that for the zone as a whole the yield in 1955 was about 5.5 centners per hectare, about 75 percent of the long-term average.

Drought conditions in 1955 were most severe in the Southern Zone of the new lands. One Soviet source stated: "The 1955 spring and summer weather in the northern oblasts of Kazakh SSR was extremely unfavorable for the growth of wheat. During the entire vegetative period there was one light rain /in the second 10-day period of July/ which soaked the soil only to a depth of 3 to 4 centimeters. Besides that, there were frequent dry hot winds. There has not been such a drought in Kazakh SSR for 44 years." 137/ This reference to a drought 44 years ago refers to the 1911 drought, when the yield in the Southern Zone (essentially the grain area of Kazakh SSR) probably was near an all-time low, less than 3 centners per hectare (see Table 7**). A Deputy Minister of Agriculture in the Kazakh SSR Ministry of Agriculture also stated that, because of the drought, the yield of grain in 1955 in the new lands of Kazakh SSR was less than one-half of the 1954 yield. On the basis of all available information the 1955 yield of grain in the Southern Zone has been estimated at 3.5 centners per hectare, about 60 percent of the long-term average. This yield is about 40 percent of the 1954 yield.

* Relative to the long-term average.
** P. 55, above.

The weighted average yield in 1955 for the new lands as a whole, based on these zonal estimates, is about 4.3 centners per hectare, which -- when multiplied by the 18.5 million hectares of grain area -- results in an estimated production of grain in the new lands in 1955 of almost 8 million tons.

The estimated 1955 average yield for the new lands of 4.3 centners per hectare is about 55 percent of the estimated average in 1955 for the USSR as a whole. The estimated production of 8 million tons in the new lands in 1955 is about 8 percent of the estimated Soviet production for that year.

VII. Crop Rotation -- Soviet Statements and Canadian Experience.

Soviet planners know that a system of crop rotation, including fallow,* must be introduced into the new lands area if productivity is to be maintained. In an area as large as the new lands, with its varying soil and climatic conditions, there are certain to be variations in the most suitable type of rotation system required. Thus a rotation system suitable for the Northern Zone of the new lands would not be appropriate under the conditions in the Southern and Western Zones. Roginets, Minister of State Farms in Kazakh SSR, expects that even a single state farm may require several different rotation systems as a means of coping with the soil and topographical conditions peculiar to different parts of its cultivated area. 141/

* Several types of fallow are planned for the new lands as a means of accumulating moisture and controlling weeds. In the northern part, emphasis is being placed on "clean" fallow 138/ and "strip" fallow. In "clean" fallow the land is allowed to lie idle during the growing season and is cultivated only to the extent necessary to prevent the growth of weeds. In "strip" fallow, 139/ strips of "clean" fallow are alternated with strips of corn or sunflowers to control wind erosion. Some of the corn may be left uncut to aid in retaining snow during the winter months. In the southern and western parts of the new lands, or in light-textured soils, Soviet agronomists recommend either "strip" fallow or "occupied" fallow. A vetch-oats mixture or oats or rye alone and occasionally even corn for green fodder are sown to create so-called "occupied" fallow as a means of controlling the wind erosion that would occur if the land were left bare. 140/

Roginets also states that the question of which system of crop rotation to establish in the new lands "had not been decided" as of January 1956. Although this is undoubtedly true of particular areas of the new lands, it appears that a general pattern of land-use had been agreed upon as a basis for setting up a rotation system.

For the first few years after bringing virgin or long-fallow land into cultivation, the USSR plans to sow grain year after year. On the best soils, grain will be grown continuously for up to 6 years before the introduction of a system of crop rotation. On the poorer light-textured soils of the new lands, Soviet plans apparently call for the introduction of a rotation system after an initial period of 2 to 3 years of continuous production of grain. 142/

An April 1954 issue of a Kazakh SSR Academy of Science journal contained a proposed crop rotation land-use plan for the virgin and long-fallow lands of Kazakh SSR. 143/ The basic rotation system called for a 10-field system in which 70 percent of the land would be sown to grain, primarily wheat, and the remaining 30 percent would be left fallow and sown to perennial grasses.* In the more arid regions of Kazakh SSR an eight-field rotation system was recommended, in which one-half of the land would be sown to grain and the remainder left fallow and sown to grasses.

In February 1956 a Soviet agricultural scientist, Andrianova, described proposed 5- and 6-field systems of crop rotation. 144/ In these rotation systems, grain would occupy 70 to 75 percent of the land, and the remaining 25 to 30 percent would be fallow and sown to perennial grasses.

There have been many proposed systems of crop rotation published in the Soviet press, but the majority imply that in most of the new lands, grain in any one year will occupy about three-fourths of the land in rotation,**

* Perennial grasses serve to maintain fertility, improve soil texture, reduce soil erosion, and control the growth of weeds.

** There is an exception in the most arid sections of the new lands, where the recommended system of crop rotation includes 50 percent sown to grain and 50 percent left fallow and sown to perennial grasses.

fallow and perennial grasses occupying the remaining one-fourth. The role of perennial grasses in the rotation systems appears to be rather flexible; [redacted] "the grass will be grown as long 50X1
as it gives high yields." 145/ [redacted] "the 50X1
practice under the conditions of Severo-Kazakhstanskaya Oblast /in the heart of the new lands/ has been to leave a field under grass for 3 to 4 years. Areas under low yielding grasses can be plowed in the second or even the first year of use."

General statements made in the summer of 1955 by Lobanov, 146/ who at that time was the official spokesman on agricultural matters for the Council of Ministers, USSR, and by a Deputy Minister of the Kazakh SSR Ministry of Agriculture 147/ are in general agreement with the systems of crop rotation recommended in the press. These statements imply that once a rotation system is put into effect, 75 percent of reclaimed land would be kept planted to crops, primarily grain, compared with the 70 to 75 percent usually called for in the recommended rotation systems.

As livestock numbers increase in the new lands, it is possible that the requirements of animal husbandry may have an influence on the system of crop rotation. More fodder crops, including corn, may be introduced to replace the natural forage lost in the process of reclaiming pasture-lands, and the amount of perennial grasses included in the rotation system of individual farms may be determined, in part, by the needs of increased flocks and herds.

Based on experience in the Canadian wheat belt -- an area with physical and climatic characteristics somewhat analogous to those of the major part of the new lands -- the Soviet systems of crop rotation discussed above include an exceptionally large proportion of land sown to grain. In the more arid regions of the chestnut soil zone of Canada, where conditions roughly approximate those in the Southern Zone of the new lands, a so-called 15-year rotation system is practiced in which one-third of the land is sown to grain in any one year, and the remaining two-thirds of the land is left fallow and sown to perennial grasses. In the zones of dark chestnut and black soil in Canada, many parts of which are more favorable for production of grain than is the Northern Zone of the new lands, there are at least 3 recommended rotation systems, varying in length from 9 to 16 years. In all cases, however, only about one-half of the land is sown to grain in any one year; the remainder is left fallow and sown to grasses.

This comparison of recommended Soviet and Canadian systems of crop rotation reveals that the USSR plans to have a significantly higher percentage of land in grain in any one year than is the practice in Canada; hence there must be correspondingly less fallow and perennial grasses.

Otto Schiller, a German agriculturist who worked in the USSR during the 1920's as manager and agronomist on large-scale farms leased as "concessions" to German corporations, has stressed the importance of perennial grasses or fallow in the new lands. 148/ Schiller discussed a system of crop rotation suitable for the new lands, in which one-third of the land would be sown to grain and two-thirds left in fallow and sown to perennial grasses. This is similar to the system recommended in portions of the chestnut soil zone of Canada. Schiller's experience in bringing virgin and long-fallow lands into use in the Trans-Volga and Kuban districts leads him to the conclusion that preservation of the soil structure is the most important prerequisite for maintaining satisfactory yields in the new lands. According to Schiller, the soil structure can be preserved only by leaving the soil idle or sown to perennial grasses for several years after each short period of cultivation. His practice, while in the USSR, was to crop reclaimed land only 3 years out of every 8 or 9 years.

Both Schiller's work and Canadian experience indicate that the USSR is in danger of depleting the soil of the new lands if the abnormally heavy cropping at present anticipated for the new lands is continued for many years. It is possible, however, that Soviet agricultural planners do not intend to press the soil to the point of depletion before modifying their system of crop rotation. One Soviet agricultural scientist believes that in the black soil areas a large proportion of grain crops can be maintained for as long as 10 years before the soil structure will require conservation measures. He also recognizes that in the areas of light, sandy soils, perennial grasses may be required much earlier than in the black soil areas, if soil structure is to be preserved.

Although a proportion of grain crops as high as 75 percent, if continued for long, would be a threat to the soil structure of the new lands and would increase the possibility of serious wind erosion, it is possible that this proportion will be reduced as the different soils approach depletion. Whether or not reduction of the grain area in the system of crop rotation will be sufficient to prevent serious damage to the soil and a permanent reduction in yields may depend more on political considerations than on the recommendations of Soviet agronomists.

VIII. Production -- Outlook for the Future.

Khrushchev and other Soviet officials have made numerous statements, many of which appear to be extremely optimistic, concerning the yields and production expected from the new lands. This section discusses a few of the more important of these statements and attempts to arrive at some judgments concerning possible achievements in the new lands.

In his report of 23 February 1954 to the Central Committee of the Communist Party, 149/ Khrushchev asked, "What will the country get as a result of the reclamation of the 13 million hectares?"* He then answered, "If we assume that only 10 to 11 centners of grain /per hectare/ will be harvested on the reclaimed lands, this will give an additional 800 million to 900 million poods /13.1 million to 14.7 million tons/ of grain, including 500 million to 600 million poods /8.2 million to 9.8 million tons/ of marketable grain." Later in his speech, Khrushchev became even more enthusiastic -- "With yields of 14 to 15 centners per hectare, the gross harvest of grain on the reclaimed areas can total 1.1 billion to 1.2 billion poods /18 million to 19.7 million tons/ and its marketable part 800 million to 900 million poods /13.1 million to 14.7 million tons/." Later evidence indicates that an average yield of 10 to 11 centners per hectare is the official Soviet goal. At the XX Party Congress, almost 1 1/2 years after the goal for new lands acreage had been raised to 28 million to 30 million hectares, Khrushchev stated, "Calculations show that we shall be able to receive annually from the new lands not less than 2 billion poods /33 million tons/ of grain." 150/ Computed on the basis of 30 million hectares, the production of 2 billion poods requires a yield of 11 centners per hectare.

The chief agronomist of the Kazakh SSR Ministry of Agriculture stated that he "anticipated an average yield comparable with the southern Ukraine, say 7-8 centners per hectare." 151/ About 60 percent of the total planned new lands area is in Kazakh SSR, and an average yield of 7 to 8 centners per hectare there would require a yield of 15 to 17 centners per hectare (more than double that in Kazakh SSR) from the new lands of the USSR if the over-all yield of 11 centners per hectare were to be obtained. Officially announced goals for Kazakh SSR indicate a planned grain yield in 1956 of 10 centners per hectare, 152/ which may suggest that Soviet planners do not agree with the yield of 7 to 8 centners per hectare given by the Kazakh SSR Deputy Minister of Agriculture.**

* This acreage was then planned to be reclaimed.

** It is possible that Kazakh officials have made a distinction between the average long-term yield and the yield planned for 1956, but no such distinction has been noted in the Soviet press.

Various Soviet officials have made estimates of the yield required for the new lands program to be financially successful. A Deputy Minister in the Kazakh SSR Ministry of Agriculture said that in order for the new lands program (possibly referring only to the Kazakh SSR part of the new lands) to be financially successful, it was necessary to obtain an average yield of 4 centners per hectare. He stated further that if the area received one good harvest every 3 years the new lands program would be profitable. 153/ An official of the Soviet Ministry of Agriculture stated that the "campaign would be worthwhile if a long-term average yield of 6 centners per hectare could be maintained."* He expressed his conviction that this figure would be exceeded but said nothing about a much higher average. 154/

The expected average yield of grain of 10 to 11 centners per hectare, suggested by Khrushchev and others, is unrealistically high. In order to maintain over a period of years an average yield equivalent to 10 centners per hectare, Canadian experience (based on soil, weather, and other factors affecting production) has shown that it was necessary to practice a system of crop rotation with one-half to two-thirds of the land fallow or sown to perennial grasses.

In general, the soil, weather, and other factors affecting production in the new lands are less favorable than in the Canadian wheat belt. The currently proposed system of crop rotation indicates that one-fourth of the land is to be fallow or sown to perennial grasses. Under such conditions the yield of 11 centners per hectare suggested by Khrushchev is unreasonable.

An average yield of grain, anticipated by the chief agronomist of the Kazakh SSR Ministry of Agriculture, "comparable with the southern Ukraine, say 7 to 8 centners per hectare" is also unrealistically high. The average yield in the USSR as a whole is only 8 centners per hectare.

A long-term average yield of grain for the new lands as a whole of about 6 centners per hectare (see Table 7**) is judged to be a more reasonable estimate of the yield to be expected over a period of years than the optimistic yields suggested by Khrushchev and others.*** It is possible that under the cropping system envisaged by the Soviet leaders even this yield cannot be maintained over a period of years, because excessive cropping may well have a detrimental effect on yields.

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* It is probable that this yield is for the new lands as a whole.

** P. 55, above.

*** In any one particular year the yield in the new lands may be significantly higher or lower than 6 centners per hectare, depending on the weather and other conditions affecting production during that crop year.

If the USSR adopts a system of crop rotation similar to that practiced by the Canadians or recommended by Schiller,* then 60 million to 90 million hectares of new land would have to be reclaimed in order to maintain 30 million hectares planted to crops. No plan for an expansion of that magnitude has been even implied by Soviet officials. The total amount of virgin and long-fallow land that could be brought under cultivation was a topic of discussion by Benediktov, the Soviet Minister of State Farms. Benediktov said that experts differ on how much land was available but some thought that 20 million hectares in addition to the 30 million hectares now under cultivation could be added without clearing forests. 155/

If no more than the present 30 million hectares are reclaimed, and a system of crop rotation similar to that of the Canadian wheat belt is used, only 10 million to 15 million hectares could be planted to crops in any one year. In this connection Schiller states, "If the Soviets will take care to stop continued cultivation in time, they may avoid disastrous consequences such as large-scale wind erosion and destruction of soil fertility for a long period. This would mean, however, that after two or three years of initial great expansion, the gain in grain area would be reduced to nearly one-third of the plan, i.e., to 10 million hectares." 156/

In his statement to the XX Party Congress in February 1956 that an annual production of not less than 2 billion poods (33 million tons) of grain could be expected from the new lands, Khrushchev apparently assumed that all of the new lands would be sown to grain, although in fact in 1955 about 10 percent of the land was sown to nongrain crops. To permit comparisons with Soviet statements, the production estimates which follow are also made on that assumption.

If it is assumed that the USSR plans to have 30 million hectares of new lands sown to grain continuously (requiring 60 million to 90 million hectares in the system of crop rotation), then with a yield of 6 centners per hectare the total production of grain in the new lands would be about 18 million tons, only slightly more than one-half of the 33 million tons mentioned by Khrushchev. It is extremely unlikely, however, that the USSR is considering a new lands reclamation program involving 60 million to 90 million hectares.

Benediktov's claim that 20 million hectares more of new land could be reclaimed without clearing forests would imply a total of only 50 million hectares of available land. If suitable systems of crop rotation were

* See VII, p. 66, above.

applied to this 50 million hectares, about 17 million to 25 million hectares could be sown to grain in any one year. Assuming a yield of 6 centners per hectare, the average total production from the new lands would then be 10 million to 15 million tons. This estimate is believed to be the most reasonable upper limit of the average production of grain that might be expected from the new lands over a period of years.

Assuming that no more than 30 million hectares are reclaimed, thus permitting only 10 million to 15 million hectares to be sown to grain in any one year, then with a yield of 6 centners per hectare the average production in the new lands of grain over a period of years would be only 6 million to 9 million tons.

On the basis of the above reasoning it is estimated that production of grain in the new lands over a period of years may be between 6 million to 15 million tons, which is a rather wide range. A more precise estimate is based on current Soviet reclamation plans, which call for the reclamation of 40 million hectares. Again assuming that no more than one-third to one-half of this area can be sown to grain in any one year, the grain area would be about 13 million to 20 million hectares. With a yield of 6 centners per hectare, the production of the new lands would then be 8 million to 12 million tons of grain, about 10 to 15 percent of the estimated average Soviet production of grain for the 4-year period (1950-53) before the inauguration of the new lands program. A gross production of 8 million to 12 million tons of grain -- after deductions for seed and waste -- indicates a net availability for human consumption of 6 million to 9 million tons. This quantity would supply the grain requirements of about 15 million to 22 million persons at the 1955 rate of consumption.

All the previous estimates of the production of grain that might be expected in the new lands over a period of years have been based on the assumption that the USSR will adopt a system of crop rotation similar to the Canadian system, which can be expected to maintain yields at the estimated long-term average of 6 centners per hectare. If, however, a rotation system with 75 percent of the land sown to grain is adopted and continued over a period of years, the average yield is likely to decrease, and there is a strong possibility that large-scale wind erosion might occur. Assuming a rotation system with 75 percent of the land sown to grain, the present plan for the reclamation of 40 million hectares would allow a grain area of 30 million hectares. For the first few years in such a rotation system there

might be only a slight diminution in the yield, but in the long run there very likely would be a significant decrease in the average yield, probably to a point where the total production would be less than that which could have been obtained with proper rotation in a smaller grain area.

IX. Animal Husbandry.

A. General.

The character of animal husbandry in the new lands of the USSR varies from north to south in accord with changing physical and climatic characteristics. In the Northern Zone, there is more rainfall than in the Southern Zone, and the moderate summer temperatures, adequate water supplies, and a relatively large area of high-yielding natural meadows and pastures have encouraged the dairy industry and swine raising, the more intensive branches of animal husbandry. Traditionally, however, sheep have been the most numerous type of livestock in the Northern Zone.

As the wooded steppe of the Northern Zone merges with the treeless steppe in the south, serious handicaps are imposed on animal husbandry. Insufficient water, inferior meadows and pastures, summer droughts, and sparsity of cultivation sharply reduce the density of livestock numbers and discourage the dairy industry and swine raising in most of the Southern Zone. The hardiness of sheep and their adaptability to inferior pastures have resulted, however, in a larger proportion of sheep numbers in the Southern Zone than in the Northern Zone.*

Shifts in livestock numbers between 1928 and 1938 in Kazakh SSR and Western Siberia indicate that the present area of the new lands shared the serious losses incurred by animal husbandry in the USSR during the collectivization period and that the subsequent recovery was slow. 157/ During this period, a pronounced increase in the relative density of sheep numbers began in both Kazakh SSR and Western Siberia and continued until the start of the new lands program. 158/

Animal husbandry in Kazakh SSR improved slowly in the early postwar years, but the Three Year Plan (1949-51) for the development of livestock was, on the whole, a failure. Total livestock numbers increased during this period, but most of the increase appears to have been in sheep numbers.

* The sheep in the Southern Zone are primarily of the coarse-wool, milk type.

According to CIA estimates,* the only appreciable increases in livestock numbers in the new lands between 1938 and 1954 were that of swine in the Northern Zone and of sheep in the Southern Zone. In Kazakh SSR the period from 1950 to 1954 was essentially a period of stagnation in animal husbandry.

Productivity of livestock in the present area of the new lands was low in the period before the new lands program. In Kazakh SSR as a whole, the yield of milk per cow, animal birthrates, and wool clip were particularly low. Average yields of milk were undoubtedly larger in the Northern Zone, but -- compared with the resources of the area -- they were small.

In the autumn of 1953, when the new lands program was conceived, the livestock situation in Kazakh SSR, in which the Southern Zone is located, was unsatisfactory.** Kazakhstanskaya pravda described the situation with striking candor:

> As of 1 October 1953 the number of cattle and horses in Kazakh SSR had fallen short of the 1928 figure; comparison with 1940 shows a drop in the number of productive livestock and a decreasing birth rate. From one year to the next, kolkhozes*** of the Republic fail to realize state plans for increasing livestock numbers.
>
> As of 1 October 1953 comparison with 1940 shows lowered output of milk and wool in Kazakh SSR. Not a single Oblast in 1953 fulfilled its state plan for wool delivery; eight oblasts fell short of completing milk deliveries, and eight oblasts were short in meat deliveries. 159/

This condemnation is so sweeping that it justifies the inclusion of the present Southern Zone in the generally unsatisfactory position of animal husbandry in Kazakh SSR as a whole.****

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* See Appendix B, Table 26, p. 138, below.

** For example, total cattle numbers in Kazakh SSR in 1954 had not even attained the total number planned for the socialized sector alone in 1951. Only sheep numbers increased appreciably between 1949 and 1953.

*** Collective farms.

**** Developments in animal husbandry in Kazakh SSR are referred to in this report when such developments are considered applicable to the Southern Zone of the new lands. Unless otherwise indicated, references to Kazakh SSR include the entire republic and not the Southern Zone alone.

Oblast reports indicate that the Northern Zone also lagged seriously in livestock development at the beginning of the new lands program. As in Kazakh SSR, inadequate procurement of fodder resulted in low productivity and a slow natural increase.

Before the beginning of the new lands program, the primary problem of animal husbandry in the present area of the new lands was shortage of fodder. This shortage was particularly acute in winter, when forage supplies were often exhausted; death and low productivity of livestock often resulted. Short-run fluctuations in fodder supply caused serious hardship, but more basic has been the long-run disparity between livestock numbers and fodder supply. For example, from 1948 to 1952, livestock numbers in Kazakh SSR increased, in spite of the failure to fulfill the state plan, by 32.9 percent. Although the bulk of this increase was in sheep numbers, the 5.9-percent increase in fodder procurement during this period was insufficient to meet increased needs. 160/

In addition to natural handicaps, animal husbandry in the new lands suffered from the same institutional weaknesses that affected most of the agriculture of the USSR. These weaknesses appear to have been particularly serious in Kazakh SSR, where in 1951 only 425,000 hectares of a planned total of 998,000 hectares were sown to perennial grasses; and only 729,000 hectares of sown and natural grasses out of a possible total of 3 million hectares were cut. 161/ The fact that animal husbandry in Kazakh SSR was in a state of neglect is also illustrated by the fact that even by 1955 the supply of water to livestock was mechanized by only 3 percent. 162/

B. Livestock Program.

1. Plan of Development.

a. General.

In his report on the new lands program in March 1954, Khrushchev proposed the "bringing into use of considerable new masses of seasonal pasture" through the construction of wells, animal shelters, and human settlements. 163/ Although this program was to include large areas in the central and southern regions of Kazakh SSR, it was also to apply to parts of the Southern and Western Zones of the new lands. At first glance, there appears to be a contradiction between this plan and the plan to plow large areas of natural pasture in the new lands, but

only in the Northern Zone and in the northern fringe of the Southern Zone will the plowing of pastures have a major effect. In most of the Southern and Western Zones the area of pastureland is sufficient to support both expansion of grain acreage and increased livestock grazing.

More important to the livestock program in the new lands than the use of natural pasture, however, is the increase in production of grain. This increase, however, is not oriented to the need of new lands livestock for more feed grains. On the contrary, the new lands are intended to produce grain for human consumption, thus releasing acreage in the traditional wheat areas of the European USSR to increase cultivation of fodder crops, principally corn. The benefits accruing to animal husbandry in the new lands undoubtedly will be large, but for the most part, they will be only incidental to the grain program. The natural pastures, state farm water supplies, farm labor released from fieldwork during the winter months, the MTS machinery park, and other resources made available by the grain program will permit expansion of animal husbandry with a minimum investment.

The USSR bases the livestock program on the belief that livestock can be raised in the Kazakh steppe with a minimum expenditure of materials, work, and capital. This belief is encouraged by the success of livestock state farms in the area, in spite of shortages of labor and of animal shelters.* 165/ The low density of livestock numbers, relative to the feedstuff potentialities of Kazakh SSR, including the Southern Zone, is supposed to make possible a large increase in livestock numbers through the improved use of natural pastures and hayfields. 166/ Straw and chaff from grain is to make an important contribution to the feeding of livestock, particularly during the winter. 167/ Also important will be the fodder and forage crops which are to be sown as soon as an orderly system of crop rotation is established in new grain areas. 168/

This approach to the development of animal husbandry in the new lands is superficially reasonable. It presupposes, however, that a well-balanced pattern of land use, including a scientific system

* A Soviet study of costs of production in 1952-53 showed that it costs about the same to produce 1 centner of milk in Kazakh SSR as it costs in the Ukraine, but the cost of beef and wool was found to be much lower in Kazakh SSR. 164/

of crop rotation, will evolve from the new lands grain program. This, in turn, presupposes that the grain program can survive the rigors of climate in the new lands. To the extent that the grain program succeeds, opportunities for the success of animal husbandry in the new lands will develop. If, in spite of the Soviet tendency to neglect this branch of agriculture in favor of production of grain, adequate care is taken to improve animal husbandry, substantial results should be achieved.

The new lands grain program involves the plowing of large areas of natural pasture and, to a certain extent, meadows. Only land definitely not suited to continual cultivation is to remain for the use of livestock.* 170/ In the Northern Zone the area of pastureland is small, compared with the vast expanse of pastures in the Southern Zone. In the Northern Zone, therefore, the grain program will restrict materially the use of natural pasture by livestock and will increase dependence on meadow hay and sown fodder crops such as perennial grasses and corn. Plowing virgin and long-fallow land will have a much less restrictive effect in the Southern Zone because of its large area of natural pasture.

The difference in the impact of the new lands program on the supply of fodder in the Northern and Southern Zones is demonstrated by the long-range Soviet plan for bringing virgin and long-fallow lands into use. In 1955 it was anticipated that only 5 percent of the virgin and long-fallow land still available for reclamation in Kazakh SSR would be sown to pastures and hayfields. In contrast, 29 percent was to be sown to pastures and hayfields in Western Siberia. 171/

b. Cattle.

In the Northern Zone of the new lands, where the dairy industry has traditionally been the most important branch of animal husbandry, the new lands livestock program will undoubtedly promote greater specialization in production of milk.

In the Trans-Volga and Kazakh areas** of the new lands a shift in emphasis from cattle raising for production of meat to that for production of milk is planned for the next few years. 173/ This

* In Kokchetavskaya Oblast, for instance, 23.2 percent of the land put under cultivation by new state farms in 1954 came from existing animal husbandry farms. 169/

** It is planned to increase cow numbers and milk production in Severo-Kazakhstanskaya and Kokchetavskaya Oblasts, and also in considerable parts of Kustanayskaya, Akmolinskaya, and Pavlodarskaya Oblasts. 172/

shift apparently will depend largely on the manpower, water supply, and fodder base being developed by the grain program. State grain farms which are near adequate transportation will raise a large proportion of cows, and those in isolated areas will concentrate on production of beef. 174/

c. Sheep.

The USSR plans to expand sheep raising on a large scale in almost all parts of the new lands. The smallest relative increase in sheep numbers probably will take place in the dairy-farming areas of the Northern Zone, although in the zone as a whole -- and particularly in Altayskiy Kray -- a large increase in sheep numbers is planned for the next few years. 175/

In Kazakh SSR the relative proportion of sheep numbers is planned to increase at a rapid rate. Although the bulk of this increase probably is to take place in the central and southern areas of Kazakh SSR, large increases are also expected in the Southern and Western Zones of the new lands.* The greatest increase in sheep numbers is planned for Zapadno-Kazakhstanskaya Oblast in the Western Zone and Aktyubinskaya Oblast in the Southern Zone. 177/

Increasing the proportion of fine-wool sheep could increase greatly the productivity of sheep raising in the new lands. To date, however, accomplishments have been so small as to suggest that the role of fine-wool sheep in the new lands will remain small for the indefinite future.**

d. Swine.

Swine numbers are to increase in the Northern Zone of the new lands and in the northern portion of the Southern Zone. 179/ A large increase may be planned for the Northern Zone, but the reported plan for increasing swine numbers in Kazakh SSR is so conservative as to preclude the existence of an ambitious plan for the Southern Zone. 180/

* The present plan is to have up to 15,000 head of sheep on each new state grain farm, compared with between 2,500 and 5,000 head of cattle and 1,000 head of swine. 176/

** As of 1 October 1955, fine-wool sheep accounted for only 2.8 percent of total sheep numbers in Kazakh SSR. 178/

e. Improvement of Forage Supplies.

In state grain farms with considerable areas of natural meadows and pastures, the feed base is to consist largely of forage native to the area and rotation fodder crops, particularly perennial grasses and corn. Wherever grain is cultivated, straw and chaff will be a significant part of the livestock feed, particularly during the winter. In the northern fringe of the Southern Zone and in much of the Northern Zone, many of the new state grain farms can cultivate almost all the area that they possess for grain and other crops. Here it may be necessary to create meadows for grazing livestock or to resort to stall feeding. On farms of this type, straw and chaff, annual leguminous crops, corn, and perennial grasses will comprise the feed base for livestock. 181/

f. Role of State Farms.

In addition to the increase of livestock numbers on state grain farms, there is planned an increase in the numbers of state livestock farms. Part of this increase will consist of the conversion of some new state grain farms that were located on poor soil to livestock farms. 182/ The remainder of the increase will consist of the formation of new state livestock farms. This increase is associated principally with the use of natural pasture in the Kazakh steppe, particularly for sheep raising. 183/

Plans to increase the numbers of livestock on state farms in the new lands pose the problem of supplying the farms with animals. In January 1956, Pravda urged that in spite of the scepticism of some party members, the stocking of state farms within a short time would be possible without prohibitive expense. 184/

In March 1956 the Central Committee of the Party and the Council of Ministers, USSR, announced a decision that the numbers of livestock held as private property by collective farm households should be reconsidered in the light of local conditions:

> Bearing in mind the fact that in a number of areas which are classified by the specimen statute of the agricultural artel as belonging to agriculture areas with seminomadic and nomadic livestock breeding, and owing to the great changes which recently took place in the direction of animal husbandry /in this area/ there is hardly a need to maintain the number of cattle fixed in the past for private use on farmsteads. 185/

The seminomadic and nomadic areas referred to include most, if not all, of Kazakh SSR, and the "changes" referred to undoubtedly are those wrought by the new lands program. This decision lends weight to Pravda's position that new state farms can be stocked without prohibitive expense.

If, as is likely, many collective farm households own as many livestock as permitted by the specimen statute of the agricultural artel,* the decision of 26 March 1956 would make available to the government a large number of livestock, particularly sheep, for stocking the new state farms. The speed with which this stocking can be completed, however, will depend on the creation of an adequate feed base on each farm.

2. Efforts to Improve Animal Husbandry.

Resources supplied by the grain program are the principal basis of the livestock program in the new lands, but these resources must be supplemented by specific efforts to improve animal husbandry. During the first 2 years of the new lands program, such efforts have been made, but not on a large scale. Meadow improvement facilities

* In Kazakh SSR a collective farm household is permitted to hold as private property the following numbers of adult livestock:

	Nomadic Areas	Seminomadic Areas
Cows	8 to 10	4 to 5
Sheep	100 to 150	30 to 40
Swine		2 to 3 186/

are being increased, 187/ and a program for building animal shelters has been started.* More than 700,000 hectares of corn were seeded in Kazakh SSR in 1955, 189/ but the drought in that year must have greatly limited the effect of the increase in corn acreage on the fodder supply.

3. Problems Encountered.

Soviet efforts to improve water supplies in the new lands appear to have met with only little success. Ground water in the more arid areas of the new lands, where many of the new state farms are located, is at "great depth," 190/ and many wells yield salt water. 191/ Many farms were established before water supplies had been adequately surveyed, with the result that some farms have to haul water from a distance. 192/ Recent plans for contruction of large water pipelines from the Irtysh and Ishim Rivers through the Southern Zone suggest that ground-water supplies have not proved to be sufficient in this area. 193/

It is apparent that the major problems of animal husbandry in the new lands during the first 2 years of the program are, for the most part, the same as those that plagued animal husbandry before the program was started. Heavy winter losses, inefficient care of livestock, slow procurement of winter fodder, and lack of MTS cooperation are typical complaints. It is not clear, however, to what extent these complaints stem from the traditional weaknesses of Soviet agriculture and to what extent they stem from the dislocations caused by the grain program.

Animal husbandry is characteristically slow in responding to investment and organizational reforms. In addition, animal husbandry is receiving only secondary emphasis in the new lands. During the first year of the program it received particularly little attention. 194/ When the grain program attains a relatively stable position and when investment in animal husbandry has had more time to produce results, a more meaningful analysis of livestock problems in the new lands can be made.

* In 1955, 700 million rubles were allocated for animal shelters in Krasnoyarskiy Kray alone, compared with 90 million rubles allocated in 1949 "for construction and mechanization of /livestock/ farms" in the entire Kazakh SSR. 188/

4. Results.

From 1 October 1954 to 1 October 1955 the yield of milk per cow in Kazakh SSR increased by 98 kilograms (kg), or 12 percent, on collective farms and by 56 kg, or 8 percent, on state farms. 195/ The increase in yield of milk per cow in the socialized sector as a whole was 10.8 percent.* Oblast reports indicate that average yields of milk per cow also increased in the Northern Zone during this period. 196/ These increases are the only evidence that the new lands program has benefited animal husbandry in the area.** They suggest that forage supplies procured during the preceding year of favorable weather were more plentiful than in past years, making moderate gains in yields of milk possible in spite of the unfavorable weather of 1955. Corn, fed as green fodder in the summer, may also have contributed to increasing yields of milk.

State plan results for 1955 indicate that the period of stagnation in livestock numbers in Kazakh SSR which had begun in 1950 continued through the first 2 years of the new lands program. 197/ On 1 October 1955 there were fewer cattle in Kazakh SSR than in 1950, and fewer sheep than in 1951, although both of these earlier years were bad years for animal husbandry. 198/

On 1 October 1955, new state farms in Kazakh SSR, located almost entirely in the Southern Zone, had 89,500 head of cattle, 243,500 head of sheep, and "many pigs." 199/ These figures represent an average of approximately 265 head of cattle and 722 head of sheep per new state farm. These data contrast with the plan to have on each new state grain farm between 2,500 and 5,000 head of cattle, up to 15,000 head of sheep, and 1,000 head of swine. 200/ Thus, although stocking of state grain farms has been progressing, livestock numbers as of 1 October 1955 were far short of ultimate goals.

* The increase in average yields of milk in the socialized sector as a whole was calculated by weighting the increase in yield per cow on state and collective farms in proportion to the ratio of collective to state farm cow numbers (1.8 to 1). This ratio was calculated by relating state and collective farm yields of milk per cow for 1955 to the yield per cow in the socialized sector as a whole.

** The majority of the cows in Kazakh SSR probably are in the Southern Zone. Changes in the yield of milk per cow, therefore, are a relatively good indication of developments in the Southern Zone.

Because 250 out of a total of 337 new grain farms were formed in 1955, most of the livestock of new grain farms probably was procured in that year.* The scale of procurement implied by these data suggests that livestock were taken from private owners even before the decision of the Central Committee and the Council of Ministers, USSR, formalized the policy of decreasing privately owned livestock in the new lands.

In view of this decision, and in view of the rapidly increasing share of state farms in the field of animal husbandry, it is possible that the Southern Zone of the new lands may eventually lose its remaining nomadic character. As the role of private ownership in animal husbandry decreases, state farms may finally challenge the present predominance of collective farms. The completion of this transition, however, will depend on great improvement in the feed base and heavy investment in water supplies and shelter -- tasks which, if completed at all, may take many years.

X. Organization of Agriculture.

A. General.

The new lands program in the USSR has been implemented with the participation of some 10,660 collective farms, 1,740 MTS's, and an indeterminate number of state farms, including 425 new state farms organized during 1954-55. Influenced by several political, economic, and geographic considerations, MTS's and collective farms have been relatively more important in the new lands area of the RSFSR (principally in the Northern Zone and most of the Western Zone of the new lands), where 1,457 MTS's and 8,961 collective farms are engaged in the program. Conversely, state farms, particularly new state farms, have been more important in Kazakh SSR (principally in the Southern Zone of the new lands), where 337 of the 425 state farms organized during 1954-55 are located.

Before the reclamation program began, much of the new lands was composed of vast stretches of unused land. As late as 1953, only a small proportion of the land in the area was actually under cultivation. In the Northern Zone of the new lands the percentage of land under cultivation ranged from less than 30 percent in Chelyabinskaya Oblast to 60 percent "here and there," and in the Western Zone 30 to 50 percent of the land

* See Table 10, p. 91, below.

was under cultivation. In the Southern Zone, less than 30 percent of total land resources was under cultivation. This pattern of land use may be contrasted with that in sections of the Ukraine and in the central European USSR, where more than 80 percent of all land was planted to crops. 201/

These land use patterns, complicated by differences in population density, resulted in extreme differences in man-land ratios between the old established agricultural areas and the new lands. In areas characterized as "land-poor," the amount of plowland per able-bodied collective farmer averaged 2.3 hectares (ranging from 1.0 hectare in Zakarpatskaya Oblast in Western Ukrainian SSR to 4.2 hectares in Gor'kovskaya Oblast); in "land-rich" areas of the new lands the amount of plowland per able-bodied collective farmer ranged from 14.8 hectares in Novosibirskaya Oblast in the Northern Zone to 34.0 hectares in Pavlodarskaya Oblast in the Southern Zone.* 203/

These characteristics of the new lands, vast land resources and low population density, not only lent themselves to the Soviet conceptions of agricultural production, but also made mandatory a program based on the fixations of mechanization and gigantomania.** As might be expected, these words have become watchwords in the propaganda campaign attendant to the new lands program, relating not only to the formation of the 425 "huge new grain state farms" but also to the augmentation of MTS's which has resulted in the development of a "new type MTS."

* The man-land ratio in the new lands was planned to be even more extreme after the virgin and long-fallow land had been brought into cultivation. There were 18.7 sown hectares per able-bodied collective farmer in Kustanayskaya Oblast in 1954; after the reclamation of a "large mass of virgin and long-fallow land" there were to be 36.7 sown hectares per able-bodied collective farmer. In some rayons of the Oblast, and in other oblasts, the figure was to reach 50 hectares. 202/

** As Khrushchev said, "Had we undertaken to develop the virgin lands in the usual way by the gradual resettlement of people in the new areas, we should have required a tremendous amount of people, vast resources, and much time." 204/

B. Role of State Farms.

Several considerations, political-ideological, economic, and physical (geographic), influenced the role of state farms in the Soviet new lands program. Foremost among the political, or ideological, considerations favoring the formation of 425 new grain state farms was the desire to expand the role of the state-owned-and-operated sector.* By this strategem the Soviet leaders strengthened their control over agriculture and, concurrently, succeeded in directing a larger proportion of gross agricultural production into the market through state channels than would have been possible under a system of collective farms. It may be assumed that the effect on the collective farm market has been roughly inversely proportional to successes achieved in the canalization of agricultural products through the state distribution system.

The new lands program, calling for the reclamation of the huge tracts of land in sparsely settled areas, no doubt was seen also as a proving ground for one of the basic tenets of Communist dogma -- that highly mechanized, large-scale agriculture is inherently superior to other systems.** The physical characteristics of the new lands, which are ideally suited to such a system of agriculture, permitted the application of this dogma; the paucity of manpower in the new lands further recommended a highly mechanized system of agriculture. Not only were the new lands generally suited to highly mechanized operations, but also the economy was in the position, relatively speaking, to supply the agricultural machinery required for large-scale, mechanized grain farming.***

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* For example, the sown acreage on state farms in Kazakh SSR in 1956 was planned to be 7 to 8 times larger than it was in 1953. 205/

** "Ideologically, large-scale socialist agriculture has always been the Bolshevik goal. ... 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 socialist agriculture." 206/

*** The general validity of this observation may be deduced from the percentage of field operations which are reported to be mechanized for various crops (small-grain cultivation is habitually reported to be more highly mechanized than is the cultivation of other crops) and from the increased emphasis placed on the production of agricultural machinery for the cultivation of nongrain crops during the Sixth Five Year Plan (1956-60).

Finally, several economic considerations tipped the scales in favor of establishing state farms, instead of collective farms, in areas of the new lands where there were no farming units in existence. Basic among these considerations was the fact that the cost of establishing farming units in these areas, regardless of type, had to be borne by the state. It is one thing to collectivize existing peasant farming units and quite another to establish farming units in an area devoid of population.* The choice was to select that type of farming unit thought to be least expensive and most advantageous to the state. State farms fulfilled both of these requirements.** It was believed, furthermore, that state farms used resources, both manpower and machinery, more efficiently. In addition, a larger portion of the crop from state farms would be distributed through state channels.

Under the terms of the original new lands program, which called for the reclamation of 13 million hectares of virgin and long-fallow land for sowing in 1955, 4.3 million hectares were to be reclaimed by state farms, including 2.3 million hectares by existing state farms and 2 million hectares by 125 "new huge grain state farms."*** It was reported that 124 state farms actually were organized in the new lands during 1954.**** Under the impetus of the revised new lands program, which raised the ultimate goal to from 28 million to 30 million hectares of virgin and long-fallow land to be sown in 1956, the number of state farms to be formed was more than tripled, and 425 state farms were established in the new lands during 1954 and 1955. Of this number, 337 are in Kazakh SSR and 88 in the RSFSR.

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* For a modern analogy, the new lands program and the corn program, in which the acreages involved are identical, may be considered. The new lands program, carried out in remote areas, required huge expenditures by the state, and the relatively modest cost of the corn program, which was executed in established agricultural areas, was largely borne by collective farms. (For a brief comparison of the two programs, see I, E, p. 18, above.)

** The Soviet press has continually expounded the superiority of state farms in the reclamation of the new lands. These views are accurately reflected in an article by Ponomarenko, Secretary of the Kazakh Central Committee, who wrote, "Experience of the 93 huge grain state farms created in Kazakh during this year shows that at the present, the organization of new state farms is the most expedient means of massive reclamation of virgin and idle land and of increasing the production of grain ... /They/ give the most inexpensive grain to the country." 207/

*** For data on acreage, see Appendix A.

**** See Table 10, p. 91, below.

Although these new state farms were ostensibly established for the exploitation of land from the "state land fund," much of the land included within their boundaries came from other sources. In Akmolinskaya and Kokchetavskaya Oblasts, where more than one-half of the state farms organized in Kazakh SSR during 1954 were located, land incorporated into the new state farms was derived from the following sources 208/:

	Akmolinskaya Oblast	Kokchetavskaya Oblast
	Percent	
State land fund	63.7	45.6
Existing state farms with "excess" land	16.7	23.2
Subordinate economies of industrial enterprises	10.4	31.2
Collective farms with "superfluous" land	9.2	0
Total	100.0	100.0

Judged by any standard, the new grain state farms are huge. They have an average of 30,000 to 40,000 hectares of land, of which 20,000 to 25,000 hectares are plowland, compared with older grain state farms in Kazakh SSR which have an average of 18,000 to 28,000 hectares of land, of which 12,000 to 18,000 hectares are plowland. 209/ The contrast is even more marked between the new state farms and the average of all state farms in the USSR, which have land resources that average approximately 15,000 hectares. The size of the new state farms is also reflected in their tractor parks, which average 100 to 120 tractors (in terms of 15-horsepower (hp) units) compared with the national average for all state farms of 36 tractors (in terms of 15-hp units).*

* It has been reported that each new state farm has, on the average, 40 to 45 "powerful track-laying tractors" (DT-54 and S-80). 210/ On the basis of deliveries of tractors to state farms in Kazakh SSR during 1954, and deliveries planned for 1955, a ratio of 1 physical tractor to 2.67 units of 15 hp each is assumed for the conversion of the tractor park of the new state farms into 15-hp units. 211/

C. Role of Machine Tractor Stations and Collective Farms.

The role of MTS's and collective farms has been subordinated to that of state farms in most popular accounts of the Soviet new lands program as well as in public statements by Soviet officials. This fact must be attributed to the position of state farms -- "the standard agricultural unit at the next stage of social development" -- in current Soviet agricultural philosophy. 212/ It cannot spring from a quantitative appraisal of the relative amounts of virgin and long-fallow land reclaimed by state and collective farms, because collective farms under the control of the MTS's were responsible for more than one-half of the land reclaimed during 1954-55 and were relatively even more important during the early stages of the new lands program.*

As previously indicated, the founding of new collective farms in the more remote areas of the new lands was militated against by ideological and, in part, by economic considerations. On the other hand, just as economic considerations were claimed as the basis for the decision to establish new state farms in areas largely empty of population, economic considerations were also invoked in the decision to use existing collective farms and MTS's in the new lands as nuclei for the reclamation program. These collective farms and MTS's, located in sparsely settled regions, were viewed as isolated farming units surrounded by readily available virgin and long-fallow land which could be brought under cultivation in a minimum of time with minimum expenditure. Expenditures for construction of supplementary housing and of repair and storage facilities at these MTS's and collective farms were substantially smaller than those involved in the creation of new state farms. In addition, the labor force of the existing collective farms and MTS's, if not large enough to meet the manpower requirements of the land reclamation program, would at least serve as an experienced cadre which could be supplemented by youthful "volunteers."

Politically, the Soviet leaders were able to use "independent" collective farms in their reclamation program because of their control of the countryside. Their rural control apparatus, the MTS's ("the

* In the RSFSR (chiefly in the Northern Zone of the new lands), collective farms plowed 6.6 million hectares of virgin and long-fallow land during 1954, and the state farms, 2.6 million hectares; in Kazakh SSR (principally in the Southern Zone) the figures were 5.7 million and 2.7 million, respectively. (For data on acreage, see Appendix A.)

decisive force in the development of collective farming"), 213/ reinforced by the reforms of 1953, was capable of "assisting" the collective farms in fulfilling the reclamation tasks which they had "voluntarily assumed."*

One final consideration, the factor of timing, probably motivated the USSR to assign a large share of the original reclamation program to the MTS's and collective farms. It was possible to get the program under way much more rapidly by using resources already in the area (in existing MTS's and collective farms) than by directing resources into a completely new operation. The sense of urgency probably was not motivated primarily by the desire to receive early returns, although this was not unimportant. It is probable that the principal motive was harsh political necessity. It was necessary to achieve early successes in the program not only because "enthusiasm" had to be kept at a high pitch among the new lands "volunteers" and other participants, but also, more important, because Khrushchev probably felt the need of an early harvest as a means of proving the "validity" of his program.**

The MTS's in the new lands, augmented by supplementary allocations of agricultural machinery and personnel, have developed into a "new type MTS," 217/ principally characterized by its large size. The evolution of this new type of MTS is indicated by the following indexes (1953 = 100) relating to the characteristics of MTS's during 1954 in Altayskiy Kray in the eastern part of the Northern Zone and in Kustanayskaya Oblast in the western part of the Southern Zone 218/:

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* The freedom with which collective farmers plan their crop patterns may be adduced from the corn program. Shortly after the publication of a decree on the decentralization of agricultural planning, Khrushchev remarked, in relation to the corn program, that "those who do not understand the importance of corn must have it explained to them, must be taught it; and those who ignore corn must be kept far away from the collective farms, MTS's, and state farms." 214/ Consequently, thousands of collective and state farms throughout the USSR succeeded in overfulfilling the 1955 goal of seeding 16 million hectares to corn by about 1.9 million hectares. 215/

** The joint Party-government decree of 17 August 1954 cited the successes achieved during the spring of 1954 as the basis for expanding the new lands program from 13 million hectares to from 28 million to 30 million hectares. 216/

	Altayskiy Kray	Kustanayskaya Oblast
Average volume of work per MTS	157.9	156.9
Average number of tractors per MTS (in 15-hp units)*	163.2	194.8
Average number of permanent workers per MTS	134.0	171.5

MTS's in the new lands are not differentiated from MTS's in established agricultural areas by size alone. Their size, coupled with the task of reclaiming vast areas of new land located within the jurisdiction of collective farms,** has resulted in a unique disposition and use of the resources at their command. New tractor brigades were formed,*** a great number of which were engaged exclusively in the plowing of virgin and long-fallow land. In addition, many tractor brigades were organized into tractor "detachments" consisting of 3 or 4 tractor brigades to exploit "large masses of virgin and long-fallow land located a great distance from the headquarters of the MTS's, often more than 100 kilometers."**** 226/ At least 650 such detachments were engaged in the reclamation of new land during 1954 alone. 227/ It is claimed that the enlargement of MTS's in the areas where virgin

* The average number of tractors per MTS in Altayskiy Kray (in terms of 15-hp units) increased from approximately 140 at the end of 1953 to approximately 235 at the end of 1954 219/; in Kustanayskaya Oblast the figures were 115 and 220, respectively. 220/ This may be compared with the national average for all MTS's of approximately 120 (in terms of 15-hp units) at the end of 1953. 221/

** Collective farms in Kazakh SSR, for example, were originally planned to reclaim an average of 2,428 hectares. 222/ They actually reclaimed an average of more than 5,000 hectares during 1954-55. 223/

*** In Kustanayskaya Oblast, for example, the number of tractor brigades per MTS increased from 13 in 1953 to 20 at the end of 1954. 224/

**** These tractor detachments typically consist of 15 to 20 heavy track-laying tractors, 20 to 30 five-bottom plows, 20 to 30 grain drills, and other necessary agricultural machinery; fuel trucks; a portable shop; and not fewer than 100 to 120 workers. 225/

and long-fallow land is being reclaimed "improves the utilization of technical equipment, lowers the expenditures of productive work, and presents the possibility of producing each centner of grain with significantly lower expenditures of capital and labor." 228/

Although much of the impetus for the expansion of MTS's in the new lands is to be found in the new lands program itself, it is not to be inferred that the expansion of MTS's was undertaken solely in response to the demands of the new lands program. Actually, a huge program designed to bring the repair and storage facilities of all MTS's in the USSR up to standard had been initiated by the MTS decree of 1953, in response to "a disparity which has arisen in the postwar years between the level of agricultural machinery with which the MTS's are equipped and the productive-technical base for the repair and storage of machinery."* 230/ At that time, 429 MTS's in the USSR were entirely without repair shops, and about 5,000 MTS's had poorly equipped shops.** The 10-billion-ruble program embarked upon called for the construction of 4,200 MTS service stations, the construction or expansion of some 300 repair shops and interrayon capital repair plants,*** in addition to the construction of thousands of dwellings, garages, and sheds for storing machinery, during 1954-56. The concerted drive to equip each MTS with the best repair and storage facilities was stimulated in western Siberia and northern Kazakh SSR by the new lands program. The reclamation program intensified the need for adequately equipped MTS's not only because of the enlarged tractor park but also to insure more efficient use of the park.

* Buildings (both "productive" and living quarters) and equipment reportedly constituted only 11 percent of the capital equipment of MTS's at the beginning of 1953. 229/

** The inadequacies of MTS repair facilities have always been one of the major obstructions to the efficient use of the MTS tractor park. The following percentages of the MTS tractor park in the RSFSR were not in use during the various months of 1955, because of "lack of technical care": May, 13 percent; June, 17 percent; August, 34 percent; July, 37 percent; and September, 35 percent. 231/

*** These plants are equipped with steel foundries and machine tools and can almost rebuild tractors or other machines.

D. Plans and Performance.*

Soviet propaganda has cast state farms, particularly the newly organized state farms, in the "principal role" in the new lands program, although they were originally planned to account for only one-third of the virgin and long-fallow land to be plowed (4.3 million hectares of the total 13 million hectares), and MTS's and collective farms were to plow 8.7 million hectares. The original plan of plowing 13 million hectares was greatly overfulfilled during 1954 -- an estimated 17.8 million hectares of virgin and long-fallow land was plowed -- but the relative proportions of land plowed by type of farm organization remained about the same as planned (state farms, 31 percent; MTS's and collective farms, 69 percent). Of the virgin and long-fallow land plowed during 1954, 47 percent was located in Kazakh SSR and 53 percent in the RSFSR.

Because the burden of reclamation in the original plan fell largely on existing state and collective farms (11 million hectares of the originally planned 13 million hectares),** much of the virgin and long-fallow land readily accessible to these established units was reclaimed during the initial drive of 1954. As a result, much of the land to be brought into cultivation in the expanded program lay in areas remote from established agriculture which could be best used by the creation of additional state farms. With the upward revision of the new lands program, state farms were assigned a larger share of the aggregate goal, 14 million hectares of a total of 30 million hectares, approximately 45 percent of the total. Of these 14 million hectares, it is estimated that about 8.5 million to 10.5 million hectares were to be plowed by 425 new state farms, compared with the reclamation of 2 million hectares by 125 new state farms as originally planned. The remainder was to be plowed by existing state farms.

The expanded program was differentiated from the original program not only by differences in the relative roles of state and collective farms but also by the geographic distribution of the land to be brought under cultivation. Under the terms of the original plan, the acreage to be reclaimed was divided almost equally between Kazakh SSR and the RSFSR, but in the enlarged plan, approximately 60 percent of the new lands to be plowed were located in Kazakh SSR (principally in the Southern Zone of the new lands).

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* For data on acreage, see Appendix A.

** MTS's and collective farms were to plow 8.7 million hectares, and existing state farms were to plow 2.3 million hectares. 232/

The new lands program, as it has evolved to date, has closely approximated the revised, enlarged plan. Some 30 million hectares were plowed during 1954-55 for sowing in the spring of 1956, including approximately 16.6 million hectares by collective farms (under the control of the MTS's) and 13.5 million hectares (approximately 45 percent of the total) by state farms. As provided by the revised plan, approximately 60 percent of the virgin and long-fallow land brought under cultivation is located in Kazakh SSR (principally in the Southern Zone of the new lands). State farms have been more important in Kazakh SSR, where they accounted for more than one-half of the new land plowed. Conversely, state farms were relatively less important in the RSFSR, accounting for approximately 35 percent of the virgin and long-fallow land plowed during 1954-55.

The farm organizations engaged in the new lands program in the USSR at the end of the years 1954 and 1955 are shown in Table 10.

Table 10

Farm Organizations Engaged in the New Lands Program in the USSR
End of Year
1954 and 1955

Units

Type of Farm Organization	Kazakh SSR 1954	Kazakh SSR 1955	RSFSR 1954	RSFSR 1955	Total USSR 1954	Total USSR 1955
Collective farms	1,699 a/	N.A.	8,961 b/	N.A.	10,660 c/	10,000 d/
Machine tractor stations	283 e/	N.A.	1,457 f/	N.A.	1,740 g/	1,600 h/
State farms	216 i/	N.A.	N.A.	N.A.	N.A.	N.A.
Including new state farms	87 j/	337 k/	37 l/	88 m/	124 n/	425 o/

a. 233/
b. 234/
[redacted]
d. 237/
e. 238/
f. 239/
[redacted]
h. 242/
i. 243/
j. 244/
k. 245/
l. 246/
m. 247/
n. 248/
o. 249/

50X1

50X1

XI. Mechanization of Agriculture.

A. General.

The Soviet new lands program of plowing 30 million hectares of virgin and long-fallow land for sowing in the spring of 1956 has required large amounts of agricultural machinery. The requirements for machinery were magnified by the Soviet desire to reduce the requirements for manpower in the thinly populated areas by establishing large-scale, highly mechanized grain farming. The requirements for machinery have been fulfilled, in part, at least, by reallocations and "loans"* of machinery from the established agricultural areas (principally the Ukrainian SSR and the southern part of the European USSR) and from the existing new lands agricultural enterprises which were not actively engaged in the program. In addition, trucks were dispatched from the metropolitan areas, during the harvests of 1954 and 1955, for use in hauling grain from the fields to points of procurement.

B. Tractors.**

[redacted] MTS's and state farms in the new lands of the USSR received 115,000 tractors*** in 1954, more than 60 percent of the 186,000 tractors of all types delivered to all of agriculture during that year. Deliveries of tractors to the new lands consisted almost entirely of heavy track-laying tractors,**** amounting to almost 85 percent of total deliveries of heavy tractors to agriculture during 1954, 115,000 out of total deliveries of 137,000. Deliveries of tractors to the new lands during 1955 were

50X1

* These loans may be of a seasonal nature. It has been customary, upon completion of the grain harvest in the southern European USSR, to ship tractors and combines on loan to the Asiatic spring wheat belt to speed up the harvest. Since the initiation of the new lands program, trucks also are being sent to the Northern and Southern Zones. It is not clear whether or not these trucks are sent on a loan basis or whether they will remain in the new lands and an equivalent number of new machines will be sent to the areas making the loans.

** See Table 11, p. 96, below.

*** Tractor numbers are given in terms of 15-hp units.

**** References to deliveries of tractors to the new lands mention only deliveries of "the most efficient and powerful diesel tractors." 250/

somewhat smaller, about 98,000,* while total deliveries to agriculture increased during 1955, amounting to 218,000 tractors. Thus the new lands received only 45 percent of the total deliveries of tractors to agriculture during 1955. The new lands share of deliveries of heavy track-laying tractors ("general-purpose" tractors in Soviet terminology) was correspondingly reduced during 1955, amounting to approximately 60 percent of estimated total deliveries of general-purpose tractors to agriculture, 98,000 out of total deliveries of 161,000.**

C. Combines.

Deliveries of grain combines to the new lands of the USSR were considerably smaller, relatively, than were deliveries of tractors. Almost one-half of total deliveries of grain combines to agriculture were allocated to the new lands during 1954, 18,000 out of total deliveries of 37,000. It is likely that MTS's and state farms in the new lands were allocated approximately the same share of the 46,000 combines received by agriculture during 1955.*** 255/

Deliveries of grain combines to the new lands were supplemented during 1954-55, particularly during the early part of the year, by the transfer of combines from areas in the southern European USSR where harvesting had been completed. More than 20,000 combines from these areas were received in the new lands during 1954 alone, including 6,000 which were directed to the new grain regions of Kazakh SSR (principally in the Southern Zone), 256/ and more than 14,000 which were directed to the new lands area of the RSFSR (principally in the Northern Zone), 257/ including 6,000 which were sent to Altayskiy Kray. 258/

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* It was planned to deliver 98,000 tractors to the new lands during 1955. 251/ As "more than 200,000" tractors were reported to have been delivered to the new lands during 1954-55, it is assumed that the plan for 1955 was achieved. 252/

** Total deliveries of general-purpose tractors to agriculture during 1955 were roughly estimated on the assumption that the ratio between the number of general-purpose tractors delivered to agriculture and the total number of tractors delivered to agriculture in 1955 was the same as in 1954, which is known. 253/

*** It was planned to deliver 26,000 combines to the new lands for use in the 1955 harvest. 254/

D. Trucks.

Little is known of the delivery of new trucks to the new lands of the USSR. In September 1955, Benediktov stated that 30,000 trucks had been sent to the new lands, presumably as of 31 August of that year. 259/ It can be computed that the bulk of these trucks, about 18,000,* were delivered during 1954 and that 12,000 were delivered during the first 8 months of 1955. Apparently this number of trucks was only about one-half of the number required to perform routine farm services and to move the grain harvested in 1954. During July and the first half of August 1954, some 15,200 trucks were shipped from the southern regions of the European USSR and from the Ukrainian SSR to the new lands area of the RSFSR. 260/ It is possible that these trucks were sent on loan to the new lands area of the RSFSR, for during 1954, "large industrial cities" of the USSR sent (probably on loan) more than 15,000 trucks to Kazakh SSR for the transport of grain. 261/ Thus in 1954 there were available in the new lands for hauling grain from combines to grain floors, to grain cleaners, and thence to local points of shortage and procurement, 18,000 new trucks and more than 30,000 trucks from other sources, a total of more than 48,000 trucks.** There is some evidence that some of the machines sent on loan to the new lands were returned to the source from which they came and that some remained in the new lands, the lenders receiving compensation in the form of new machines.

As stated above, it is probable that in addition to the more than 18,000 new trucks sent to the new lands in 1954, about 12,000 new trucks were delivered during the first 8 months of 1955 -- that at time of harvest more than 30,000 new trucks were available for moving the poor production of that year. 262/ There is no evidence regarding the over-all number of trucks classified as "loans" that remained in the new lands after the 1954 harvest had been moved and the number sent in for moving the 1955 harvested grain. Any conclusion about these numbers is further obscured by the statement that in 1955 Krasnoyarskskiy Kray received 4,600 trucks dispatched from the southern oblasts of the USSR and from many regions of Altayskiy Kray, Omskaya Oblast, Novosibirskaya Oblast, and other oblasts (possibly of the new lands). 263/ As soon as the grain harvest is cleaned up in one locality the trucks apparently are sent to some other place to move the grain.

* The figure is rounded.
** All figures are rounded.

In contrast to the numerous references to the transfer of trucks and combines from established agricultural areas to the new lands, relatively little has been said in the Soviet press concerning the transfer of tractors. It is reported, however, that tractors as well as trucks and combines were diverted from farming units within the new lands which were not engaged in the new lands program to those MTS's and state farms (both existing and newly established) which were engaged in the program. 264/

Although large quantities of agricultural machinery had been directed into the new lands, the goal of "complete complex mechanization of all /field/ work" 265/ in the new lands had certainly not been achieved as of 1955. The production program was accomplished, however, in spite of serious local shortages of agricultural machinery, particularly of combines and trucks.

E. Outlook.

Because of the continuing priority which the new lands program is being accorded, at least during 1956, the machinery requirements of the program should be met within the next few years. Evidence of this priority may be seen in the plan to deliver 34,600 tractors to the state farms in Kazakh SSR during 1956, which is "almost 70 percent of the number received during 1954-55." 266/ The priority is also reflected in the plan to deliver 23,100 combines to state farms in Kazakh SSR during 1956, 267/ compared with the 30,000 combines delivered to MTS's and state farms in Kazakh SSR during 1954-55. 268/

The impact on the established agricultural areas of the delivery of the relatively large amounts of agricultural machinery to the new lands was accurately anticipated by Khrushchev in September 1954:

> This year's and next year's factory output of caterpillar tractors, ploughs, drills, and certain other agricultural machinery will be sent mainly to newly cultivated lands. Therefore, this year and next year the number of caterpillar tractors on the already cultivated land will not be increased. We will send there lighter tractors, cultivators, and other implements for the cultivation of the land and also spare parts for existing tractors there. 269/

As shown in Table 11, the delivery of tractors to the established agricultural areas in 1954 was only one-half of the average annual delivery in the 3 preceding years. In 1955, however, delivery to the established agricultural areas had increased to 85 percent of the average annual delivery during the first 3 years of the Fifth Five Year Plan because of increased deliveries to all agriculture and decreased allocations to the new lands. The major effect of deliveries to the new lands probably has been to delay the reequipment of agriculture in the established agricultural areas, particularly the grain areas, and therefore to impose a temporarily greater workload on the existing machinery park in those areas.

Table 11

Deliveries of Tractors in the USSR
1951-55

Thousand Units

Area	1951	1952	1953	1954	1955
New lands	0	0	0	115 a/	98 b/
Established areas c/	137	131	152	71	120
Total USSR	137 d/	131 d/	152 d/	186 e/	218 f/

a. 270/
b. Planned deliveries to the new lands during 1955. 271/
c. These figures are calculated residuals.
d. 272/
e. Estimated as the difference between total deliveries to agriculture during 1954-55 273/ and deliveries to agriculture during 1955. 274/
f. 275/

XII. Requirements for Petroleum Products.

A. General.

Farming in the new lands of the USSR involves the cultivation of vast acreages of land with large quantities of agricultural machinery. This machinery is required for plowing, harrowing, sowing, harvesting, and other farm operations. In addition, trucks are required both for tasks on the farm and for transporting farm products to points of concentration and processing.

Because of the size of the new lands program and the large machinery and truck park, petroleum products are extremely important. The purpose of this section is to determine the kinds and quantities of petroleum consumed in the new lands in 1954, 1955, and 1956.

B. Requirements in 1954.

In the spring of 1954, collective and state farms plowed, harrowed, and sowed 4.3 million hectares of virgin and long-fallow lands, using track-laying diesel tractors. During the summer and fall, these tractors plowed 13.5 million additional hectares and replowed the 4.3 million hectares. In addition, tractors hauled combines in harvesting 2,042,000 hectares of grain.* These activities are estimated to have consumed the following metric tonnages of petroleum products: diesel fuels, 394,000; diesel lubricants, 30,000; and gasoline, 4,000 -- a total of 428,000 tons of petroleum products.**

In the summer of 1954, combines (both tractor-drawn and self-propelled***) harvested 4,085,000 hectares of grain, using gasoline-powered equipment. This equipment consumed 31,000 tons of gasoline and 2,000 tons of avtol lubricants -- a total of 33,000 tons of petroleum products.

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* It is estimated that half of the harvested area was harvested by tractor-drawn combines and half by self-propelled combines.

** For the methodology employed in estimating all quantities of petroleum products consumed by machinery in the development of the new lands program, see Appendix C.

*** Self-propelled combines use gasoline both for propulsion and for cutting and threshing grain. Tractor-drawn combines use gasoline only for cutting and threshing.

Petroleum products are consumed in a large number of farm uses not directly related to field work. For example, stationary motors are used to produce electricity for lighting and pumping and for operating milking and feed-grinding machines. Trucks must also be provided with fuel for work on the farm and for transporting farm products to points of concentration and processing. Because of the variety of the tasks performed, it is impossible to estimate directly the quantities of petroleum products consumed. It is possible, however, to make indirect estimates of these quantities. Fuel and lubricant consumption in "miscellaneous machinery" bears a fixed relationship of somewhat less than 43 percent to consumption by combines. 276/ On the basis of this relationship, it is calculated that consumption of petroleum products by "miscellaneous machinery" was 13,000 tons of gasoline and 1,000 tons of avtol lubricants, a total of 14,000 tons.

An estimate of fuel consumption by trucks can be calculated from work norms developed by Soviet planners.* One such norm, based on average field work performed in the USSR in 1938, is expressed in terms of horsepower-hours per hectare developed by tractors in plowing, harrowing, sowing, and harvesting. A similar norm was established for the energy developed by trucks in normal farm hauling, exclusive of the transportation of grain and other farm products to points of concentration and processing. The ratio of the norms thus developed for tractors and trucks in 1938 was 1 to 0.30264.*

For purposes of analysis, it is assumed that the quantity of fuel consumed by trucks and tractors -- whether diesel fuel or gasoline -- is proportional to the normal horsepower developed by each. The fact that tractors and trucks use different fuels does not invalidate this assumption, because the theoretical energy availability of diesel fuel and gasoline is about the same per unit of weight. It is further assumed that the normal ratio of tractor horsepower-hours to truck horsepower-hours in 1954 is not widely divergent from the corresponding ratio for the USSR as a whole in 1938. The quantity of diesel fuel consumed by tractors in field work in 1954 has already been established at 332,000 tons. On the basis of these assumptions, the gasoline consumed by trucks in farm operations (exclusive of the transportation of grain and other farm products to points of concentration and processing) is estimated at 332,000 times 0.30264, a total of 100,000

* See Appendix C.

tons. Two percent must be added for intergarage and repair operations, and 5 percent for losses, giving a total of 107,000 tons. There is no basis for estimating the quantity of gasoline consumed by trucks in 1954 in transporting grain and other farm products from farms to points of concentration and processing.

On the basis of a 1948 study of motor transport, the quantity of lubricants consumed by trucks in normal intrafarm operations is estimated to have been equivalent to 5 percent of the 107,000 tons of gasoline consumed in 1954, about 5,000 tons.

C. Requirements in 1955.

In addition to the 17.8 million hectares plowed in 1954 for sowing in 1955, about 2.7 million hectares of virgin and long-fallow land were plowed in the spring of 1955. The entire 20.5 million hectares were harrowed and sown; 18.5 million hectares were sown to grain, and 2 million hectares, to other crops. In the summer and fall of 1955, another area of 9.6 million hectares of land was plowed for the first time, and the previously plowed 20.5 million hectares were replowed -- all for sowing in 1956. In addition, tractors hauled combines which harvested 8,788,000 hectares of grain. It is estimated that tractors consumed the following tonnages of petroleum products in these operations: diesel fuel, 632,000; diesel lubricants, 47,000; gasoline, 6,000 -- a total of 685,000 tons of petroleum products.

In the summer of 1955, combines (both tractor-drawn and self-propelled) harvested 17,576,000 hectares of grain. This harvesting consumed 134,000 tons of gasoline and 7,000 tons of avtol lubricants, a total of 141,000 tons of petroleum products.

The consumption of petroleum products by "miscellaneous machinery" must again be determined by the relationship of this consumption to consumption by combines. 277/ Based on this relationship, it is estimated that such machinery consumed 57,000 tons of gasoline and 3,000 tons of avtol lubricants, a total of 60,000 tons of petroleum products.

Consumption by trucks must also be obtained indirectly, as it was for 1954. Consumption of diesel fuel by tractors engaged in field work during 1955 was 532,000 tons. When multiplied by the factor 0.30264 developed earlier, this figure gives a consumption by trucks on the

farm of about 161,000 tons of gasoline. Two percent must be added for intergarage and repair operations, and 5 percent for losses, giving a total of 172,000 tons. Consumption of lubricants is estimated at 5 percent of this total, about 10,000 tons. Fragmentary information also permits calculating the quantities of petroleum products required by trucks in 1955 in transporting farm products to points of concentration and processing.

First, it is necessary to estimate the quantities of procurable (shipped from the farm) products grown on 20.5 million hectares. As stated above, 20.5 million hectares were sown in the spring of 1955, of which 18.5 million hectares were sown to grain and 2 million hectares to miscellaneous crops. The 18.5 million hectares sown to grain are estimated to have produced 7.95 million tons of grain, an average of 4.3 centners per hectare. For purposes of analysis it is assumed that the yield of the miscellaneous crops was not less than that of grain and that the production of grain and other crops in 1955 was about 8,815,000 tons. Khrushchev once indicated that he expected that about two-thirds of the new lands production would be procurable 278/ and therefore hauled by truck. If this ratio held for 1954, then about 5.9 million tons of farm products were moved by truck.

Second, it is necessary to estimate the average distance over which farm products must be moved to points of concentration and processing. Unfortunately, there is no information available on this point. Information is available, however, on the average length of truck haul from railhead to destination for all freight in various oblasts in the Southern Zone of the new lands in 1955. It is assumed that these averages represent, at least reasonably accurately, the average length of haul between farm and points of concentration and processing. For purposes of this calculation, the average distance selected was 63.7 km, which is the shortest of the distances reported for any oblast in the Southern Zone (and which, therefore, probably yields a conservative estimate of fuel consumption). Using 63.7 km as the average length of haul, and multiplying it by the tonnage of procurable farm products, gives a total of 376 million ton-kilometers (tkm) to be hauled.

Total consumption of gasoline by trucks engaged in off-farm haul is estimated to be about 82,000 tons. Two percent must be added for repair operations, 279/ and 5 percent for wastage, giving a total of 87,000 tons of gasoline consumed. Consumption of lubricants is estimated at 5 percent of this total, about 4,000 tons.

D. Requirements in 1956.

As stated above, 30.1 million hectares were plowed in the new lands in the autumn of 1955 for sowing in the spring of 1956. There is no evidence that additional acreage was plowed in the spring of 1956. Although there is evidence that 40 million hectares of virgin and long-fallow land are planned to be farmed eventually in the new lands, 280/ it appears that operations will be restricted to approximately 30.1 million hectares for several years.

If, as in 1955, grain will be sown on about 90 percent of the cultivated acreage in 1956, then 27.1 million hectares will be sown to grain and the remaining 3 million hectares to other crops. Combines will harvest an estimated 95 percent of the grain acreage, of which one-half, 12,872,000 hectares, will be harvested by tractor-drawn combines. Tractors will also replow the 30.1 million hectares for sowing in 1957. In performing these operations, tractors will consume the following tonnages of petroleum products: diesel fuel, 622,000; lubricants, 47,000; gasoline, 6,000 -- a total of 675,000 tons of petroleum products.

It is estimated that the total acreage to be harvested by both tractor-drawn and self-propelled combines will be 25,745,000 hectares, with each type accounting for 50 percent of the total. This amount of harvesting would require 196,000 tons of gasoline and 10,000 tons of lubricants, a total of 206,000 tons of petroleum products.

Based on its relationship with consumption by combines, 281/ it is estimated that consumption of petroleum products by "miscellaneous machinery" will be 84,000 tons of gasoline and 4,000 tons of avtol lubricants, a total of 88,000 tons.

Consumption of diesel fuel by tractors engaged in field work during 1956 is estimated at 523,000 tons. Consumption of gasoline by trucks in performing intrafarm work would therefore be about 158,000 tons, based on the factor 0.30264 developed earlier. Two percent must be added for intergarage and repair operations, and 5 percent for losses, giving a total of 170,000 tons. Consumption of lubricants is computed to be 5 percent of this total, about 8,000 tons. It is impossible to make a realistic estimate of the probable yield of grain in the new lands in 1956. It seems best, therefore, to take the long-term probable average yield of 6 centners per hectare for purposes of calculation and, as before, to apply it to both grain and

nongrain acreage. With 30.1 million hectares under cultivation, procurable farm products (two-thirds of the total) would be about 12 million tons. Based on an average length of haul of 63.7 km, total truck haulage would be 764.4 million tkm. Gasoline consumption at 0.2164 kg per ton-kilometer would therefore be about 165,000 tons. Adding 2 percent for repair operations and 5 percent for losses gives a total for trucks of about 177,000 tons of gasoline. Consumption of lubricants is estimated at 5 percent of this total, about 9,000 tons.

Consumption of petroleum products in the new lands in 1954-56 is compared with total Soviet production of diesel fuel, motor gasoline, and lubricants in the same years in Table 12.* It will be noted that the new lands represent a significant, though not serious, drain on the petroleum resources of the USSR, particularly of motor gasoline. Adjustments doubtless have been made in other parts of the economy in order that the new lands can be supplied with adequate quantities of petroleum products to cover field and other normal agricultural work. The estimated requirements for the transport of grain and other farm products in 1956 will tend to decrease, on the average, as the completion of the railroad systems reduces the ton-kilometers of haulage.

XIII. Manpower Requirements.

A. General.

In planning the new lands program, Soviet officials were as aware of the need for providing adequate manpower as they were of the need for providing machinery and petroleum products.

Several methods were used to get young, trained, and Party-indoctrinated persons into the new program. All levels of the government and the Communist Party were directed to send administrators, specialists, and experienced workers to the state farms, MTS's, and collective farms. The all-union and local Komsomol organizations, for example, were to send 100,000 young Communists to the new lands. Cash bonus payments, housing loans, and free transportation were among the inducements offered to acceptable volunteers. 282/

* Table 12 follows on p. 103.

Table 12

Consumption of Petroleum Products in the New Lands Compared with Production of Petroleum Products in the USSR
1954-56

Thousand Metric Tons

Uses	1954				1955				1956			
	Diesel Fuel	Motor Gasoline	Diesel Lubricants	Avtol Lubricants	Diesel Fuel	Motor Gasoline	Diesel Lubricants	Avtol Lubricants	Diesel Fuel	Motor Gasoline	Diesel Lubricants	Avtol Lubricants
New lands consumption												
Tractors: plowing, harrowing, sowing, and harvesting	394	4	30		632	6	47		622	6	47	
Combines		31		2		134		7		196		10
Total field work	394	35	30	2	632	140	47	7	622	202	47	10
Other agricultural work (miscellaneous machinery)		13		1		57		3		84		4
Trucks, intrafarm hauling		107		5		172		9		170		8
Trucks, extrafarm hauling		N.A.		N.A.		87		4		177		9
Total	394	N.A.	30	N.A.	632	456	47	23	622	633	47	31
Soviet production	9,990	8,090	3,120		13,080	9,550	3,700		14,840	11,210	4,200	
Percent consumed in the new lands	3.9	N.A.	N.A.		4.8	4.8	1.9		4.2	5.6	1.9	

B. Requirements.

The USSR has made no announcements about the number of workers required to reach and maintain the 1956 goal of 30 million hectares under cultivation.

1. Agricultural Labor.

On the basis of available published material and the number of workers ordinarily employed on collective farms, state farms, and MTS's, the new lands agricultural labor force required by the end of 1956 is estimated to be 1.33 million.* 284/ This figure includes collective farm members, hired laborers on state farms and MTS's, administrative personnel, and technicians of all kinds whose work is directly related to agriculture.

If the number of all such workers per unit of land prevailing in the established agricultural areas of the USSR** were to apply in the new lands, the number would be 7 times larger than the estimate of 1.33 million. A much smaller labor force is required, however, because the major emphasis in the initial phase of the new lands program is on grain farming, which will be carried out on a large scale with mechanized equipment. As the livestock program is expanded in the new lands, manpower requirements may rise somewhat.

It is estimated that Kazakh SSR (largely the Southern Zone) will require 680,000 workers, 51 percent of the total, and the RSFSR (largely the Northern and Western Zones) will require 650,000 workers, 49 percent of the total. 285/ This distribution may be contrasted with the distribution of total plowed lands at the end of the 1955 harvest. Of the 30 million hectares plowed by that date, 59 percent were in Kazakh SSR and 41 percent in the RSFSR. It follows that the number of workers per hectare will be lower in the Southern Zone. This lower ratio is reasonable because fields in the Southern Zone are, to a greater extent, of the large and level type which permits the efficient use of large-scale machinery. In addition, about two-thirds of the new lands in the Southern Zone are worked by state farms, which usually have the highest priority in obtaining machinery, spare parts, and other materials conducive to labor-saving operations. State farms play a larger role in the Southern Zone than in the Northern and Western Zones.

* The British have put the lower limit for the number of agricultural workers required and have made an estimate of 1 million. 283/

** The number is based on the following estimates for 1953: an agricultural labor force of 53 million and a sown acreage of 157 million hectares, an average of 3 hectares per worker.

In the discussion of physical factors affecting production,* it was stated that most existing state and collective farms are clustered in the northern part of the Southern Zone. It may be assumed, therefore, that most of the collective farm expansion in that zone will be in the north. Most of the state farms will be established or enlarged in the sparsely settled south, where the land is level to undulating -- conditions that are especially favorable for the development of grain farms.

The predominance of collective farm expansion in the Northern and Western Zones was a logical development; in the past, collective farms have been the major bases of settlement in this area. Much of the land that is being reclaimed in this area has been farmed, was abandoned, and now is again being brought under cultivation.

2. Other Labor.

Only scattered data have appeared relating to total manpower requirements in the development of the new lands. It is estimated, however, that 400,000 nonagricultural workers** will be required to construct the facilities and man the services that are to be associated with the cultivation of 30 million hectares of virgin and long-fallow land. 286/ The addition of nonagricultural workers to the 1.33 million agricultural workers and specialists gives an estimated total manpower requirement of 1.73 million workers.

C. Population Increase.

It is assumed that the average family in the new lands of the USSR during the initial stages of development will be somewhat similar in composition to that found in East Siberia and the Far East when those regions were undergoing a less spectacular expansion. In 1938, collective farm households in those areas averaged 4 persons and 2.5 workers -- that is, 1 worker represented 1.6 settlers. 287/ This ratio would indicate an increase in the population of the new lands of about 2.8 million people, slightly more than 1 percent of the total population of the USSR.

D. Impact of the Manpower Requirements of the New Lands.

It is estimated that the total sown acreage in the USSR by the end of 1956 will be approximately 196 million hectares. 288/ The 30 million hectares of new lands will represent about 15 percent of this total, an important addition to the sown acreage.

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* See II, p. 21, above.

** This figure includes all trade and professional personnel and all employed persons whose work is not in agriculture.

Because farming in the new lands is labor extensive, the manpower required is not in proportion to the increase in crop land. Whereas acreage in the new lands will represent 15 percent of the total Soviet crop acreage, additional manpower requirements will represent only 3 percent of the total agricultural labor force of 56 million workers. 289/ The population and manpower requirements of the new lands, therefore, are relatively small when compared with the total population and with the total manpower requirements in the agriculture of the USSR as a whole.

The manpower requirements of the new lands, however, will have an impact on industry. It is estimated that from 1953 to the end of 1956 the agricultural labor force will increase by about 3.5 million. About one-third of this increase will be allocated to the new lands, and the remainder will be allocated to the corn program, to animal husbandry, and to other enterprises in the established areas of production.

The manpower requirements of the new lands are being met, in part, by transferring workers and peasant families from existing collective farms to farms in the new areas. Some young people reaching working age are remaining in agriculture rather than going into industry or other urban activities. Many graduates of technical schools are being assigned to work in MTS's and on state farms, and many members of the Komsomol organizations are required to volunteer for work in agriculture requiring less specialized skills. Skilled workers and specialists are being recruited in industry, in state farms and MTS's, and from among former members of the armed forces. 290/

Before the beginning of the new lands program, industry had the highest priority in obtaining manpower. For the period that is required to meet agriculture's increased manpower requirements, not only are industry's recruitment opportunities restricted but also industry has had to contribute some of its skilled workers to agriculture.

It is possible that the reduction in the armed forces that was announced in May 1956 may have been made to alleviate the tighter manpower situation that has resulted from the new agricultural programs.

If there are no major changes in the new lands acreage goals, the program will not be a continuing drain on the national manpower supply. Once the manpower requirements have been met and the shifting of some construction workers and other workers to agriculture as their primary tasks has been completed, normal migration and the maturing of young people should maintain a constant flow of labor to agriculture and to the other occupations in the new areas of crop and livestock production.

XIV. Construction.

A. General.

Expenditures for construction constitute a large part of the investment in the Soviet new lands program. Housing and other facilities for workers and their families, transportation facilities, storage facilities, and miscellaneous installations were built in 1954 and 1955. Although the construction effort in the new lands has been reduced in 1956, it continues to be important.

Announced or estimated requirements include housing for about 2.8 million persons; communal facilities; almost 2,300 km of rail line (to be completed by August 1957); more than 6,000 km of roads and highways* 291/; granary capacity of almost 20 million tons; grain elevators with a capacity of more than 773,000 tons 292/; and nonresidential farm buildings for 425 new state farms, for new and expanded MTS's, and for expanded collective farms.

When they are completed, the state farms and MTS's each will have a repair shop, equipment sheds and garages, storage for petroleum products, power-generating facilities, an administration building, and streets and roads. 293/ The state farms will also have livestock buildings and local grain storage.

In addition to housing, installations being built at the new settlements include stores, dining halls, bathhouses, bakeries, schools, medical facilities, clubhouses, libraries, and wells. The total number and breakdown of these facilities are not known, but in Kazakh SSR more than 1,000 stores, dining halls, bathhouses, and bakeries were to have been completed in 1955. 294/

Telephone and telegraph lines and radio units have been built. 295/ Plants for making precast concrete, quarries, brick plants, carpentry shops, and the like are being built in support of the construction program. 296/ Truck repair shops are planned, 297/ and a number of new local industry enterprises are being built. 298/

* Although rail and highway construction will continue in 1957, most of this construction will be completed by the end of 1956.

B. Cost of Construction and the Effect on the Soviet Construction Industry.

It is estimated that the total cost of state construction required for the Soviet new lands program in 1954-56 is about 13 billion rubles. 299/ In addition, the cost of collective farm construction has been estimated at 5 billion to 15 billion rubles, and the cost of private housing construction at about 5 billion rubles. 300/ The scarcity of information makes some of these estimates, especially the estimate of the cost of collective farm construction, quite tenuous. Nevertheless, the sum of 13 billion rubles probably covers the cost of most of the basic state-constructed facilities built from 1954 through 1956. Additional construction will undoubtedly continue beyond 1956 but at a greatly reduced rate.

Although construction expenditures have been heavy in the new lands, the expenditures do not appear to have had much impact on construction in other sectors of the Soviet economy. Two measures of the effect of the new lands program on the Soviet construction industry may be revealing. One measure is the share of total state construction resources required for the new lands. Another is the priority rating of construction in the new lands as it affects construction in other sectors of the economy.

The cost of planned state construction in the new lands in 1955 has been estimated at slightly more than 7 billion rubles, which is approximately 7 percent of the estimated total cost of new construction in the USSR for which state funds were allocated in 1955. 301/ The percentage of total state construction expenditures spent in the new lands in 1955 was considerably more than in 1954, but it will be reduced in 1956. The estimated share of some of the building materials required for construction in the new lands varies from slightly less than 7 percent of total asbestos cement shingles to less than 4 percent of total cement and slightly more than 1 percent of total soft roofing. 302/ Because of the extensive use of local materials (clay, stone, mud, reeds, and the like) in the new lands, a close value relationship between these shares and the percentage of new state construction should not be expected.

Press and radio reports indicate that construction priorities for the new lands have been high but not overriding. Considerable effort has been made to meet the new lands construction goals, but there is little evidence that other projects have been seriously hindered as a result.

Several circumstances contributed to the accomplishment of new lands construction without major effects on the rest of the Soviet economy. Resources set aside for previous Soviet agricultural schemes probably were allocated to the new program. Three of the "Great Projects,"* intended primarily for the benefit of agriculture, were almost certainly suspended in the first half of 1953. The heaviest demands for construction resources would have arisen in 1954-56, if these projects had been continued. In addition, the 10.5-billion-ruble program for the construction in 1954-56 304/ of MTS's, which was outlined in 1953, may have been drawn upon for the new lands. If this was done, however, it restricted the development of MTS's in other areas. The new lands apparently received a considerable share of the resources released by the completion of a large number of construction projects in heavy industry in the later stages of the Fifth Five Year Plan (1951-55). A Soviet statement in June 1955 indicates that tens of thousands of qualified personnel, engineers, and technicians -- veterans of the greatest construction projects in the USSR -- have come to Kazakh SSR to participate in the construction of state farms. 305/ Still another reason for the small impact of the new lands construction program has been the extensive use of local building materials.

C. Progress to Date.

Construction plans for the new lands were underfulfilled in 1954 and 1955, but the underfulfillment had little noticeable effect on the implementation of the agricultural program.** The major share of the basic construction required for the new lands program probably was completed by the end of 1955. It is evident that efforts have been concentrated on providing the means of production needed for agriculture. Construction of nonresidential buildings at MTS's and state farms is apparently more advanced than construction of housing. The construction of rail lines is well advanced. The building of storage facilities, however, may have been allowed to fall behind the ambitious schedule in 1955. The over-all plan for construction in the new lands in 1954 was evidently underfulfilled by a wide margin, but the 1955 plan probably was more nearly met, mainly as a result of strenuous efforts in the second half of the year. 307/

* These three "Great Projects" were the Main Turkmen, South Ukrainian - North Crimean, and Volga-Ural Canals, the construction of which has not been reported in the press since Stalin's death. 303/

** The shortage of storage facilities and elevators caused some losses after the harvest of 1954. 306/ The poor harvest in 1955 lessened the need for storage facilities in that year. There have been accounts in the Soviet press of local shortages of transportation facilities, with resulting congestion.

Results of the construction plan in the new lands in 1954 were not fully reported, but it is evident that the goals were far from met. In 1954 the Ministry of State Farms in Kazakh SSR fulfilled its construction plan by 80.9 percent; the Ministry of Agriculture, by 67.5 percent; and the Ministry of Urban and Rural Construction, by only 52.3 percent. 308/ It is likely that the construction plan was also underfulfilled in the new lands of the RSFSR.

The construction plan in the new lands in 1955 was almost certainly underfulfilled, but probably by a smaller margin than in 1954. 309/ Railroad construction was approximately on schedule in 1955, 310/ but there were serious lags in the new lands building program in the earlier part of 1955. Half-year plan fulfillment for the Kazakh SSR Ministry of Urban and Rural Construction was 78 percent 311/ and for the RSFSR Ministry was 79 percent. 312/ The July construction plan in the new lands of Kazakh SSR was overfulfilled, but it was recognized that strong measures were needed to overcome the lag in the first half of the year. 313/ As of 1 August 1955, construction in Kazakh SSR was still behind schedule, and it was stated that deliveries of building materials were lagging and that many projects at state farms were halted. 314/ In a review of progress as of September 1955, it was revealed that construction in the new lands of Kazakh SSR, particularly of housing, was still lagging badly and that almost no work had been done at 46 of the 260 state farms where construction was under way. 315/

In an October 1955 issue of Pravda, urgent efforts were demanded of the USSR Ministry of Urban and Rural Construction, the USSR Ministries of State Farms and of Agriculture, and the RSFSR and Kazakh SSR Ministries of State Farms and of Agriculture. These ministries were called on to analyze the state of construction affairs at every state farm and every MTS and to take immediate measures to fulfill the established plans. 316/

The measures undertaken to implement the construction program in the new lands in the middle and later months of 1955 included putting work on a 24-hour basis, releasing farm workers to construction jobs, and asking all-union ministries for assistance in the form of supplies of building materials, equipment, and technical aid. 317/ The USSR Ministry of Urban and Rural Construction fulfilled its 1955 plan by 85 percent.* 318/ This ministry had the major responsibility for the construction of state farms and MTS's in the new lands in 1955. 319/

* The plan report of the USSR Ministry of Urban and Rural Construction includes the reports of the Kazakh SSR and RSFSR Ministries of Urban and Rural Construction.

Extraordinary measures for the attainment of necessary construction goals are apparently to continue in 1956. Projects of the Ministry of Urban and Rural Construction in the Far East, Siberia, the Urals, and Kazakh SSR (that is, primarily in the new lands) are included in a broad grouping of heavy industrial and defense projects at which construction wages will be 14 percent higher than at other projects. 320/ At the conference on the new lands in January 1956, agricultural workers were asked to lend their hands to the construction of housing and communal facilities which Khrushchev described as a task that "must be solved." 321/

D. Conclusions.

Although there have been lags in accomplishment all along the line, often resulting in underfulfillment of plans, it is probable that the underfulfillment of construction plans has not seriously hindered the new lands program. The cost of construction in connection with the new lands program has been well considered by Soviet planners, and resources for the completion of all projects probably will be forthcoming without undue strain on the rest of the economy.

XV. Transportation.

A. General.

At the beginning of the Soviet new lands program in 1954, the area selected for agricultural expansion was served by railroads which had been built primarily to meet the over-all industrial needs of the USSR.* The two principal east-west lines were the Trans-Siberian Railroad in the Northern Zone and the South Siberian Railroad in the Southern Zone. Connecting these two lines from north to south were the Chelyabinsk-Kartaly line in the west, the Petropavlovsk-Akmolinsk (Trans-Kazakh Railroad) and the Tatarsk-Semipalatinsk lines in the center, and the Novosibirsk-Barnaul (Turkmen-Siberian Railroad) line in the east. The Western Zone was also served by two rail lines with outlets to the west -- the Orsk-Buzuluk line in the north and the Kandagach-Ural'sk line in the south. The Trans-Siberian and South Siberian Railroads linked the Northern and Southern Zones with the European USSR, and the Trans-Kazakh and Turkmen-Siberian Railroads connected the Northern and Southern Zones with Central Asia.

* See Figure 14, following p. 112.

Compared with other grain areas, the Southern Zone had relatively few railroads, and most motor roads were unsuited to year-round use. 322/ The many unpaved roads caused particular difficulty during the spring thaw, when water destroyed the repairs of the previous year and deep mud hampered transportation. Under such conditions, transport problems in the Southern Zone were inevitable until the transportation system was expanded and improved.*

Since 1954, considerable new construction of railroads and motor roads has been undertaken in the new lands. The principal purpose of this new construction is to meet the needs of a rapidly expanding agriculture. The bulk of the freight on most of these railroads and motor roads will be grain, but inbound machinery, construction materials, fuel, fertilizer, and consumer goods will also be important. Industrial needs have been taken into account, but they appear to have been considered secondary. The most important of the new rail lines, however, the Kustanay-Kaymanachikha line, although associated with the new lands program, probably could be justified by industrial and strategic requirements as well.

B. Transportation During the First Two Years of the Program.

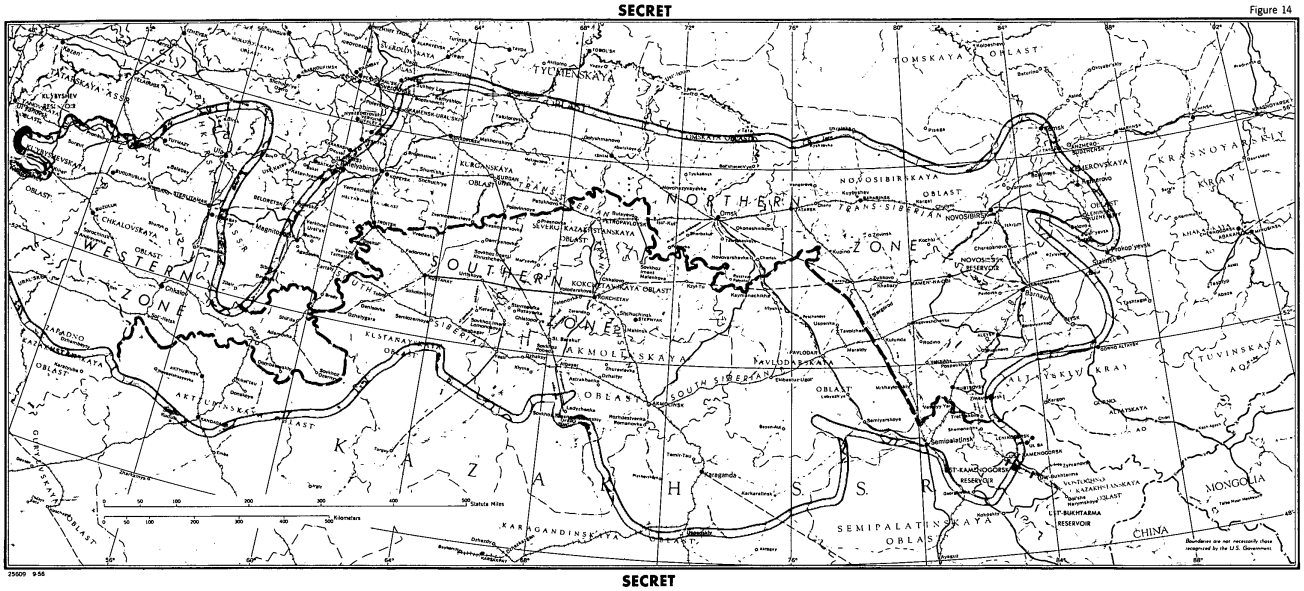
The new lands program has put great strains on the transportation system of the area. Particularly in 1954 a huge volume of inbound construction materials, fuel, and machines congested the rail system, and outbound traffic was snarled in September and October by the increased load of grain following the grain harvest. 323/ Although it operated under serious stress, the transportation system does not appear to have presented an insurmountable obstacle to agricultural development in the new lands. Shipping the grain harvest, however, was attended by losses of grain stored in the open air while awaiting transport. 324/ It is probable that in 1955 only a poor harvest prevented a crisis in the shipment of grain.

Although traffic on the Trans-Siberian Railroad increased sharply, there appears to have been little difficulty in meeting the transportation requirements of the new lands program in the Northern Zone. It was

* It also must be remembered that a steady increase in industrial traffic on the main rail lines has taken place in recent years and will undoubtedly continue in response to the planned expansion of industry during the Sixth Five Year Plan.

SECRET

Figure 14



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USSR: New Lands

Transportation System

General limits of the main New Lands area

RAILROADS

- Completed prior to 1954
- Completed during 1954-1956
- Planned for completion by 1960

The exact alignments of certain railroads are unknown. Points which are known to lie along these railroad lines have been used where possible to aid in approximating the actual alignments.

ROADS

- Main motor road
- Improved dirt road
- Improved dirt road under construction
- Other route (possibly improved)

In most cases roads shown submerged by new reservoirs presumably have been relocated, but specific information is lacking on this point.

Reservoir
Dam
Head of navigation

POPULATED PLACES

- over 500,000
- 100,000-500,000
- 50,000-100,000
- 25,000-50,000
- 10,000-25,000
- under 10,000 (selected)

50X1

*Supplemented by additional settlements which figure in the New Lands program, or which are related to transportation routes.

50X1

not to be expected that the existing transportation system would be seriously disturbed by the relatively small increase in grain production over production on farms already established in the zone. In the Southern Zone, however, where the absolute and relative increase in grain production was larger and the rail and road system less well developed, the demands of the program have been more than the rail and road system could accommodate without delay and inconvenience.

The greatest concentration of new state grain farms is in Kustanayskaya, Kokchetavskaya, and Akmolinskaya Oblasts, and especially in the area bounded by the cities of Kustanay, Kokchetav, Yesil', and Atbasar. These farms have had to rely heavily on the South Siberian Railroad, even though it has been overloaded and is not easily accessible from many farms. Rail facilities at Akmolinsk, Atbasar, and Yesil' appear to have been unable to cope satisfactorily with the additional burden of new lands traffic during 1954 and at least the early months of 1955. 325/

During 1955, several new rail lines were opened for temporary service, including the Kustanay-Uritskoye and Kokchetav-Volodarskoye sections of the Kustanay-Kaymanachikha line. 326/ These lines undoubtedly facilitated the shipment of the 1955 wheat harvest and of other freight. Most of the proposed narrow-gauge lines probably will be in at least temporary operation for the 1956 harvest season. The completion in November 1955 of a second track on the South Siberian Railroad 327/ must have relieved greatly the heavy burden of traffic on this line and will certainly contribute to the effective shipment of grain during the 1956 harvest season.

C. Plans and Perspectives.

1. Railroads.

By August 1957 the USSR expects to have completed a total of 1,577 km of standard-gauge and 746 km of narrow-gauge railroads in the new lands.* 329/ If this goal is achieved, as appears likely, the

* These figures represent a considerable shift from original plans, which emphasized narrow-gauge railroads. This shift was undoubtedly encouraged by the lull provided by the poor harvest of 1955. In addition, some lines that have been completed as narrow-gauge are to be converted to standard gauge by 1957. 328/ Narrow-gauge lines probably were emphasized originally because they can be constructed more rapidly than broad-gauge lines.

1957 harvest season should be attended by no significant transport difficulties, even with a good crop. In addition, improvement of storage facilities for grain will have reduced the seasonality of grain shipments. Finally, the heavy imports of construction materials and machinery required in the first 2 years of the new lands program can be expected to decline during the next 2 years. Even by 1957, however, there probably will be many rough spots left in the transportation system of the new lands; and loading, storage, repair, and other railroad yard facilities still will require improvement.

The Sixth Five Year Plan provides that an important new rail line from Omsk to Barnaul will be built by 1960 and will incorporate the Karasuk - Kamen'-na-Obi line now under construction. 330/ Although designed to carry coal from the Kuznetsk coal basin, this line will also serve important grain areas in the new lands. 331/ It is likely that the Kustanay-Kaymanachikha line will ultimately join the Osmk-Barnaul line at Karasuk, but no plans to this effect have been published.

In view of the fact that grain grown in the new lands is intended to replace in some degree the wheat previously grown in the areas of the western USSR which are now being seeded to corn, it is probable that the bulk of production of grain in the new lands will be shipped westward. Large quantities of grain, however, will still be shipped to the cotton areas of Central Asia by the Turkmen-Siberian Railroad and to the grain-deficit areas of the north and northeast.

2. Motor Roads.

The USSR plans to build 6,100 km of new motor roads in the new lands. 332/ About one-half of this mileage will be in the Northern Zone and one-half in the Southern and Western Zones. 333/ These roads, for the most part, will feed the railroad system with grain from state farms and collective farms in the new lands. Government-operated trucks are to pick up grain from the farms and deliver it to procurement points and railheads. 334/ A large number of new trucks will be required for this purpose, as well as for the internal requirements of the huge new grain farms. Truck deliveries during the first 2 years, however, do not appear to have been adequate to meet present needs.

The construction of major through highways has been given a relatively small place in transportation plans, probably because truck transport is more expensive than rail transport.* New service stations, repair shops, petroleum supply centers, and freight shipping centers are to be built in conjunction with the road building program. Judging from Soviet experience in the past, this part of the program may prove to be slow in meeting the needs of the transportation system.

3. Navigable Rivers.

Navigable rivers carry a very small proportion of total freight in the new lands. Soviet plans to increase traffic on the Ob', Irtysh, and Kama Rivers, however, may permit these rivers to make a significant contribution to the shipment of grain during the harvest season. 336/ Part of the grain shipped on these rivers will go directly to consumption centers in the European USSR, via the Ob' River, the Arctic Ocean, and such ports as Murmansk, Archangel, and Riga in the northwest, and via the Kama and the Volga Rivers to the central industrial areas in the west. A larger part of river traffic in grain, however, probably will be transloaded to the main rail lines within or near the new lands.

The short interval between the harvest season and the end of the navigation season complicates the use of navigable rivers for the shipment of grain, but this difficulty is to be reduced by storing grain in idle boats after the navigation season has ended and shipping it out in the spring. 337/

D. Conclusions.

The present program for the construction of new transportation in the new lands of the USSR appears to be adequate to meet the eventual needs of the new lands program. Although some confusion and delays may be experienced during the 1956 harvest season, it is probable that after that time the transportation system will be adequate for transport needs.

* Shipping by truck is estimated by Soviet planners to be five times as expensive as shipping by narrow-gauge railroad. 335/

XVI. Effect of the New Lands Program on the Soviet State Budget.

A. Difficulties in the Interpretation of Changes in Budget Allocations.

By the use of budget data only, it is impossible to develop a fully adequate analysis of the cost or the effects on the economy of a particular program such as the new lands program in the USSR. This would be true even if many detailed budget data were available. Because the relevant budget data are limited, it is possible to develop only a fragmentary analysis of the cost and effects of the new lands program. (Some of the particular problems involved in the interpretation of budget data are discussed briefly in Appendix D.*) Because a large part of the expenditures on the new lands is reflected in the state budget, however, it is likely that an examination of changes in the budget can yield some information about the over-all impact of the new lands program on the Soviet economy.

B. Budget Allocations to the New Lands.

Eleven billion rubles was stated by Zverev as the amount provided by the 1955 state budget of the USSR for the new lands program. MTS allocations were 5 billion rubles, and state farm allocations were 6 billion rubles. 338/ Similar comprehensive totals for the new lands budget expenditures for 1954 and 1956 are not available. Eleven billion rubles cannot be taken as including total resources allocated to the new lands, or even as total budget expenditures in the area, in 1955. Excluded are such budget items as some construction expenditures in the new lands, such nonbudget items as expenditures out of their own funds by khozraschet organizations, and probably all the expenditures of collective farms.

The new lands program has not been accompanied by a reduction in the planned state budget allocations to other agricultural areas or by reductions in other major budget items. Planned state budget expenditures of the USSR in 1951-56 are shown in Table 13.**

* P. 153, below.
** Table 13 follows on p. 117.

Table 13

Planned State Budget Expenditures of the USSR a/
1951-56

Billion Current Rubles

Sector of the Economy	1951	1952	1953	1954	1955 Original	1955 Adjusted b/	1956
Financing the national economy	178.5	180.4	192.5	216.4	222.4	217.4	237.3
Agriculture	39.0	34.7	(40.4) c/	(51.5) c/	55.1	48.1	48.6
Industry	79.9	80.6	82.6	92.3	111.8	99.0	110.0
Transport and communications	11.9	14.3	17.4	21.5	23.0	19.8	21.8
Social-cultural measures	120.8	124.8	129.8	141.4	146.9	N.A.	161.5
Defense	96.4	113.8	110.2	100.3	112.1	N.A.	102.5
Total real expenditures d/	451.5	476.9	487.3	523.8	541.0	533.0	569.6

[redacted] 50X1

b. On 1 July 1955, prices of producer goods were reduced. The "adjusted" figures for 1955 reflect the effects of the price cut.
c. The figure is estimated.
d. These figures exclude "fictitious" entries which appeared in the budget in 1953-55 and referred to changes in retail prices and agricultural prices. Because they did not represent expenditures for resources, they have been omitted from total expenditures in this table. [redacted] 50X1

[redacted] 50X1

Table 13 shows an increase in budget allocations to agriculture from 1953 to 1954, the first year of the new lands program, of about 27 percent. The increase from 1953 to 1955 is about 36 percent. If a deduction of 11 billion rubles is made for the 1955 new lands allocation, however, the 1955 allocation to the rest of agriculture is still greater than the 1953 allocation to agriculture by 9 percent (an increase from 40.4 billion to 44.1 billion rubles). In comparable prices, the planned budget allocation in 1956 is slightly larger than in 1955 (when new lands expenditures are included in both years).

Budget allocations to agriculture, as a portion of total allocations to the national economy, were 22 percent in 1951, 19 percent in 1952, 21 percent in 1953, 24 percent in 1954, and 25 percent in 1955. In 1956, allocations to agriculture will be about 21 percent of total allocations to the national economy. Agricultural expenditures, exclusive of MTS's and expenditures on state farms, have been reduced in 1956. Because the expenses of the mass resettlement of agricultural workers and of the clearing and development of land are believed to be included in this part of the agricultural budget, 342/ the reduction may well be explained chiefly by the fact that the major tasks of the resettlement of agricultural workers and of the organization of farms have been substantially completed. The 1955 price changes, as shown in Table 13,* would explain part but not all of the reduction.

Most of the 1951-55 increase in the Soviet budget allocations to agriculture has gone to the MTS's. The share of the MTS's in the agricultural allocation increased from 49 percent in 1951 to 59 percent in 1955. In 1956, MTS allocations are planned to be 67 percent of total allocations to agriculture. Planned Soviet budget allocations to agriculture in 1951-56 are shown in Table 14.**

In 1955 the budget allocation to the new lands of 5 billion rubles for MTS expenditures was only about 15 percent of total agricultural allocations for MTS's, while nearly two-thirds, 6 billion rubles, of the allocation to the Ministry of State Farms went to the new lands. Because the collective farms and MTS's have developed about 55 percent of the new lands, these relationships may seem surprising. Because the new lands state farms, however, had no accumulated funds, had large expenditures for plowing land

* P. 117, above.
** Table 14 follows on p. 119.

Table 14

Planned Soviet Budget Allocations to Agriculture a/
1951-56

Billion Current Rubles

Sector	1951	1952	1953	1954	1955	1956
Machine tractor stations	(19.0) b/	17.0	(20.0) b/	30.8	32.6	32.7
Ministry of State Farms					9.7	8.0
Other agricultural expenditures					12.8	7.9
Total	39.0	34.7	(40.4)	(51.5)	55.1	48.6

50X1

b. This figure is estimated.

from which no crop was gathered in 1955, and had all the initial expenses involved in setting up entirely new farms, it is not surprising that they received a large share of the allocation to state farms. A large part of the expansion of MTS's in the new lands, on the other hand, consisted of additions to, and more intensive use of, existing facilities. A final reason for the high proportion of Ministry of State Farms funds going to the new lands is the fact that state farms are heavily concentrated in the new lands. In 1955, approximately 30 percent of the total sown area of all state farms was in the new lands. Only 8 percent of the total sown area of collective farms (serviced by MTS's) was in the new lands.

C. State Agricultural Investment.

In the 4-year period of 1950 through 1953, state agricultural investment tended to average about 10 percent of total state investment in the national economy. 345/ Agriculture's share declined in 1953 to

slightly more than 8 percent, but it rose to about 12 percent in 1954 and in 1955 (from 12 billion rubles in 1953 to 20.6 billion rubles in 1955). Investment planned for 1956 is 21.3 billion rubles, 13 percent of total state investment in the national economy. Soviet investment in the national economy in 1953-56 is shown in Table 15.

Table 15

Soviet Investment in the National Economy a/
1953-56

	1953 Actual	1954 Actual	1955 Actual	1956 Plan
Total investment (billion current rubles)	(145.0) b/	(157.0)	(166.0)	160.8
Investment in agriculture (billion current rubles)	12.0	(19.0)	(20.6)	21.3
Agricultural investment as a percent of total	8.3	(12.1)	(12.4)	13.2

50X1

a. The 1956 figures are in investment planning prices of the Sixth Five Year Plan, which are 16 percent below those of the Fifth Five Year Plan, in which the figures for 1953-55 are expressed.
b. Figures in parentheses are estimates.

With the available information, total expenditures for the new lands program cannot be broken down successfully into the shares which go to investment and to current operations. It is possible, however, to obtain an idea of the possible magnitude of state agricultural investment in the new lands. For the USSR as a whole in 1955, state agricultural investment of approximately 21 billion rubles was only 38 percent of the total planned budget allocation to agriculture of 55.1 billion

rubles. Even if the 1955 budget allocation of 11 billion rubles to the new lands were as much as three-fourths of investment, the resulting 8.3 billion rubles of new lands investment would be only 5 percent of total state investment and only about 40 percent of state investment in agriculture. Deduction of 8 billion rubles for new lands investment in 1955 leaves 13 billion rubles for state agricultural investment outside the new lands, virtually the same amount as that invested in state agriculture in 1953.

D. Conclusions.

Although the new lands program is gigantic in territorial extent and large amounts of resources are involved, it does not appear to have been accompanied by a reduction in budget allocations to the nonagricultural sectors of the Soviet economy or to the rest of agriculture. When viewed in relation to total allocations to the national economy and in relation to total state investment, new lands expenditures are relatively small. A large part of the new lands expenditures will yield returns over many years, unless the program is abandoned. After the major impact of 1955, budget expenditures in the new lands probably will decrease rapidly, although mechanization continues at a rapid pace in 1956.

XVII. Appraisal of the Program.

An adequate appraisal of the Soviet new lands program requires consideration of several separate aspects of its development and implementation. On the one hand, as an example of the workings of the Soviet system in a major economic undertaking, the new lands program suggests some generalizations as to important strengths and weaknesses of the Soviet socioeconomic system. On the other hand, an examination of the program as an economic undertaking raises the following questions: Why was the new lands program undertaken, why was it initiated and implemented with such haste, and will it be a success or failure? This section will discuss these aspects briefly.

A. Evidence of Strengths and Weaknesses in the Soviet Socioeconomic System.

The speed with which the USSR brought the new lands under cultivation is unparalleled in history. Never before has a country extended its cultivated area so quickly. In slightly more than 2 years, 30 million hectares of virgin and long-fallow land will have been plowed and sown. Thirty million hectares (about 74 million acres) is an area about 25 percent larger than the acreage sown to wheat in the US in 1955. 347/ US expansion into the western areas of the country in the nineteenth century was not nearly so rapid. From 1889 to 1899, the decade of the most rapid expansion of the US farm area, crop land harvested increased about 63.5 million acres. 348/

Several important conditions contributed to the speed of the Soviet expansion, including the treeless character of much of the area, the preexistence of isolated areas of cultivation, the preexistence of some basic transportation facilities, and the availability of an appropriate technology. Basic to the accomplishment, however, was the ability of a highly centralized and monolithic state to make quick decisions and to marshal vast resources and the products of modern technology. Similar speed would be impossible in a free, decentralized society in peacetime, even with all the other conditions listed above. In a free society, thousands of individuals must make separate decisions in order for such large amounts of resources to be allocated, and the job could not be done so swiftly.

The new lands program also exemplifies the flexibility of the Soviet system. As late as October 1952, Malenkov had stated that "the grain problem is solved finally and irrevocably." 349/ In February 1953 an authoritative discussion of agricultural policy emphasized increases in yields as a primary means of increasing agricultural production. 350/ By September 1953, however, the new lands program was under consideration, 351/ and by March 1954 a great expansion of cultivated area was under way.

The flexibility of Soviet planning, like the ability to act swiftly, arises from the extreme centralization of decision-making and authority. On the one hand, it may be argued that frequent changes in policy are a sign of irresolution or injudicious decisions. On the other hand, however, the ability to shift the direction of major programs rapidly is a source of strength.

The new lands program also provides an example of the ability of the USSR to conceive and carry out with considerable speed a very large program without major dislocations in the economy. Even in 1955, the year of the greatest impact of the investment in the new lands, the demands of the program appear to have been met without serious harm to other important sectors of the economy. Although there have been some shortages and bottlenecks in the new lands, they have not been very significant. The largest part of the necessary investment has now been made, and the drain on the economy will be less in the future.

The new lands program also exemplifies the potential weakness of centralized decision-making. Although a society with highly centralized decision-making may act very quickly in initiating and carrying out certain programs, it may act with insufficient information and, as a result, make avoidable mistakes. This weakness arises because such a society lacks the balance provided by judgments of many minds and may lack the means of gathering objective evaluations from those in a position to judge best. This weakness has not produced consequences in the new lands which are as obvious or as dramatic as the positive accomplishments, but in the long run the weakness may prove serious.

A major weakness of the new lands program is that it apparently was initiated and crystallized in its major aspects without extensive preliminary scientific planning. The new lands were not an unknown area, and the USSR had accumulated a considerable amount of experience in farming in that area. There is much evidence, nevertheless, that the new program was begun without an adequate analysis of the best procedures to follow and of the results which could reasonably be expected.

In the early 1930's the attempts of the USSR to extend cultivation to the dry steppe area failed, and much of the acreage was abandoned. During the next 20 years the possible expansion of cultivation was the subject of some discussion in the Soviet press. There was no appreciable increase, however, in published technical discussion before 1954, and many important issues remained unsettled. In fact, some of the most crucial questions are still being debated. In the summer of 1954, expeditions were sent to the new lands to make soil surveys. In January 1956 the Minister of State Farms of Kazakh SSR stated that the question of crop rotation had not yet been settled. Scientists and specialists have continued their debate on suitable rotation systems* and have not yet arrived at a feasible long-run program. Even the total area to be plowed apparently remains in doubt.

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* See VII, p. 63, above.

The statements of Soviet leaders on the expected results from the new lands have been overoptimistic. The experience in the 1930's could not have provided the basis for their predictions, and it seems unlikely that they are based on sober, scientific analysis. The haste of the program -- and the evidence discussed above concerning crucial, unsettled issues -- lead to the conclusion that the USSR may have proceeded on the basis of unrealistic expectations. It is possible, however, that the Soviet leaders do not take seriously their own statements of what the new lands will produce.

B. Reasons for the Program.

By 1953 it was obvious that the USSR would have to obtain more food to feed its expanding population. In addition, it became evident that some efforts were to be made to improve the monotonous diet.

To obtain increased supplies of food, the Soviet leaders had several courses which they might have chosen instead of the new lands program. They might have imported more food, they might have concentrated on increasing yields (the alternative which was emphasized in the period immediately preceding the new lands program), or they might have expanded the area of cultivation by clearing forested areas.

In this report, it has not been possible to estimate the costs of obtaining grain by these various methods. There are reasons to believe, however, that the Soviet leaders were not motivated primarily by economic considerations in their decision to develop the new lands program in the way in which they did develop it.

Expansion into the new lands will yield certain "economic" results which would not have resulted from the other programs. Expansion of the area of cultivation into new territory should reduce, as it did in 1954 and 1955, the year-to-year variability in the over-all agricultural production. In 1954 the yields in new lands were exceptionally high while yields in the Ukraine were exceptionally low. In 1955 the positions were reversed, and yields in the new lands were low and those in the Ukraine were high.

With the increased expansion of industry into the new lands and the other eastern areas, it is possible that costs of food transportation will be reduced as a result of the new lands production. Regional self-sufficiency is a recurring theme in Soviet economic discussion.

The new lands program had another characteristic which apparently weighed heavily in the decision to undertake this program rather than the other possible programs. Excluding the expansion of food imports, none of the other programs would have produced results so quickly; and none of them, including expansion of imports, would have been so dramatic.

C. Reasons for the Rapid Initiation and Implementation of the Program.

Speed was apparently of great importance in the Soviet decision to expand into the new lands, as is suggested not only by the choice of this program rather than other possible ones but also by the extreme haste with which the decision was apparently reached and the program implemented. Why the USSR rushed into the new lands so hastily is a question not easily answered. Soviet leaders have not discussed this question publicly. They have alleged, however, that their decision to develop the new lands was based on economic criteria. Matskevich made an obscure and unelaborated comparison indicating that the cost of grain is less in the new lands than in other areas. 352/ Khrushchev said that "... all these riches -- that is, the virgin soil -- have been unused all the time ..." because "it was beyond our thought during the first decades of Soviet rule when we still did not have sufficiently developed agricultural machine building." 353/ Brezhnev recently said that the availability of skilled manpower made the development of the new lands practical now whereas it was not practical in the past. 354/

It is doubtful, however, that the reasons for the rapid initiation of the new lands program were economic. It is true that the development of technology and increased supplies of machinery and manpower affect the costs of production of grain and can make economically feasible the extension of cultivation on previously submarginal lands. It is possible that such conditions, along with the conditions of demand for grain in the USSR, did make an expansion of the cultivated area desirable. These reasons are inadequate, however, as explanations of the sudden initiation of the program and of the extremely rapid commitment of resources without adequate scientific investigation. The development of technology, machinery, and manpower did not take place overnight, and it was not necessary to organize and commit them overnight. The great haste might have been understandable if there had been a sudden and unforeseen food crisis. In spite of the poor 1953 harvest, however, there was no evidence of any such

crisis in the USSR in 1954. In fact, the USSR continued to export grain in 1954. Clearly, a critical need for grain cannot have been the main reason for the rapid implementation of the program. In the turbulent internal situation after the death of Stalin, it is possible that political considerations weighed heavily in the decision. The program was dramatic and, with a good probability of initial successes, was well designed to gain popular attention and approval.

D. Chances for Success or Failure of the Program.

If Soviet statements on expected production from the new lands are accepted as the standard of success, it can be stated with considerable confidence that the program will fail. The USSR probably will achieve, on a long-run basis, approximately one-third of the production that official statements have predicted. There are good reasons for believing, however, that the program probably will not be abandoned, even though the results fall far short of the stated expectations of the Soviet leaders. First, the Soviet leaders may really expect to obtain much less than their statements indicate. Second, because much of the investment is already made, a production considerably less than the original expectations may be sufficient to justify the current costs and maintenance of the program.

It is possible that official statements on expected production are not an adequate standard for judging the possible success or failure of the program. If, as was suggested above, political considerations were important in the decision to undertake the program, then the political effects are relevant to a judgment.

Of course, the Soviet leaders may not take seriously their own statements about expected production. In any case, Soviet agricultural goals are not achieved. They often are apparently based on somewhat naive "planning" concepts or contain an exhortatory or propaganda element which raises the goals above a reasonable level.

If an appropriate system of crop rotation is followed, the new lands probably will add an average of 8 million to 12 million tons per year (about 10 to 15 percent of the average production during 1950-53) to the Soviet supply of grain.* This grain, in terms of direct costs --

* In any one particular year, the production in the new lands may be significantly larger or smaller than the long-run average, depending on the weather and other conditions affecting production during that crop year.

such as manpower, fuel, machinery, and the like, which are directly involved in production -- probably will be more expensive than grain produced in the traditional grain-producing regions because yields per hectare will be smaller in the new lands and because such direct costs are more closely related to the extent of the area farmed than they are to the amount of grain produced.

If the Soviet authorities do not develop more suitable systems of crop rotation for the new lands than they have thus far publicized, they will not be able to maintain yields and will run great risks of developing extreme dust conditions, which might even force abandonment of large areas. Unless such extreme conditions develop, there is no reason to expect large-scale abandonment of the new lands.

APPENDIX A

ACREAGE DATA RELATING TO THE NEW LANDS PROGRAM OF THE USSR 1954-56

This appendix consists of tables (Tables 16 through 25*) which show the acreage goals for plowing and sowing of virgin and long-fallow land in the new lands of the USSR. The data are categorized by republic, as well as by type of farm unit, for the years 1954-56. Data concerning the acreages of new land actually plowed and sown are similarly presented.

Because of the limitations of the data, the figures in the tables should be considered to be only indicative of the actual magnitudes and should not be interpreted as absolute values.

Table 16

Original Plan for the Reclamation of New Lands in the USSR a/
1954-55

Thousand Hectares

Area	Collective Farms	State Farms	Total
Kazakh SSR	4,100 b/	2,195 c/	6,300 d/
RSFSR	4,700 e/	2,000 f/	6,700 g/
Total USSR	8,700 h/	4,300 i/	13,000 j/

50X1

b. 355/
c. 356/
d. 357/
e. 358/
f. 359/
g. 360/
h. 361/
i. 362/
j. 363/

* Tables 17 through 25 follow on pp. 130-136.

Table 17

New Lands Plowed in the USSR a/
1954

Thousand Hectares

Area	Collective Farms	State Farms	Total
Kazakh SSR	5,729 b/	2,775 c/	8,500 d/
RSFSR	6,654 e/	2,600 f/	9,346 g/
Total USSR	12,300 h/	5,500 i/	17,800 j/

50X1

b. 364/
c. 365/
d. 366/
e. 367/
f. 368/
g. 369/
h. Residual figure.
i. 370/
j. The amount of new land plowed during 1954 has been reported as totaling from 17.43 million hectares 371/ to 18.29 million hectares. 372/ In view of the substantial agreement in republic estimates, the total amount of new land plowed in 1954 has been estimated at 17.8 million hectares.

Table 18

Planned Sowing of New Lands in the USSR a/
1954

Thousand Hectares

Area	Collective Farms	State Farms	Total
Kazakh SSR	550 b/	105 c/	650 d/
RSFSR	1,250 e/	395 f/	1,600 g/
Total USSR	1,800 h/	500 i/	2,300 j/

50X1

b. 373/
c. 374/
d. 375/
e. Residual figure.
f. Residual figure.
g. 376/
h. 377/
i. 378/
j. 379/

Table 19

New Lands Sown in the USSR a/
1954

Thousand Hectares

Area	Collective Farms	State Farms	Total
Kazakh SSR	1,350 b/	250 c/	1,600 d/
RSFSR	2,150 e/	550 f/	2,700 g/
Total USSR	3,500 h/	800 i/	4,300 j/

50X1

b. Residual figure.
c. 380/
d. 381/
e. Residual figure.
f. Residual figure.
g. 382/
h. Residual figure.
i. 383/
j. 384/

Table 20

Revised Plan for the Reclamation of New Lands in the USSR a/
1954-56

Thousand Hectares

Area	Collective Farms	State Farms	Total
Kazakh SSR	9,400 b/	8,600 c/	18,000 d/
RSFSR	6,600 e/	5,400 f/	12,000 g/
Total USSR	16,000 h/	14,000 i/	30,000 j/

50X1

b. Residual figure.
c. 385/
d. 386/
e. Residual figure.
f. Residual figure.

50X1

h. 388/
i. 389/
j. 390/

Table 21

New Lands Plowed in the USSR a/
1954-55

Thousand Hectares

Area	Collective Farms	State Farms	Total
Kazakh SSR	8,886 b/	9,114 c/	18,000 d/
RSFSR	7,714 e/	4,386 f/	12,100 g/
Total USSR	16,000 h/	13,500 i/	30,100 j/

[redacted] 50X1

b. Residual figure.
c. 391/
d. 392/
e. Residual figure.
f. Residual figure.
g. Residual figure.
h. 393/
i. 394/
j. 395/

Table 22

Original Plan for the Initial Sowing of New Lands in the USSR
1955

Thousand Hectares

Area	Collective Farms	State Farms	Total
Kazakh SSR a/	3,550	2,090	5,650
RSFSR a/	3,450	1,605	5,100
Total USSR	6,900 b/	3,800 c/	10,700 d/

a. [redacted] 50X1
[redacted] 50X1
[redacted] Data for Kazakh SSR and the RSFSR were derived by subtracting the sowing plans for the republics in 1954 (see Table 18, p. 131, above) from the original republic reclamation plans (see Table 16, p. 129, above). 50X1
b. 396/
c. 397/
d. 398/

Table 23

Original Plan for Sowing of New Lands in the USSR a/
1955

Thousand Hectares

Area	Collective Farms	State Farms	Total
Kazakh SSR	4,100 b/	2,195 c/	6,300 d/
RSFSR	4,700 e/	2,000 f/	6,700 g/
Total USSR	8,700 h/	4,300 i/	13,000 j/

a. The original plan for the total area to be sown on new lands in 1955 is coincident to the area originally planned to be plowed during 1954. [redacted] 50X1
[redacted] 50X1

b. 399/
c. 400/
d. 401/
e. 402/
f. 403/
g. 404/
h. 405/
i. 406/
j. 407/

Table 24

Revised Plan for Sowing of New Lands in the USSR a/
1955

Thousand Hectares

Area	Collective Farms	State Farms	Total
Kazakh SSR	N.A.	N.A.	8,130 b/ to 9,300 c/
RSFSR	N.A.	N.A.	9,870 d/ to 10,700 e/
Total USSR	11,200 f/	6,800 g/	18,000 h/ to 20,000 i/

50X1

b. 408/
c. 409/
d. Residual figure.
e. Residual figure.
f. 410/
g. 411/
h. 412/
i. 413/

Table 25

New Lands Sown in the USSR a/
1955

Thousand Hectares

Area	Collective Farms	State Farms	Total
Kazakh SSR	5,900 b/	4,600 c/	10,500 d/
RSFSR	5,600 e/	4,400 f/	10,000 g/
Total USSR	11,500 h/	9,000 i/	20,500 j/

50X1

b. Residual figure.
c. 414/
d. Residual figure.
e. Residual figure.
f. Residual figure.
g. 415/
h. 416/
i. Residual figure.
j. 417/

APPENDIX B

LIVESTOCK NUMBERS IN THE NORTHERN AND SOUTHERN ZONES OF THE NEW LANDS OF THE USSR

Estimates of the livestock numbers in the Northern Zone of the new lands of the USSR in 1954 are based on the percentage that each type of livestock in the area was of the total number of the same type in the RSFSR as a whole in 1938. On the assumption that the percentages for the different types of livestock remained the same between 1938 and 1955, these percentages were applied to livestock numbers in the RSFSR as reported for 1954 418/ to estimate the numbers of each type of livestock in the Northern Zone of the new lands in this year. This methodology was also used in estimating livestock numbers in the Southern Zone, with the exception of sheep and goats, from 1954 livestock numbers for Kazakh SSR. 419/

The estimate of sheep and goat numbers in the Southern Zone of the new lands in 1954 is based on reported sheep distribution in Kazakh SSR by groups of oblasts.* 420/ In view of the probability that goat numbers in Kazakh SSR comprise only a small percentage of total sheep and goat numbers, the reported percentage distribution of sheep numbers was applied to total sheep and goat numbers in 1954.** Using the percentages reported for each group of oblasts, total sheep and goat numbers in Kazakh SSR were apportioned among the groups. Sheep and goat numbers for each oblast in the Southern Zone were then estimated by apportioning to each oblast a proportion of the 1954 group total equal to the proportion of the 1938 group total that sheep numbers in each oblast comprised in 1938.

Livestock numbers in the Northern and Southern Zones of the new lands of the USSR as of 1 January 1938 and as of 1 October 1954 are shown in Table 26.***

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* In Akmolinskaya, Pavlodarskaya, and Semipalatinskaya Oblasts, for example, there were 16.2 percent of the total sheep numbers in Kazakh SSR in 1954.

** Sheep and goat numbers in Kazakh SSR were reported as a combined total in 1954.

*** Table 26 follows on p. 138.

Table 26

Livestock Numbers in the Northern and Southern Zones of the New Lands of the USSR
1 January 1938 and 1 October 1954

Thousand Head

Date and Zone	Cattle	Cows	Swine	Sheep and Goats
1 January 1938 (reported)				
Northern Zone	6,299.7	2,784.7	2,074.1	7,009.8
Southern Zone	1,555.0	547.2	116.0	1,658.4
Total	7,854.7	3,331.9	2,190.1	8,668.2
1 October 1954 (estimated)				
Northern Zone	6,853.1	2,735.6	3,970.1	10,024.6
Southern Zone	2,336.6	804.7	287.2	6,062.5
Total	9,189.7	3,540.3	4,257.3	16,087.1

APPENDIX C

PETROLEUM PRODUCTS REQUIRED BY TRACTORS, TRUCKS, COMBINES, AND OTHER AGRICULTURAL MACHINERY IN THE NEW LANDS OF THE USSR

1. General.

The object of this analysis is to determine the quantities of gasoline, diesel fuel, avtol lubricants, and deisel oil consumed by tractors, combines, trucks, and other agricultural machinery in plowing, harrowing, sowing, harvesting, and other agricultural operations in the new lands of the USSR. In the discussion of physical factors affecting production,* the area of the new lands was described as comprised of three zones differing in soil, climate, and other factors. The consumption of petroleum products by farm machinery cannot readily be differentiated by zone, and therefore the requirement for petroleum products will be analyzed on the basis of the new lands as a whole. The consumption of petroleum products by different types of machines in performing different types of work can be differentiated. Among these types of work are plowing virgin and long-fallow land for the first time, replowing land, sowing, harvesting, transporting grain, and the like. Such agricultural operations can best be discussed in terms of acreages, production, and services.

2. Acreages.

It is reported that 4.3 million hectares of virgin and long-fallow lands were sown in 1954. It is assumed that this acreage was plowed, harrowed, and sown in the spring of 1954 and that 95 percent of the sown acreage was harvested by combines in the summer of that year. Acreages reclaimed, replowed, harrowed, sown, and harvested by combines in the new lands of the USSR in 1954-56 are shown in Table 27.**

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* See II, p. 21, above.

** Table 27 follows on p. 140.

Table 27

Acreages Reclaimed, Replowed, Harrowed, Sown, and Harvested by Combines in the New Lands of the USSR
1954-56

Thousand Hectares

Year	Acreages				
	Reclaimed	Replowed	Harrowed	Sown	Harvested by Combines a/
1954					
Spring	4,300 b/		4,300	4,300	
Summer	13,500	4,300			4,085
1955					
Spring	2,700 c/		20,500	20,500 d/	
Summer	9,600 e/	20,500 e/			17,575 d/
1956					
Spring			30,100	30,100 f/	
Summer		30,100 f/			25,745 g/

a. The area harvested by combines is assumed to be 95 percent of the area sown to grass. One-half of the harvesting is estimated to be done by tractor-drawn combines, and one-half by self-propelled combines.
b. For sowing in 1954.
c. For sowing in 1955.
d. Of this total sown acreage, 90 percent, 18.5 million hectares, 421/ was sown to grain, of which 95 percent, 17,575,000 hectares, is estimated to have been harvested by combines.
e. For sowing in 1956.
f. For sowing in 1957.
g. It is assumed that as in 1955 about 90 percent of the sown acreage, 27.1 million hectares, was sown to grain, of which 95 percent, 25,745,000 hectares, was harvested by combines.

It was further reported that the total acreage of virgin and long-fallow land reclaimed in 1954 in Kazakh SSR was 8.5 million hectares, 422/ and in the RSFSR 9.3 million additional hectares were reclaimed; a total of 17.8 million hectares, then, were reclaimed. 423/ This total acreage includes the 4.3 million hectares reclaimed in the spring of 1954 and the 13.5 million hectares reclaimed in the summer and fall of that year.

It is also reported that "in 1955 collective and state farms on virgin and fallow lands have sown 20.5 million hectares with all agricultural crops ... ." 424/ As indicated above; 13.5 million hectares of this acreage were plowed for the first time (reclaimed) in the summer or fall of 1954. In addition, 4.3 million hectares were replowed, probably in the summer or fall of 1954. This leaves 2.7 million hectares that must have been reclaimed in the spring of 1955. Of the total acreage, all of which was harrowed in the spring of 1955, 18.5 million hectares were sown to grain. 425/ It is estimated that 95 percent of the grain acreage, 17,575,000 hectares, was harvested by combines in the summer of 1955. There are indications that the total acreage of virgin and long-fallow lands reclaimed during 1954-55 for sowing in 1956 was approximately 30.1 million hectares. 426/ If 20.5 million hectares were reclaimed in 1954-55, and if it is assumed that this acreage was replowed in 1955 for sowing in 1956, then 9.6 million additional hectares probably were reclaimed in the summer and fall of 1955. Pending more detailed information, it is assumed that this acreage of 30.1 million hectares was harrowed in the spring of 1956 and that 90 percent (as in 1955), 27.1 million hectares, was sown to grain. It is further assumed that 95 percent of the sown acreage, 25,745,000 hectares, was harvested by combines in the summer of 1956.

At the date of this analysis, there is no evidence that acreages of virgin and long-fallow lands in addition to the reported 30.1 million hectares were reclaimed in the spring of 1956. Pending more detailed information, it is assumed that these 30.1 million hectares were replowed in the summer and fall of 1956 for sowing in the spring of 1957. Different quantities of petroleum products are consumed in each of the operations shown in Table 27.* To compute the over-all requirements of fuel, lubricating oil, and the like for tractors in the performance of such work, the Soviet planners, in their agricultural studies and accounting, reduce all field-work operations to a common denominator called "soft plowing." This common denominator is obtained by comparing each type of

* P. 140, above.

agricultural work on a hectare of land with the work performed in plowing a "soft," or previously plowed, hectare. The USSR has established the following factors for each of the operations indicated in Table 27*: soft plowing (replowing), 1; reclaiming land, 1.4; harrowing, 0.19; sowing, 0.3; and harvesting by tractor-drawn combine,** 0.5. 427/ Acreages reclaimed, replowed, harrowed, sown, and harvested by tractor-drawn combines in the new lands of the USSR, in terms of soft plowing, in 1954-56 are shown in Table 28.

Table 28

Acreages Reclaimed, Replowed, Harrowed, Sown, and Harvested by Tractor-Drawn Combines in the New Lands of the USSR in Terms of Soft Plowing 1954-56

Thousand Hectares

	Acreages					
Year	Reclaimed	Replowed	Harrowed	Sown	Harvested by Tractor-Drawn Combines a/	Total Work Performed by Tractors
1954	24,920	4,300	817	1,290	1,021	32,350
1955	17,220	20,500	3,895	6,150	4,394	52,159
1956		30,100	5,719	9,030	6,436	51,285

a. One-half of the total acreage harvested by combines (see Table 27, p. 140, above) multiplied by 0.5.

3. Types of Tractors.

The total work performed by tractors in 1954, 1955, and 1956 was performed by various types of tractors. Those sent to the new lands during 1954 and 1955 were all of the track-laying, general-purpose

* P. 140, above.
** One-half of the acreage harvested by combines.

type, consuming diesel fuel but varying in horsepower at the drawbar as follows: S-80, 65 hp; DT-54, 36 hp; and KD-35, 24 hp. In 1954 an allocation was made to the new lands of 47,716 tractors of all 3 types of horsepower, which were equivalent to 115,000 tractors in terms of 15-hp units. As indicated in Table 29, most of these tractors were the DT-54 type, and there were some of the small KD-35 type and the large S-80 type. In 1955 the new lands received 38,808 additional tractors with a combined horsepower equivalent to 98,000 units of 15 hp each. Allocation of tractors to the new lands of the USSR, in terms of physical units and 15-hp units, in 1954-55 is shown in Table 29.

Table 29

Allocation of Tractors to the New Lands of the USSR
in Terms of Equivalent 15-Horsepower Units
1954-55

		1954		1955	
Types	Drawbar Hp	Physical Units a/	Equivalent 15-Hp Units	Physical Units a/	Equivalent 15-Hp Units
DT-54	36	34,587	83,009	29,729	71,350
KD-35	24	9,109	14,574	4,643	7,429
S-80	65	4,020	17,420	4,436	19,223
Total		47,716	115,003	38,808	98,002

a. These figures are estimated.

Each of the three types of tractors sent to the new lands in 1954 and 1955 had a different potential soft-plowing capacity. It is estimated that a DT-54 working at full capacity has a soft-plowing potential of 7.7 hectares 428/ per shift. The potential of a KD-35 is 5.8 hectares and of the S-80, 15 hectares per shift. Applying these factors to the number of physical units of each type of tractor allocated to the new lands in 1954 indicates that the soft-plowing potential per shift of

the allocated numbers of each type of tractor working at full capacity would have been: DT-54, 266,320 hectares; KD-35, 52,832 hectares; and S-80, 60,300 hectares -- a total potential capacity of 379,458 hectares. The percentage of the total potential soft-plowing capacity of the tractor park in the new lands in 1954, by type of tractor, is computed to be as follows: DT-54, 70.18 percent; KD-35, 13.93 percent; and S-80, 15.89 percent.

Similarly calculated, the percentage of the total potential soft-plowing capacity of the tractor park in the new lands in 1955,* by type of tractor, is computed to be: DT-54, 70.56 percent; KD-35, 11.37 percent; and S-80, 18.07 percent. Estimated consumption of fuel by the tractor park in the new lands of the USSR, in terms of average per soft-plowing unit, in 1954-55 is shown in Table 30.

Table 30

Estimated Consumption of Fuel by the Tractor Park in the New Lands of the USSR, in Terms of Average per Soft-Plowing Unit 1954-55

Year	Type of Tractor	Consumption per Soft-Plowing Unit a/ (Kilograms)	Percentage of Hectares Plowed at Full Capacity (Percent)	Fuel Consumption Share of Potential Capacity (Kilograms)
1954				
	DT-54	10.2	70.18	7.15836
	KD-35	11.6	13.93	1.61588
	S-80	9.3	15.89	1.47777
Weighted average				10.25201
1955				
	DT-54	10.2	70.56	7.19712
	KD-35	11.6	11.37	1.31892
	S-80	9.3	18.07	1.68051
Weighted average				10.19655

a. 429/

* The new lands tractor park included 47,716 tractors received in 1954 and 38,808 tractors received in 1955.

Each of the three types of tractors consumed a different quantity of diesel fuel per hectare of soft plowing. In kilograms of fuel per hectare, consumption is estimated as follows: DT-54, 10.2; KD-35, 11.6; and S-80, 9.3.

Applying these factors to the percentage of the total potential soft-plowing capacity of the tractor park in the new lands representative of the capacity of each type of tractor gives the weighted average fuel consumption for the tractor park in the new lands in terms of kilograms per hectare of soft plowing.

In making this calculation, it is assumed that the relative quantity of plowing, harrowing, and the like done by each type of tractor is proportional to the relative potential capacity of each type as described in the previous paragraphs.

4. Consumption of Diesel Fuel by Tractors.

All tractors in the new lands park consume diesel fuel. As indicated above, the weighted average fuel consumption per hectare of soft plowing for the tractor park operating in the new lands in 1954 was 10.25201 kg. It is estimated that tractors in the USSR consume in nonfield work 13.2 percent as much additional fuel as is used in field work. 430/ Thus the quantity of fuel consumed per hectare for field and nonfield work would be 10.25201 times 1.132 -- 11.60528 kg. It is further estimated that storage and hauling losses equal 5 percent of the fuel consumed in field plus nonfield work. 431/ Thus total fuel consumed in 1954 per hectare of soft plowing, including field and nonfield work, and losses would be 11.60528 times 1.05 -- 12.18554 kg. Similarly estimated, the total diesel fuel consumed by tractors in 1955 per hectare of soft plowing, including field and nonfield work and losses, is computed to be 12.11973 kg.

Pending the receipt of more definite information the 1955 rate of fuel consumption is also used for projected tractor operations in 1956 because it is probable that the 1956 rate is closer to that of 1955 than to the figure for 1954 or to the average for 1954-55.

In terms of soft plowing, the total work performed by tractors in 1954 was shown at 32,350,000 hectares.* This figure multiplied by 12.18554 kg gives 394,202 tons as the total quantity of diesel fuel consumed by tractors in the new lands in 1954. Similarly calculated, the total diesel fuel consumed in 1955 is 52,159,000 hectares times 12.11973 kg -- 632,153 tons of diesel fuel. For 1956 the calculation is 51,285,000 hectares times 12.11973 kg -- 621,560 tons of diesel fuel.

5. Consumption of Gasoline by Tractors.

The gasoline consumed in starting tractors, including losses, is estimated to be 1 percent of the weight of the total diesel fuel consumed, including losses. 432/ The estimates are as follows: 1954, 3,942 tons; 1955, 6,322 tons; and 1956, 6,216 tons.

6. Consumption of Lubricants by Tractors.

The average consumption of all lubricants by diesel tractors is computed to be 7.5 percent of total fuel consumption. 433/ Thus tractor lubricant consumption in 1954 is calculated to be 29,565 tons. (Total diesel fuel consumption of 394,262 tons minus fuel losses of 5 percent equals 375,430 tons of diesel fuel actually consumed. Diesel fuel consumption of 375,430 tons multiplied by 7.5 percent equals lubricant consumption of 28,157 tons, net of losses. The addition of an allowance of 5 percent for losses results in an estimate of 29,565 tons of lubricant consumed in 1954.) Similarly lubricant consumption is estimated to have been 47,411 tons in 1955 and 46,624 tons in 1956.

7. Estimated Consumption of Gasoline and Lubricants by Combines.

The consumption of gasoline by the S-4 combine (the only type of self-propelled combine used in the new lands) is 10 kg per hectare. 434/ The consumption of gasoline by the S-1 or S-6 combines, which are typical of all tractor-drawn combines used in the new lands, equals 4.5 kg per hectare. 435/ Each of the two types (self-propelled and tractor-drawn) is assumed to have harvested one-half of the total harvested area. The average consumption per combine per hectare in field operations is therefore computed to be 7.25 kg per hectare. Storage and hauling losses based on Soviet studies are 5 percent of the field work consumption. Hence the total expenditure of gasoline per hectare is 7.25 times 1.05 -- 7.6125 kg.

* See Table 28, p. 142, above.

The total acreage harvested by combines in the new lands is estimated at 4,085,000 hectares.* This figure multiplied by 7.6125 gives a total gasoline consumption, including losses, by combines in 1954 of 31,097 tons. Similarly calculated, harvesting of 17,575,000 hectares in 1955 required 133,790 tons of gasoline, and in 1956 harvesting, 25,745,000 hectares may require 195,984 tons of gasoline.

Based on 1952 Soviet technical standards of oil products, 436/ consumption of avtol lubricants by combines is estimated at 5 percent of the total consumption of gasoline, including losses. Applying this factor to the total quantities of gasoline consumed by combines gives the following total consumption of lubricants, including losses: 1954, 1,555 tons; 1955, 6,690 tons; and 1956, 9,799 tons.

8. Estimated Consumption of Gasoline and Avtol Lubricants by Other Agricultural Machinery.

a. Gasoline.

Under conditions prevailing in the USSR the consumption of gasoline by all farm machinery other than tractors is estimated to be 70 percent by combines and 30 percent by other agricultural machinery. 437/

Thus the quantity of gasoline consumed by other agricultural machinery in 1954 is computed by applying the factor 0.4286 (30/70) to the 31,097 tons of gasoline consumed by all combines in the new lands in that year.**

b. Avtol Lubricants.

Similarly, the avtol lubricants consumed by other agricultural machinery associated with that consumed by all combines are computed in tons as follows:

Year	All Combines (Metric Tons)	Other Agricultural Machinery (Metric Tons)
1954	1,555	666
1955	6,690	2,867
1956	9,799	4,277

* See Table 27, p. 140, above.

** The ratio of 1 to 0.4286 holds good for lubricants as well as for gasoline, based on the constant relationship between the consumption of fuel and lubricants. 438/

9. Consumption of Petroleum Products by Trucks.

It is impossible to estimate directly the quantities of petroleum products consumed by trucks in operations in the new lands. There is no direct information on which to base an estimate of the number of trucks working in the new lands at any given time. Some new trucks were sent to the new lands to remain there permanently. Others were sent on loan from cities and industrial centers and from the southern European USSR to operate during the harvest period and to haul agricultural products from farms to points of concentration and processing. Many of these trucks were returned to the lenders, but some remained in the new lands, and the lenders were compensated by allocations direct from factories.

a. Consumption of Gasoline in 1954.

A clue to the consumption of gasoline by trucks in farm operations other than transporting grain and other farm products can be deduced from the estimates made by Matskevich in working up the energy balance of socialized agriculture as of 1938. Matskevich first reduced all field work performed by tractors to the common denominator of hectares of soft plowing and then computed the energy required (in terms of horsepower-hours) by use of the factor of 49.0544 horsepower-hours per hectare. 439/ He thus calculated that the field work of plowing, harrowing, sowing, and harvesting in the USSR as a whole in 1938 totaled 246.4 million hectares of soft plowing and that a total of 12,087 million horsepower-hours were expended in this quantity of work. 440/ The energy expended in the normal activities of trucks -- such as hauling farm workers, fertilizers, lumber and other building materials, fuel, manufactured goods, and the like -- associated with 246.4 million hectares of soft plowing was computed to be 3,658 million hoursepower-hours. 441/ This figure does not include the transportation of grain and other farm products. The ratio of housepower-hours expended by tractors in soft plowing to the corresponding horsepower-hours expended by trucks in normal farm operations other than hauling grain and other farm products was 1 to 0.30264.

The tractor operations of plowing 17.5 million hectares and harrowing, sowing, and harvesting 4.3 million hectares associated with the new lands program in 1954 is estimated to be equivalent to 32,350,000

hectares of soft plowing.* The diesel fuel consumed in performing this quantity of field work is computed to be 331,652 tons (total fuel consumption of 394,202 tons less 5 percent for losses and 13.2 percent for nonfield work).** The theoretical energy availability of gasoline is approximately the same as that of diesel fuel. Assuming that the normal farm activities in the new lands were not widely different from those in 1938 as far as truck operations in relation to tractor operations are concerned, then 331,652 tons of diesel fuel multiplied by 0.30264 gives 100,371 tons of gasoline. In addition, 2 percent 442/ must be added to cover intragarage and repair operations, and 5 percent must be added for losses, giving a total of 107,397 tons as the possible quantity of gasoline that could be expected to be consumed by trucks in normal intrafarm operations in 1954.

b. Consumption of Lubricants in 1954.

On the basis of a 1948 study of motor transport, the quantity of lubricants consumed by trucks in normal intrafarm operations would be equivalent to 5 percent 443/ of the 107,397 tons of gasoline consumed -- about 5,370 tons.

There is no basis for estimating the quantity of petroleum products consumed by trucks in 1954 in transporting grain and other farm products from farms to points of concentration and processing.

c. Consumption of Gasoline and Lubricants in Intrafarm Operations in 1955.

Estimates of consumption of gasoline by trucks in 1955 must be obtained indirectly, as they were for 1954. The tractor operations of plowing and harvesting associated with the cultivation of 20.5 million hectares of virgin and long-fallow land in 1955 is estimated at 531,846 tons (total fuel consumption of 632,153 tons less 5 percent for losses and 13.2 percent for nonfield work). This figure multiplied by the factor of 0.30264 developed above gives 160,958 tons

* See Table 28, p. 142, above.
** See p. 146, above.

of gasoline. Adding 2 percent to cover intragarage and repair operations, and 5 percent for losses, gives a total of 172,386 tons as the possible quantity of gasoline that could be expected to be consumed by trucks in normal intrafarm operations in 1955.

Lubricants consumed by trucks in normal intrafarm operations in 1955 would be equivalent to 5 percent of the 172,386 tons of gasoline consumed -- about 8,619 tons.

d. Consumption of Gasoline and Lubricants in the Transport of Grain and Other Farm Products in 1955.

Fragmentary information permits calculating the quantities of gasoline required by trucks in 1955 in transporting grain and other farm products to points of concentration and processing.

It is necessary first to estimate the quantities of procurable (shipped from the farm) products grown in 20.5 million hectares.

As stated above, 20.5 million hectares were planted in the spring of 1955, of which 18.5 million hectares were sown to grain and 2 million hectares were planted to other crops. The 18.5 million hectares of grain are estimated to have produced 7.95 million tons, an average of 4.3 centners per hectare. For purposes of analysis, it is assumed that the yield of miscellaneous crops was not less than that of grain and that the production of grain and other crops on 20.5 million hectares in 1955 was about 8,815,000 tons. Khrushchev has stated that out of a production of 900 million poods of grain, about 600 million poods, or two-thirds, would be marketable (procurable). 444/ Assuming that out of a total agricultural production of 8,815,000 tons about two-thirds would be procurable, it is possible that about 5.9 million tons might be moved by trucks.

The second step in this calculation is to establish the average distance over which farm products are moved to points of concentration. Unfortunately, there is no information available on this point. Information is available on the average length of truck-haul from railhead to destination for all freight in the various oblasts in the Southern Zone of the new lands in 1955. It is assumed here that these averages represent, at least reasonably accurately, the average length of haul between farm and points of concentration or processing. For purposes of the

calculations, the average distance selected was 63.7 km, 445/ which is the shortest of the average distances reported for any oblast in the Southern Zone of the new lands. Using this average length of haul and multiplying it by 5.9 million -- the tonnage of the procurable farm products -- gives a total of 376 million tkm.

The truck park in the new lands is assumed to be composed of an equal number of 3- and 4-ton trucks. The average length of haul is assumed to be constant and identical for each type. The share of the ton-kilometers accounted for by the 4-ton trucks would thus approximate four-sevenths of the total ton-kilometers -- 215 million tkm -- and the 3-ton trucks would account for three-sevenths of the total -- 161 million tkm.

On the basis of the experience of a fleet of ZIS-150 (4-ton) trucks engaged in construction work in the Moscow area, 446/ the gasoline consumer per ton-kilometer by this truck (loaded) is estimated at 0.126 kg per ton-kilometer, which, multiplied by 215 million tkm, gives 27,090 tons of gasoline consumed by the 4-ton trucks.

A 3-ton truck (loaded) consumes a gallon of gasoline per 6.9 miles, and a 4-ton truck consumes a gallon per 6.2 miles. 447/ Assuming that the difference in gasoline consumption per ton-kilometer between 3-ton and 4-ton trucks is proportional to their rates of fuel consumption per mile of full load, the consumption for 3-ton trucks would be 6.2/6.9 of 0.126 kg per ton-kilometers -- 0.1132 kg per ton-kilometer. Total gasoline consumed by the 3-ton trucks would be 161 million tkm times 0.1132 -- 18,225 tons. Total consumption of the truck fleet in hauling 5.9 million tons of farm products an average distance of 63.7 km would be 45,315 tons.

[redacted] 50X1
[redacted] the gasoline consumed by an unloaded truck on the r 50X1
return trip to base is 80 percent of the consumption of the truck when loaded. 448/ The gasoline consumed by the loaded and unloaded trucks is thus computed to be 45,315 tons times 1.8 -- 81,567 tons. To this quantity is added 2 percent 449/ for repair operations and 5 percent for wastage. This gives about 87,358 tons as the total quantity of gasoline consumed by the truck park in the new lands, in transporting 5.9 million tons of off-farm grain and other farm products (extra-farm hauling) associated with the exploitation of 20.5 million hectares of virgin and long-fallow lands in 1955.

[redacted] the quantity of lubricants consumed by trucks would be equivalent to 5 percent 450/ of the 87,358 tons of gasoline consumed in extrafarm hauling -- 4,160 tons in 1955.

50X1

APPENDIX D

INTERPRETATION OF SOVIET BUDGET ALLOCATIONS

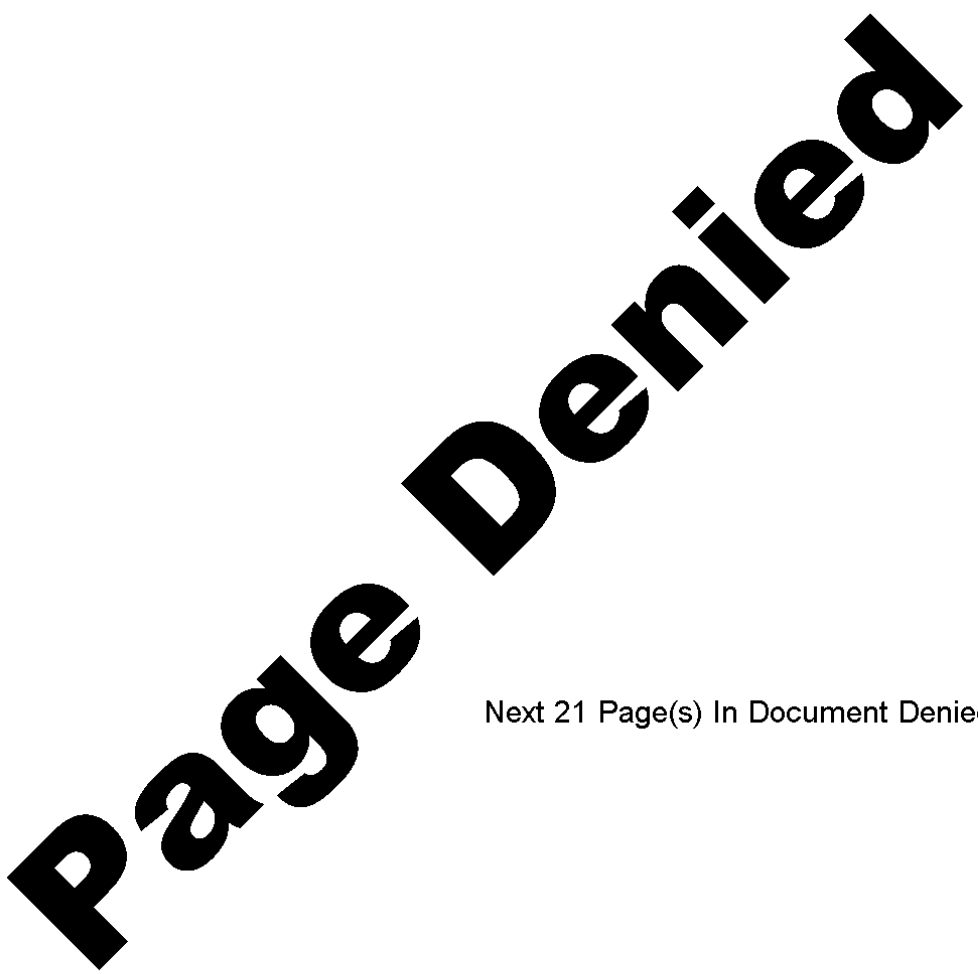
The composition of the Soviet state budget is such that only a rough indication of the impact of the new lands program on the economy may be gained from a study of the budget. The financial operations of the MTS's, for example, enter the budget on a "gross" basis, in that all MTS income and expenditures are budget items. On the other hand, other state production organizations have ordinarily operated in recent years on a self-sustaining basis, using their revenues to cover their expenses. The state budget receives taxes from such economic organizations, contributes funds to them for fixed and working capital, and provides subsidies to meet losses and operational expenses. 451/ Collective farms may receive state loans for investment purposes (and very recently they may receive "advance" payments on commodities to be delivered to the state), but such loans are repayable.

State budget expenditures include both investment and operational items. Enterprises may meet part of their investment needs, as well as operational expenses, out of their own income. Funds are accumulated by enterprises for investment purposes.

It is obvious, therefore, that changes in the amount and direction of expenditures by, and costs to, the Soviet economy could be adequately related to changes in budget expenditures only by means of detailed knowledge of the organizations making the expenditures and knowledge of the distribution of operational and investment expenditures and the composition of investment expenditures. An expansion in the activities of MTS's, for example, would have a greater effect on the budget than would a similar expansion of the activities of state farms. On the other hand, an expansion of the activities of collective farms would have less effect on the budget than would a similar expansion of the activities of state farms. Changes in the prices of agricultural products might affect budget allocations to the state farms (because their income would be affected), but they would not affect allocations to

MTS's, which do not meet expenses from income. Higher prices for agricultural products also affect the amounts spent by the state for the agricultural products of collective farms, but they would not be reflected in a change in budget allocations to "agriculture."*

* Procurement allocations were separated from allocations to "agriculture" in 1955. 452/



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