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THE VIRGIN LANDS: SOVIET AND CANADIAN  
A Comparison of Two Farming Systems

Ten years have passed since Khrushchev proposed a vast expansion of the USSR cropland by plowing up the virgin and idle lands located beyond the lower Volga and north Caucasus and extending into eastern Siberia. This spectacular undertaking will rank, alongside the elimination of the police terror, as one of the most significant domestic achievements of Soviet policy during the post-Stalin period. In the decade, over 42 million hectares were added to the Soviet cropland total; the national grain area increased by over 30 million hectares; grain production, in official terms, rose almost 60 percent by 1962, and livestock products similarly. The progress was substantial, yet the "grain problem" remained unsolved as the big gap between the plan and performance - and the dramatic decision<sup>1</sup> to import over 11 million tons from the West - both indicate.

Clearly in recognition of the primacy of the subject, the volume of critical literature on the virgin lands program by western scholars has reached significant proportions.<sup>2</sup> These detailed and comprehensive analyses have dealt mainly with composite studies of the "basic virgin land regions," as the Soviet statistical handbooks designate the areas, and of necessity included a large proportion of established farmland in the total, thus inflating the picture of actual performance of the new lands increment. This paper will deal with a more homogeneous region - the Tselinnyi Krai - but even here almost one-third of the land had been cultivated by 1953. The emphasis will be to appraise the potentiality of the new lands by a comparison with an established farming region analogous in resources and climate.

The Distribution of the Virgin Lands

By 1963, Khrushchev was able to report that over 42 million hectares of virgin and idle land had been put under plough since

1954. An analysis of the changes in cropland in the principal geographic regions since 1953 is a more effective measure of the impact of the program on agricultural potential than the aggregate plow-up figure, as some of the new land reverted to grass or fallow since being plowed. The dynamic of the sown area in crops shapes ups as follows.

TABLE I  
GROWTH IN CROPLAND AREA: USSR AND BASIC VIRGIN  
LAND REGIONS (million hectares)

	1953 <sup>+</sup>	1961 <sup>+</sup>	Index 1953=100
USSR	157.2	204.6	130
Kazakhstan	9.7	28.6	295
of which			
Tselinnyi krai	5.1	18.3	360
RSFSR	38.9	55.5	140
of which			
Lower Volga	8.3	10.8	130
Urals	13.9	18.2	131
W. Siberia	13.8	17.7	128
E. Siberia and Far East	5.3	8.8	166

<sup>+</sup>Narkhoz 1961, p. 373.

The 1961 cut-off date is perhaps a more accurate indicator of the growth in the same area than the 1962-1963 figures as the anti-grasslands/fallow campaign of 1962 raised the cropping area to 218 million hectares by 1963, although the latter data (Pravda, 19 July 1963) do reveal that several million hectares of new land were turned back to fallow or grassland between 1954 to 1961.

The total cropland expanded by 30 percent in the Soviet Union between 1953 to 1961; in the RSFSR it grew by 40 percent. The areal growth in the established farm regions of the RSFSR, many farmed for over a hundred years and which constitute some of the "basic virgin land" regions of the federation, has been modest however.<sup>3</sup> Fully 70 percent of this increment occurred in the five northeastern oblasts of the Kazakh republic - the Tselinnyi krai - where the same area grew by 260 percent. This represents about 30 percent of the total land area reclaimed since 1954. The territory is essentially the heartland of the Virgin Lands project, where substantially three out of every four hectares cropland are "new" compared to those "virgin" RSFSR regions where less than one hectare out of three has been plowed up during the decade. Because of its relative compactness and homogeneity of resources, and its reliance on a monolithic crop structure based on Spring wheat, the Virgin Land territory has been selected as the model for a comparative study of the potential of the Soviet drive to solve its perennial grain problem.

#### The Tselinnyi Krai (Virgin Land Territory)

The Tselinnyi krai is composed of five political-administrative regions (oblasts) in northern and northeastern Kazakhstan: Kustainai, Kokchetav, Pavlodar, Tselinograd, and North Kazakhstan. Its land area, the Soviets are proud to relate, equals that of France, Benelux and Denmark combined, over 600,000 square kilometers. It was recently described in Pravda as the largest agricultural region in the Soviet Union with 22.4 million hectares arable land, which account for almost a fifth of the national wheat hectareage.<sup>4</sup> In its one bumper harvest, 1956, when the Ukraine had a poor crop, the state purchases reached 12.6 million tons, or almost a fourth (24 percent) of the nation's marketable grain.<sup>5</sup> This is considerably above the krai's nine year average (1954-1962) of 6.2 million tons, or 13.3 percent of all grain procurement.<sup>6</sup> In terms of the primary grain crop, wheat, the share of the territory's contribution to the national stocks is impressive: nominally 20 percent of both gross harvest and total state purchases of wheat.<sup>7</sup> In the last three years, however, this share has dropped precipitately.

#### The Promise

The plow-up and reclamation of the eastern steppe lands have historically been associated with the eastward migration of Russians, under Imperial and Soviet rule alike. Much of this land was farmed intermittently, and as often reverted back to grassland. Party propagandists for their massive undertaking

emphasize that during the hundred years prior to 1954 some 5 million hectares had been plowed up by peasant in the northern oblasts of Kazakhstan while in a few years under Soviet rule over 17 million hectares had been reclaimed as cropland. It is precisely this degree of scale and speed which differentiate the 1954 Soviet operation from all previous efforts in land reclamation, and fully justifies the Kremlin's description of it as "grandiose, colossal." With this experience in reclamation as background, it would seem that the output potentialities could have been more accurately charted.

Following the discussions of the February-March (1954) plenum, when the virgin lands program was inaugurated, the concluding resolution of the Central Committee, CPSU, set the task of the agricultural agencies to expand the grain sowings in Kazakhstan, Siberia, the Urals, the Volga region, and north Caucasus by placing during 1954 and 1955 "Not less than 13 million hectares of virgin and idle lands under cultivation, and obtaining from them 1.1 to 1.2 billion poods of grain."<sup>9</sup> This implied an average yield of 13.9 to 15.0 quintals grain per hectare! After the excellent harvest of 1954, however, these visionary targets were sharply deflated. Encouraged by the initial good crop, the Central Committee revised its earlier plans and raised the plow-up target from 13 to 28-30 million hectares for the 1956 calendar year. For this enlarged sown area, Khrushchev envisaged a "minimum" yield of 10 quintals per hectare, or a total of 30 million tons of grain.<sup>10</sup> That both these statements were exclusively political decisions, which the history of the grain growing beyond the Volga clearly substantiates, may be seen from the fact that the then current average yields (1949-53) for the new land areas were: RSFSR - 7.0 quintals of grain per hectare; Kazakhstan - 6.2 quintals. After the 1955 near crop failure, Khrushchev trimmed back earlier projections to the defensive position that "if every five years we get two good harvests, one average and two poor crops" the project, he averred, would still be economically profitable.<sup>12</sup> By 1961, he revealed that the original plans were based on an overall average of 8 quintals per hectare.<sup>13</sup> These shiftings of position were politically motivated, no doubt. That a hardened opposition had existed within the upper level of the party hierarchy was made abundantly clear by the disclosures at the December (1958-1959) plenums, and at the 21st and 22nd Party Congresses. This opposition, beyond the "anti-party group" hard core, still remains, however dormant, or Khrushchev and the press would not constantly be defending the feasibility and profitability of the venture. Meanwhile, as the yields kept declining in the last few years so more frequently have been the protestations of Khrushchev.



### The Performance - First Phase

The Tselinnyi krai is perhaps the world's largest monoculture region. Approximately three-fourths of its cropland is seeded to Spring wheat each year, compared to a little over 50 percent prior to 1954. All grains occupied 83 percent of the sown areas during 1958-1959, a pattern which remains more or less valid to date; however, maize has played a minor role, accounting for only 4 percent of the cropland, and its utilization has been as silage or fodder.<sup>14</sup>

The main thrust in the reclamation campaign came in 1955, when the added plowland permitted a three fold expansion of the grain area the following year. The magnitude and speed of the undertaking have been acclaimed as a prodigious achievement, cut to order for a command economy where resources are mobilized and shifted with despatch and in echelon. But the nature of grain farming should not be overlooked. It consists largely of a series of a few routinized operations ideally adapted to large-scale power equipment: plowing, seeding and harvesting. The effort initially required mainly machinery allocations and a moderately skilled labor supply, neither resource exactly in short supply. As the emphasis of the Soviet farm implement industry had long been on large-scale power units, their crawler-type tractors were admirably suited to plowing up sod, it was no effort to direct these existing machine types from the older agricultural areas to the new lands. Loans of equipment from other areas were also important factors, especially during harvesting operations. In fact, the logistical support for the machinery and manpower proved to be a far greater problem. Nor should the advantages of terrain be minimized. The Tselinnyi krai soil, and most of the new lands is unglaciated so there was no problem with stones, potholes and other plowing impediments. The land was level, upland, of good humus content, which required no preliminary drainage or brush clearance before plowing. It was a perfect layout for a big power (non-political) machinery operation. Within two seasons time, almost 20 million hectares were plowed up with dispatch.

Table II shows the performance of the Tselinnyi krai during the "Big Decade." The data from official sources pertain specifically to the krai, save in the few instances estimates were made using the Kazakhstan figures as reference. These are marked with an asterisk. Yield data were derived by dividing sown area by output. There were also some minor revisions of territory during the decade which had no appreciable influence on the results. But the issue of determining actual grain yields from the official Soviet claims presented the biggest problem in

arriving at a realistic appraisal. The geographical and climatic characteristics of the territory make the harvesting of grain a drawn out operation.<sup>15</sup> It extends into the cool, rainy season from the end of August to the first period of October, when snowfall intervenes. As the barn yield for

TABLE II  
TSEKLINNYI KRAI; GRAIN PRODUCTION;  
Area, Output, Yields, 1953-1963

Year	Grain Area, million hectares	Grain Output, million tons, official Soviet claims	Revised, Estimates, million tons	Procure- ments, million tons	Yields, unadjusted quintals per hectares	Yield s quint per hecta
1953	3.9	3.4	--	1.6	8.7	--
1954	5.0	4.6	4.2	2.5	9.0	8.4
1955	11.2	3.1	2.8	1.7	2.9	2.5
1956	15.6	17.7	14.5	12.6	11.3	9.3
1957	16.1 <sup>+</sup>	6.7	6.0	3.0	4.2	3.7
1958	15.9	14.3	12.1	9.9	9.0	7.5
1959	14.9	13.8	11.3	8.7	9.2	7.6
1960	15.1	12.9	10.5	7.4	8.5	6.9
1961	16.0 <sup>+</sup>	10.3	8.7	5.5	6.4	5.4
1962	17.0 <sup>+</sup>	10.1	8.6	5.2	5.9	5.1
1963	16.0 (est.)	4.9 (est.)	4.4	--	3.1	2.8

+ Estimated from the official data for Kazakhstan.

Sources: Posevnye Ploshchadi, SSSR, I, pp. 220-21, 218-19; Narkhoz 1960, pp. 394-95, 418-19, 430-31, 440-41, 442-43; Narkhoz 1961, pp. 373-75; Narkhoz 1962, pp. 292-93; Selkhoz 1960, pp. 147, 210-11, 214, 228-29; Yusupov, Kazakhstanskaya Pravda, 12 November 1963.

grain is determined by the bunker weight of the crop as registered on the combine at the time of harvesting, the recorded yields contain considerable excess moisture. Heavy weed infestations too, particularly in seasons of late rainfall during the growing season, raise the amount of foreign matter abnormally. Another factor adding to the statistical ballast, and not generally recognized, is the admixture of unripe grain caused by delayed germination of a part of the crop during a dry season; these "sweepings" raise the moisture, add excessive chaff and promote spoilage of grain. The frequency and volume of this dockage (skidka) is perhaps the highest in the Tselinnyi krai among the major grain producing areas of the Soviet Union. For our purpose, in determining the revised estimate of output and yields, the dockage factor applied to the official claims varied from 8 to 18 percent depending on the variable climatic and harvesting conditions prevalent during each specific crop year.<sup>16</sup> It seems a conservative range and does not include losses after harvest from spoilage and shipping. It is at best a tooled estimate. Another inclusion in the discount factor was the maize silage grain equivalent which, we feel, is included in the union republic grain totals. Fortunately, maize is a minor crop in the krai occupying about 4 percent of the grain area - it is harvested in the green or lactic-wax stage.

Several striking patterns/<sup>become</sup> readily apparent from the table:  
(1) the wide fluctuations in output and yields that occur from year to year, (2) the steady deterioration in yields since 1959, (3) the failure to equal the record output of the 1956 harvest, and (4) the widening gap between the planned goals and actual performance.

After the initial impetus of the plow-up, the area seeded to grain reached a plateau in the mid-decade, and only after the anti-grasslands/fallow campaign of 1962 did a modest expansion in scale continue. The effects of the current harvest failure are reflected in the reduced sown area for 1963, as it is rather certain some cropland was not harvested because of a complete failure.<sup>17</sup>

The criterion of success in evaluating the achievements of the new land program had better be deferred to one whose reputation as an agricultural apparatchik had been made as first secretary in the Altai territory before becoming the party chief in Kazakhstan. N.I. Belyaev, at the December (1958) plenum, classified the grain harvests in Kazakhstan since 1954 accordingly: in only one year out of five was a "more or less" bumper

crop (1956) harvested, two years (1954 and 1958) were average yields, and 1955 and 1957 were failures (neurozhainy).<sup>18</sup> By this score yields over ten quintals per hectare are credited below ten average, and those less than eight seem in the unsatisfactory category. On the Belyaev rating then, (he used the officially claimed averages), the "Big Decade" produced excellent harvest (1956), 4 average, while five crop years unsatisfactory or failures. The importance of the frequency of the failures is rather significant as the break-even point over production costs, in an average crop year, is indicated at about six quintals per hectare.<sup>19</sup> But, at this point, the major conclusion is that the performance fell wide of the target and, more ominous, that the yields have been progressively declining.

The wide variations in output from year to year are characteristic of dry-land farming regions the world over, and are by no means a Soviet phenomenon. Accordingly, comparative studies in dry-land farming conditions are generally based on crop averages for a period of years. Table III shows the ten year aggregate yields and the breakdown in five year period for the decade.

TABLE III  
YIELDS PER HECTARE: TSELINNYI KRAI  
Weighted Averages: 1954-1963

<u>Based on Official</u>		<u>Revised Estimates</u>
<u>Claims</u>		
10 Year Average, quintals per hectare	6.89	5.81
1954-1958 Average quintals per hectare	7.27	6.20
1959-1963 Average quintals per hectare	6.59	5.50



The ten year averages of 6.89 quintals, official, and 5.81 quintals, adjusted, are low by Canadian and United States dry-land farming standards but compared to the USSR average for Spring wheat (8 quintals, unadjusted, 1954-1958 average) they are not excessive.

The Soviets recognize these yields as low, accounted for in part by the frequency of poor harvest years. Again the corroborating source is Belyaev, who at the December (1959) plenum, disclosed that during five of the previous ten years average yields in Kazakhstan were less than 6 quintals per hectare.<sup>20</sup> The selection of this figure would seem to substantiate the above cited claim that 6 quintals is near the break-even point on costs. A later cost study in the krai, based on the 1961 harvest (average yield 6.4 quintals, official), showed that the profit margin was reached at slightly over 7 quintals per hectare.<sup>21</sup>

On these cost criteria, it appears that the ten year average of 6.89 quintals, official, is apparently near the break-even point. The first five year performance, however, with three creditable harvests, was on the profitable side, while the 1959-1963 period, with successively three poor harvests, was reaching the point of no returns.

The main lesson of the decade's dynamics in grain growing, and what causes the Soviet planners the most concern, are the steadily and progressively declining yields since the moderate levels of 1958-59 were reached. All the recommendations embodied in the resolutions of the Central Committee made after each of the special plenums of agriculture since 1958, along with the advice and counsel of Khrushchev, have been of no avail in halting the steady decline in the yields of the virgin lands.

The immediate task set at the plenums was to raise the grain yields by 3 to 4 quintals per hectare. No progress toward these often repeated goals has been made - rather the regression has persisted. While the inherent fertility of the soil has undoubtedly been ruined by a decade of monoculture, wheat following wheat, one or two successive years of favorable weather could set things alright for a time. But the problem lies deeper than the vagaries of the weather and good fortune is fickle. Khrushchev feels that the limitations of management and cadres are the primary deterrents to raising crop yields; the farm managers and technicians blame, among other factors, the shortage of machinery and other capital inputs, and the labor disincentives, caused by the lack of amenities in living. Yet the virgin

lands program was apparently not intended as a short-run venture; the Party Program for 1970 and 1980 envisaged a flourishing agriculture based on grain growing in the eastern new land regions. Russian agriculture has historically been characterized by persistently low yields which have largely contributed to its backwardness and the low living levels of the rural population. Raising the low yields is indeed "the most urgent task." As a measure of the potentials of development of the Tselinnyi krai, the model for the virgin lands, a comparison with an established and successful area analogous in natural resources and climate is in order.

#### Two Virgin Lands: Soviet and Canadian

Any comparison in yields and performance of the Tselinnyi krai with an agricultural region other than one analogous in climate and resources would be misleading and irrelevant. There are very few comparable Spring wheat regions in the world where statistics are at hand. In the United States, North Dakota is not representative because of the undue influence of the fertile Red River valley; the Montana wheat fields are limited in size. In Canada, of the three prairie provinces, Manitoba, because of the proximity of a large inland body of water, enjoys more rainfall and a milder climate than the Tselinnyi krai. Alberta, bordering on the Rocky mountains, has more rainfall than the krai and its yields are considerably higher. This leaves the province in between Manitoba and Alberta, Saskatchewan, with the largest wheat area of any political sub-division in the north American hemisphere, as the most comparable area for study.

#### The Climate and Physical Setting

Both regions are located in semi-arid zones characterized by high latitudinal positions and in the Tselinnyi, by great longitudinal extent. Temperature extremes are common both in the winter and summer. Cold winters prevent the overwintering of crops and fruit trees, so spring grains rather than the heavier-yielding winter grains are the common crop in both regions. Both regions are short of adequate heat during the growing season. In fact, the limited heat supply has almost an equally retarding effect on crop yields as moisture shortages. The Canadian Farm Service warns that "excellent crops result only when ample rainfall coincides with long hours of sunlight and high temperatures of summer."

COMPARATIVE METEOROLOGICAL DATA - LONG TERM AVERAGE

	<u>Tselinnyi Krai</u>	<u>Saskatchewan Province</u>
Yearly Precipitation	330 mm (13 inches)	350 mm (13.8 inches)
Length of Frostfree Season	105-110 days	110-115 days
No. Days with Temperature over 20° C.	40-50	-

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Sources: Atlas Selskogo Khozyaistva SSSR, 1960,  
pp. 27, 32, 45.

Guide to Farm Practice, University of  
Saskatchewan, 1960 pp. 4-6.

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The effect of continental weather is readily apparent in the moisture data. Both regions lie deep in the interior of the continents and total rainfall is practically equal; they both suffer in that the moisture-laden winds blowing out from the western seas have long dropped their heavy volumes of precipitation before penetrating into the interior. The distribution of the rainfall favors the Canadian province: about 80 percent of the annual precipitation occurs from about April 1 to November 1, compared to about 70 percent for the Soviet counterpart.<sup>22</sup> In comparing average rainfall data, however, the Canadian report makes clear that exceptionally heavy falls raise the average somewhat higher than the observed values for one half of a twenty-year period, so that the median precipitations are about one inch (25.4 mm) lower than the average shown in the above total. This phenomenon undoubtedly also applies to the Soviet zone under study.

In the length of the growing season the statistics favor slightly the Canadian prairie lands, although the high variability in the length of the frostfree season from year to year is associated with the dangerous risk of unseasonable late frosts in spring or early frosts in fall. Both regions have reported at one time or another heavy snowfalls in mid-August that ruined large areas of grain. Another hazardous element is the occasional occurrence of the dessicating winds known as sukhovey, more common in Kazakhstan than in Canada because of the close proximity of the central Asian deserts.

The soils in both regions are quite similar, and are listed in the order of their moisture supply: degraded chernozems, chestnut-brown loams, podzols, and some sandy loams in Kazakhstan. The main difference, however, is the Canadian soils are glaciated, while the Kazakhstan soils are unglaciated. The contrast favors the Kazakh soils to a degree, (higher organic matter content and absence of stones) although by conservation and fertility practices the balance can be redressed.

Under such hazardous climatic conditions soil structure is vitally important. The University of Saskatchewan's Guide to Farming counsels farmers:

"to obtain the maximum production of crops it is imperative to improve the structure and fertility of the soil, to conserve the moisture and to prevent losses of valuable topsoil by wind and water erosion. The latter are more serious than fertility depletion by cropping or grazing.... good structure can be maintained by building up organic matter in the soil through fallowing, and crop rotations."

op. cit., pp. 10-11.

On balance, both regions are abundantly similar in resources, climate, and location. Because of the unfavorable climatic conditions, the ultimate physical limits of output per hectare are much lower than in eastern Canada or western Europe. Accordingly, small grain farming is the dominant enterprise common to the regions with a heavy emphasis on spring wheat. Wheat is the one crop that is better adapted to the indicated variable climatic conditions than any other, with the exception of the original grass cover which is now practically destroyed. One advantage does accrue to the northern regions however: while the yields per hectare are not high the quality of the wheat is of the highest order. A high protein content and suitable quality of gluten proteins yield breads with finer texture and more nutrients. Such wheats also command higher prices on the world markets. In this respect, the Canadian quality is of a higher order than the Tselinnyi wheat, if for no other reason than that the Canadians decided fifty years ago to breed new varieties of quality wheat rather than heavy yielding strains.



### The Results - First Phase

The Saskatchewan wheat fields have been farmed continuously since 1905-1911, or over fifty years. The Tselinnyi territory, although small areas had been cultivated sporadically in the past century, was opened up to mass cultivation in 1954. Thus the Soviet fields have had the benefit of the original flush of fertility latent in the virgin lands while the Canadians have had to rely on cropping practices to produce the harvests. Our appraisal of the two areas will be based on production returns for a ten-year period. Because of the high variability of yields from season to season, a long-term average is more accurate and meaningful.<sup>23</sup>

#### GRAIN YIELDS - 10 YEAR AVERAGE (1954-63)<sup>24</sup>

	<u>Quintals per hectare</u>
Saskatchewan Province	12.4
Tselinnyi Territory	6.89

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For such unusually analogous regions, the difference in the long term yields of 79 percent is a tribute to the comparative efficiency of Canadian agriculture over the Soviet model. Of perhaps even greater significance is that the yields of the Tselinnyi territory have shown a steady regression in output while the Saskatchewan yields have been rising. The factors responsible for this superiority in performance require an appraisal.

### The Basic Comparisons

The institutional organization of the two systems differs greatly: there are 85,000 commercial farms in Saskatchewan, with an average land area of 390 hectares, of which 340 hectares are cropland. The Tselinnyi krai currently has 694 state farms and 92 collective farms, operating tracts from 10,000 to 70,000 hectares of cropland.<sup>25</sup> The Canadian system is based on the family-type farm with its own labor supply (about 16 to 18 months labor units per year), while the krai depends on a paid labor supply of excessive mobility in its dominantly sovkhoz oriented structure.

Both systems are mechanized. The average Canadian farm has two tractors: one 50 H.P. rubber-tired heavy duty unit and one lighter model, or approximately one 45 H.P. unit per 100 hectares sown area. The krai with 90,000 tractors, mostly over 54 H.P. crawler type models, averages one 45 H.P. unit to 190 hectares sown area.<sup>26</sup> The rubber-mounted tractors are speedier than the crawler type and better suited to dry-land cropping practices. Fewer, and faster, field operations give the Canadian system an advantage. The conventional mouldboard plow is almost a museum piece in Canada; disc seeders are used to prepare the seed bed and plant the seed in one operation. The mouldboard gang plow is almost exclusively used in the stereotyped seedbed operations of plowing, discing and seeding, each carried out separately, that still characterize Soviet farming. Both systems have combine harvesters, windrowers, and trucks. Because of his greater concentration of power machinery, the Saskatchewan farmer has no need for wind-rowing grain as the smaller acreage permits direct combining. The investment in machinery comes to \$87 a hectare, a high cost factor but crucially essential for carrying out the timely, high quality field operations that give the Canadian system such a superiority over the Tselinnyi model.

Perhaps the most visually apparent difference between the operational procedures is the widespread use of summer fallowing of cropland. Saskatchewan has over 40 percent of its cropland in fallow. The trend has been going up from the 20 percent in 1925 to 40 to 50 percent in different sectors of the province. In the Tselinnyi krai fallow occupied 13 percent of the cropland in 1960, but at the behest of Khrushchev's anti-fallow campaign by 1963 only 5 percent of the 22 million hectares were in fallow.<sup>27</sup> Fallowing controls moisture losses, builds up soil organic matter, controls weeds, and reduces wind erosion hazards. But primarily it makes for greater stability in yields. The Canadians use a shallow duck-foot weeder machine which deposits a stubble mulch on the soil surface. Such machines are not yet in serial production in the Soviet Union, so fallowing there is generally done by heavy discing operations, or simply letting the weeds grow.

Weed infestation is a serious problem in both areas. A decade of monoculture has sprouted an alarming growth of wild oats, which even impedes the movement of combines in the virgin lands. The Canadians admit they are just able to keep ahead of the weeds, even when 90 percent of the province's grain area is sprayed with herbicides. Weed spraying is still in its infancy in the Soviet Union, as the December (1963) plenum on the chemical industry indicated.

Canadian seed stocks are of a high order. Only adapted seed may be sold. The stress has been on quality wheat rather than on heavy yielding varieties. Improved strains of Selkirk constitute 85 percent of all seed sown. By contrast, only 58 percent of the wheat sown in the Tselinnyi krai in 1962 was of adapted, certified seedstock.<sup>28</sup> It is difficult to understand why a leading wheat nation cannot stock its socialized farms with such a basic essential - quality, adapted seed. Producing fertilizers and herbicides would seem far more difficult.

### The Soviet Counter-Measures

The disparity between the determining production factors of the two systems is readily apparent. The Soviets lag far behind the Canadians in the volume of essential resource inputs available to the grain economy. But it does not follow that they need remain so.

Of Khrushchev's latest, and most rational, proposal to lift agricultural output by an expansion in the use of fertilizers and irrigation, the new lands will hardly benefit. Chemical fertilizers are hardly used on any scale in dry land farming. Fertilizer needs moisture to make its nutrients available to plants. The Saskatchewan farms pay more attention to timely and optimal seed-bed preparation and other cultural crop practices than to fertilizers, although the land has been farmed for half a century. True, some nitrogen is being used in the more moist regions of the province to give the wheat seedlings a better start but the applications are minimal. Fertilizer, then, will be of no great assist in raising grain yields in the new lands. Irrigation, however, could be beneficial for row crops. Large scale cultivation of small grains is likewise not adapted to irrigation; only the floodable crops (rice) and the inter-tilled crops (maize, some pulses) are grains readily watered. The rotating sprinkler system is designed primarily for commercial crops, and could be advantageous in suburban commercial farming. Alongside the logistical limitations of irrigation in the territory, the task of channeling irrigation water into so vast an area short of rivers, lakes, and swamps would seem a prohibitive undertaking. Irrigation projects in Kazakhstan would better be left to the warm areas of the republic.

As the principal yield stabilizer of grain crops, fallowing must be extended. Soviet thinking to date is based on an expansion of about 15 to 20 percent of the cropland as fallow. However, short cuts are always advanced. For example, Khrushchev suggested at the January (1961) plenum to grow peas on

fallow land.<sup>29</sup> The success of the Canadian experience in fallow is that all vegetation be controlled and left as a stubble mulch. It is the harvesting and removal of a crop that causes the damage. The Soviets must face the issue straight away: to retire to fallow each year at least 40 percent of the cropland in the Tselinnyi krai in order to insure a sustained rise in grain yields. The Canadian experience demonstrates that there is no short cut in fallowing.

The application of herbicides cannot be too soon as the infestation of the pernicious wild oats has done severe damage to the grain industry. Here, too, the Canadian experience shows that the weeds are difficult to master and require constant efforts at eradication, in addition to 40 percent cropland in fallow.

Some Soviet agricultural planners recognize that grain specialization is the only alternative for the large scale state farm system in the new lands. Yet the official thrust has been on "two tselinny": livestock production, notably sheep raising. This may seem rational at first sight, but the feed problem is the limiting factor and it works adversely against the grain enterprise. For unlike Canada, where the straw after combining is left on the soil as organic matter, in the Tselinnyi krai, as almost everywhere in Russia, the straw is harvested as feed for livestock because native grass hay yields are extremely low. This practice drains the fertility, as well as damages the structure of the soil. The valuable legume hay crops, alfalfa and clovers, cannot be grown under the krai's severe weather conditions. A decision on this issue must be made: either grain or livestock farming, as separate specialized units. The Canadian experience shows that straw mulching is essential to normal yields and that livestock farming had better be left to the foothill regions or specialized farms. A decade of exploitation, monoculture and mining of the soil by almost total crop removals must be corrected. Unless, of course, reversion to the natural grassland cover is intended. But the task before Tselinnyi agriculture is explicit by Party order: raise grain output "in the near future" to 21.8 million tons, or two and a half times the 10 year average!<sup>30</sup>

### CONCLUSIONS

The productivity of the Virgin Land territory is much below that of an analogous grain region, Saskatchewan, and is not likely to reach the Canadian level in the next decade or two, if ever. The superiority of the family type farm system as an efficient operating unit is strikingly demonstrated over the socialized agricultural order.



In the short run, the Virgin Land program was politically successful. It provided a decisive rise in marketable grain at a time when reserves were nearly exhausted. The bumper harvest of 1956 in the new lands strengthened Khrushchev's position within the Central Committee and enabled him to defeat the "anti-Party" faction the following year. Two successive bad harvests would likely have caused his downfall in 1957.

x x x

Although the ten year grain average indicates that the prime costs of production were approximately covered, the aggregate costs of the program exceed the returns. Nonetheless, again in the short run, the venture was economically advantageous. In part, it was responsible for the total rise in agricultural output, and it spread the risks inherent in Soviet farming. However, since 1959, the performance has taken on an acutely regressive trend. Yields have shown a persistent decline, dust storms have become more frequent, most farms operated at a loss. True, one good year could set things right temporarily. But a change in policy to counter the alarming downward drift seems imperative if the lands are to remain productive.

x x x

Neither fertilizers nor irrigation will furnish the decisive solution. Dry land farming is not adapted to widespread use of chemical fertilizers; nor is small grain farming adapted to irrigation. Irrigation offers some possibilities in selected areas on row crops. But the new lands are distant from water sources. Herbicides for weed control look promising but are only one of many essential inputs required.

x x x

If the Canadian model demonstrates the need for any essentials, it is fallowing and proper soil tillage practices to restore the depleted organic matter and build up the soil structure. At least 40 percent of the Tselinnyi cropland ought be in fallow each year.

x x x

Again as many tractors and heavy machinery are necessary to insure the optimal and timely field operations. Over-mechanization is virtually necessary, as the Canadian pattern shows, to overcome the limitations of weather during the seeding and harvesting periods.

x x x

Restoring the consequences of a decade of exploitative monoculture farming will take time, new technology, and a continuous and massive flow of capital into the new lands. And the human factor cannot be assuaged with slogans. The incentive and initiative sparks, so dynamic in the Canadian model, need fertilization and irrigation in the Virgin Lands. The task is formidable and urgent or else a large share of the new lands may revert back to their native grassland cover.

CZ

APPENDIX

The politics of Kazakhstan are grain.

Nothing succeeds like a good harvest. And a crop failure can wreck a promising party career with the dessicating force of a "sukhovey."

As a measure of the dissatisfaction of the Kremlin with the failure of top party officials to resolve the grain problem, the turn-over among the top party leadership in Kazakhstan far exceeds that of other union republics. Confronted with steadily declining yields, the widening gap between performance and plan, and mounting deficits on the farms, the familiar cycle of accusations and dismissals has followed with seasonal regularity.

Khrushchev has put the blame on the failure of leadership. His slogan, "Cadres Decide All," can be put to a test by a roll-call of the party chiefs in Kazakhstan for the past decade.

TENURES OF FIRST SECRETARIES OF THE CC, CP KAZAKHSTAN

<u>Date</u>	<u>Name</u>	<u>Present Position</u>
1952 to April 1954	Shayakhmetov, Zh.	Unknown
April 1954 to May 1955	Ponomarenko, P.K.	Unknown
May 1955 to March 1956	Brezhnev, L.I.	Chairman of the Supreme Soviet, Member of the Presidium, and Secretary, CC, CPSU
March 1956 to Dec. 1957	Yakolev, I.D.	Unknown
Dec. 1957 to Jan. 1960	Belyaev, N.I.	Unknown
Jan. 1960 to Dec. 1962	Kunaev, D.A.	Resumed his old post as Chairman of the Kazakh Supreme Soviet after dismissals
December 1962	Yusupov, I.	-

Seven men have occupied the First secretary posts in the decade. With one exception the job has proved a burial ground for the apparatchiki. Four of these once powerful figures have disappeared into political anonymity. The only exception is L.I. Brezhnev, who spent two years in the republic, first as second secretary and later as First secretary. His two year term of duty brought him to the pinnacle of power - member of the Presidium, secretariat of the CC, and Chairman of the Supreme Soviet. His record showed one average harvest and one dismal failure.



# FOOTNOTES

1) The accumulated deficit between planned and realized State purchases of grain during the first five years of the current plan is over 55 million tons of grain.

2) For example, in English alone, see, among others, papers by Harris, Volin, Johnson, Schiller, "The Resources and Performance of Soviet Agriculture," Journal of Farm Economics, May 1956, pp. 258-309; W.A.D. Jackson, "The Virgin and Idle Lands Program Reappraised," Annals of the Association of American Geographers, LII (1962), 69-79; and F. Durgin, "The Virgin Lands Program, 1954-1960," Soviet Studies, XIII (1961-1962), 255-80.

3) Compare, for example, the expansion of cropland in such old farming areas in the eastern Virgin land regions:

	<u>Million Hectares</u>	<u>Increase in</u> <u>percent over</u>	
	<u>1953</u>	<u>1959</u>	<u>1953</u>
Orenburg oblast	4.2	5.5	31
Omsk oblast	2.8	4.8	50
Altai krai	4.6	7.4	61

Selkhoz 1960, p. 506.

4) G. Melnik, Pravda, 4 December 1963.

5) Ekonomika selskogo khozyaistva, No. 6, 1961, p. 12  
Narkhoz 1958, p. 357.

6) Narkhoz 1963, p. 293.

7) Estimated from data in Narkhoz 1962, pp. 274, 289.

8) Ekonomika selskogo khozyaistva, No. 6, 1961, p. 10.

9) Pravda, March 6, 1954; resolution dated 2 March 1954.

10) As revealed in his private interview with the English scientist, John Bernal, held on 25 September 1954 but not published until 24 December 1954 (Pravda, et al), after Bernal had released his version in The Times. In this remarkable interview, Khrushchev defended the views of Stalin and Malenkov,

who, at the 18th and 19th Party Congresses, had declared the grain problem was solved. He said there was no contradiction between these assurances and the decision of the February-March (1954) plenum to enlarge the grain area by plowing up the virgin lands - the added grain was needed for the livestock program. By the December (1958) plenum and the 21st Party Congress, Khrushchev had reversed his position full turn and condemned both spokesmen for proclaiming the grain problem as solved.

11) Selkhoz 1960, p. 214.

12) Pravda, 15 February 1956, 20th Party Congress.

13) Ekonomika selskogo khozyaistva, No. 6, 1961, p. 19.

14) Derived from Selkhoz 1960, pp. 510-1, 518-9, 530-1.

15) First secretary of the Kazakh CC, Belyaev, at the December (1959) plenum disclosed that the unfavorable weather conditions in the krai prolonged the harvest to 40 to 50 days and beyond. (Pravda, 23 December 1959).

16) An early analysis of the Soviet methodology of determining the basic yield appeared in an unpublished RFE research paper, Grain Harvest Caveat, USSR (15 July 1959). It was suggested that from 10-15 percent of the claimed national yields as determined (at the combine) consisted of excessive moisture and impurities. For the new regions the discount would be higher in some years. If corn silage equivalents were included, the revision factor would be greater. For a later and more fully documented study of the moisture-foreign matter factor in estimating these grain yields, see A. Kahan, "Soviet Agricultural Statistics," in Soviet Agricultural and Peasant Affairs, University of Kansas, 1963, ed. by Laird, pp. 143-144.

17) For example, Pavlodar Oblast, with almost a fifth of the krai's grain area, and an average yield of 1.8 quintals per hectare in 1963, just sufficient to replace the seed use. This abysmal yield implies that some areas went unharvested. Yusupov, Kazakhstanskaya Pravda, 12 November 1963.

18) Pravda, 18 December 1958.

19) Ekonomika selskogo khozyaistva, No. 6, 1961, p. 19. The data refer to production costs in sovkhozy in the territory for 1959.

20) Pravda, 23 December 1959.

21) Ekonomika selskogo khozyaistva, No. 10, 1963, p. 26. Iter alia, actual production costs exceeded planned costs by 1.89 rubles a quintal in 1961, and 2.64 rubles in 1962. The state purchase price appears to be 4.80 rubles a quintal.

22) Rainfall distribution in the krai is rather disadvantageous. Maximum precipitation comes in July-August, when 40 percent of the annual rain occurs. May and June - the critical months - account for 20 percent. Baraev, Pravda, 13 February 1964.

23) By a strange trick of fortune, 1963 brought extremes to each area: Saskatchewan registered its record all-time harvest - 18.5 quintals of wheat; the Tselinnyi krai, had an object failure - 3.1 quintals of grain. (Foreign Agriculture, USDA, 20 January 1964, p. 3)

24) I am especially indebted to the Department of Agricultural Economics, University of Saskatchewan, for the supporting statistics. The selection and interpretation of these data are, of course, my responsibility.

25) Pravda, 14 February 1964.

26) Op. cit., No. 6, 1961, p. 5.

27) Sokolov, Pravda, 12 January 1961.  
Yusupov, Kazakhstanskaya Pravda, 12 November 1963.

28) Op. cit., No. 12, 1962, p. 20.

29) At the height of his anti-fallow/grasslands campaign, he exhorted farm officials in a speech at Tselinograd: "Take a risk, the less fallow the better." Pravda, 24 November 1961.

30) Yusupov, Pravda, 12 December 1963.