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FOREIGN AGRICULTURE ECONOMICS

SOVIET GRAIN IMPORTS

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SUMMARY AND CONCLUSIONS

The Soviet Union has become a large importer of wheat since the disastrous harvest of 1963. Prior to that it had been a major wheat exporter principally to communist countries. While exports to these countries have continued they have been greatly reduced and those to non-communist countries practically stopped. Soviet grain imports in the past have been small and primarily for the grain deficit Far Eastern regions. The conversion of the Soviet Union from a major wheat exporter to a major importer, although in large part caused by adverse weather, is an important reversal of traditional international grain trade patterns which raises a number of questions as to causes and the future outlook. This report analyses these questions through an examination of production, utilization and government procurements of wheat and rye, both major food grains in the Soviet Union.

The analysis supports the contention of western specialists, including those of the U.S. Department of Agriculture, that the Soviet official grain production figures are inflated. On the basis of Soviet production figures, considerable stocks of wheat and rye would have been accumulated, making large imports unnecessary. The lower USDA production estimates indicate a low stock position by 1963 making imports necessary when a crop failure materialized. The system of collective farm organization and management and the government policy of providing inadequate incentives, capital investment and other inputs, and improper farm practices are responsible for the general low level of yields. While yields have remained low food grain requirements have increased because of rapid population growth and continued large exports. These factors militated against building up stocks which made imports necessary in 1963-64. Even the good 1964 harvest did not provide an adequate margin for building up depleted stocks. The Soviet Union was again confronted with bad weather and a poor bread grain crop in 1965, although it is estimated to be somewhat better than 1963, which resulted again in substantial imports. Essentially the same results are obtained by the analysis of government procurements.

The future outlook will depend upon the ability of the Soviet government to raise the very low yields of wheat and rye. Measures adopted toward the end of the Khrushchev regime and the agricultural program of his successors provide for much larger inputs of fertilizer, machinery, and capital, increased irrigation, improved plant varieties, and higher incentives. Expanded production of bread grains has been emphasized in this program. The impact of these measures may have suffered a setback due to the poor 1965 harvest, but if carried out moderately well during subsequent years, a modest increase in yields by 1970 can be anticipated. Even a small increase in yields is magnified by the huge acreage into a large addition to output. This would make large imports of wheat unnecessary and could result in a surplus by 1970, despite the increased requirements for human consumption and other uses. But, several years of poor weather between the present and 1970 may seriously alter the picture and could necessitate further imports. Surpluses could develop if several years of good weather occur. Under average weather conditions, the most likely prospect for the future is that grain imports by the USSR will decline.

Trends in Soviet Grain Trade

The Soviet Union has historically been a leading grain exporting country. However, continuing wheat imports during the last 3 years by the Soviet Union, raise the question of the causes for this reversal of a traditional pattern and how the outlook for the years ahead may be affected.

During the 1963-64 crop year, the Soviet Union imported about 11 million metric tons of wheat and flour, more than half from Canada (table 1). These imports were attributed to a crop failure in 1963, coming after several mediocre harvests. (Soviet grain imports for 1955-59 and 1960 to 1963 are presented in table 2.) However, substantial Soviet exports also took place during 1963-64 (tables 3 and 4). Imports of wheat have continued during the relatively good crop year of 1964-65. From the fall of 1964 and through June 1965, the Soviet Government purchased about 3.2 million metric tons of wheat and flour in Canada, Australia, and Argentina and, to a lesser extent, in France.

Most of the 1.3 million tons of wheat bought in Australia is likely being shipped to Soviet Pacific ports for use in the grain-deficit Far Eastern territory. The territory has imported wheat for many years, though in smaller quantities, because of its remoteness from the Soviet surplus-producing regions. During July and August 1965, the Soviet Union contracted for shipments during 1965-66 from Canada of about 6.1 million tons of wheat and flour in grain equivalent, 1.1 million tons of wheat from Argentina, and 300,000 tons from France, or a total of about 7.5 million tons.

In dealing with Soviet trade data it should be kept in mind that, although a purchase is recorded as an import, it need not physically be imported. The Soviet Union frequently buys grain in one country for direct shipment to another--for example, Canadian wheat to Cuba. Another recent example is diversion of purchased grain to Egypt. As far as our analysis is concerned, it makes little difference whether the Soviet Union actually exports 3 million tons of its own wheat and imports wheat to offset this, or whether it buys wheat abroad to cover export commitments and retains its own wheat for domestic use.

Table 1.--Soviet Union: Imports of wheat and flour, by source, fiscal 1963-64

Source	:	Volume	::	Source	:	Volume
	:		::		:	
	:	1,000 metric tons	::		:	1,000 metric tons
United States <u>1/</u>	:	1,752.2	::	Belgium	:	-
Canada	:	5,656.1	::	Denmark	:	6.6
Australia	:	1,522.9	::	Mexico	:	-
Argentina	:	9.6	::	Rumania	:	400.0
France	:	148.3	::	Sweden	:	-
Germany, West	:	402.0	::	Switzerland	:	-
Italy	:	14.3	::	Others	:	499.0
	:		::	Total	:	<u>2/</u> 10,411.0
	:		::		:	

1/ Includes transshipments through Canada.

2/ The total is recorded shipments; it is slightly below the more than 11 million tons of grain commonly referred to as the imports caused by the 1963 crop failure.

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

Table 2.--Soviet Union: Wheat, rice, and coarse grain imports from Bloc and non-Bloc countries, average 1955-59, annual 1960-63

Commodity and source	:	1955-59	:	1960	:	1961	:	1962	:	1963
	:	average	:		:		:		:	
	:		:		:		:		:	
	:	- - - - -	:	-1,000 metric tons	:	- - - - -	:	- - - - -	:	- - - - -
Wheat, total <u>1/</u>	:	232.9	:	98.0	:	655.9	:	73.1	:	3,402.5
Bloc <u>2/</u>	:	31.9	:	98.0	:	167.2	:	48.1	:	454.9
Non-Bloc	:	201.0	:	-	:	485.6	:	-	:	2,751.4
Other	:	-	:	-	:	3.1	:	25.0	:	196.2
	:		:		:		:		:	
Rice, total	:	537.0	:	501.1	:	19.9	:	337.5	:	193.3
Bloc	:	412.5	:	450.9	:	19.9	:	150.2	:	-
Non-Bloc	:	124.0	:	50.2	:	-	:	179.4	:	171.2
Other	:	.5	:	-	:	-	:	7.9	:	22.1
	:		:		:		:		:	
Coarse grains, total <u>3/</u>	:	165.0	:	142.4	:	22.8	:	1.1	:	50.4
Bloc	:	109.5	:	104.5	:	3.8	:	-	:	-
Non-Bloc	:	55.3	:	35.2	:	18.8	:	-	:	-
Other	:	.2	:	2.7	:	.2	:	1.1	:	50.4
	:		:		:		:		:	

1/ Includes flour converted to grain.

2/ Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, Rumania, Communist China, Mongolia, North Korea, North Vietnam, and Cuba.

3/ Rye, barley, oats, and corn.

Source: Vneshnyaya trgovlya SSSR za 1955-59 and subsequent years.

Table 3.--Soviet Union: Exports of wheat and flour in terms of grain and other grains^{1/}, average 1955-59, annual 1960-63

Commodity and source	1955-59 average	1960	1961	1962	1963
----- 1,000 metric tons -----					
Volume:					
Wheat flour:					
Total	3,861.4	5,674.7	5,135.4	5,100.3	4,449.2
Bloc	2,887.5	4,324.7	3,607.9	3,502.2	3,191.3
Other	983.9	1,350.0	1,527.5	1,598.1	1,257.9
Other grains:					
Total	1,510.0	1,170.2	2,680.3	3,049.1	2,154.3
Bloc ^{2/}	1,029.8	722.1	1,508.0	2,497.9	1,784.7
Other	480.2	448.1	1,172.3	551.2	369.6
----- Percent -----					
Share:					
Wheat and flour:					
Total	100.0	100.0	100.0	100.0	100.0
Bloc ^{2/}	74.6	76.2	70.3	68.7	71.7
Other	25.4	23.8	29.7	31.3	28.3
Other grains:					
Total	100.0	100.0	100.0	100.0	100.0
Bloc ^{2/}	68.2	61.7	56.3	81.9	82.8
Other	31.8	38.3	43.7	18.1	17.2

^{1/} Other grains are rye, barley, oats, and corn.

^{2/} Bloc countries, 1955-59, are Albania, Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, Rumania, Communist China, Mongolia, North Korea, and North Vietnam. Since 1960, Cuba has been added to this list.

Source: Vneshnyaya trgovlya SSSR za 1955-59 and subsequent years.

Table 4.--Soviet Union: Exports of principal grains and flour, in terms of grain, selected time periods

Time period	Wheat including: flour	Rye including: flour	Barley	Oats	Corn	Total grain and flour
----- Million bushels -----						1,000 metric tons
Year beginning July 1:						
1904/05-1908/09	125.3	38.7	114.6	72.7	20.3	8,458
1909/10-1913/14	165.7	34.5	172.9	70.8	28.4	10,898
1924/25-1928/29	16.3	6.5	12.3	1.7	4.7	1,021
1929/30-1933/34	49.1	19.0	30.8	12.6	5.7	2,816
1934/35-1937/38	20.4	5.2	12.1	5.0	.1	1,030
1955/56-1959/60	142.2	21.0	27.2	11.8	8.4	5,381.5
Calendar year:						
1960	208.5	26.9	14.9	2.9	4.8	6,844.9
1961	188.7	42.8	46.2	12.4	16.0	7,815.7
1962	187.4	51.2	21.4	1.7	49.5	8,149.4
1963	163.5	32.1	27.3	1.5	28.5	6,603.5

Source: Volin, Lazar, A Survey of Soviet Russian Agriculture, Agriculture Monograph No. 5, USDA 1951. p. 180. Vneshnyaya trgovlya SSSR za 1955-59 gody. Moscow 1961. Vneshnyaya trgovlya SSSR za 1961 god, and subsequent years. Moscow.

Before 1963, the Soviet Union was a substantial exporter of wheat and other small grains. Its export trade dates back to the 19th century and became particularly heavy during the early 1900's. During the 5 years preceding World War I, Russia exported 166 million bushels of wheat and flour, 173 million bushels of barley, 71 million bushels of oats, 34 million bushels of rye, and 28 million bushels of corn--a total of 10.9 million metric tons (table 4). During the interwar period, marked by the revolution, civil war, and ruthless agricultural collectivization, Soviet exports of wheat and other grains were much smaller and in some years nonexistent. They were also small or nonexistent following the devastation of World War II. After the mid-1950's, the Soviet Union again became an important exporter of grain, but shipped it mainly to Communist countries. However, exports to non-Communist countries had also been increasing prior to 1963.

All its foreign trade transactions, of course, involve decisions by the Government which may be motivated not only by economic but also by political considerations, as illustrated by the recent shipment of imported wheat to Egypt.

Production and Utilization of Bread Grains and Imports

Analyzing the Soviet grain situation is difficult because of the unreliability of Soviet crop statistics and the paucity or fragmentary character of utilization data. Foreign trade figures are the sole exception; they are published for the calendar year, but are usually many months late. By recently changing the reporting of grain production, the USSR has clearly indicated that its published data are inflated. ^{1/} The U.S. Department of Agriculture and practically all western specialists have recognized this fact. These difficulties with official Soviet statistics have long made it necessary for USDA to develop production and utilization estimates of its own. While they can be only rough approximations because of the magnitudes involved and inadequate information, USDA figures are probably nearer to reality than the Soviet statistics. They explain the import situation much better, as demonstrated below. Since rye is an important bread grain in the Soviet Union, second only to wheat, data on the production and utilization of these two grains were combined in the following statistical analysis.

Two balances were prepared for 1954 through 1963 (tables 5 and 6). One is based on the published wheat and rye production figures by the Soviet Union; the other is based on USDA estimates. Identical utilization estimates are used in both balances, except that the larger production indicated by the official Soviet figures also leads to a larger amount of waste on the basis of the same 5 percent factor. Since there is no information on stocks, they are treated as residual items. Note the striking difference between the two residual balances after all utilization items, which could be estimated, have been accounted for. The substantial residual in the Soviet-based balance grew rapidly during the

^{1/} Walters, Harry, Foreign Agriculture, U.S. Dept. Agr. March 22, 1965, pp. 3-4

Table 5.--Soviet Union: Wheat and rye balance, 1954-63. Official Soviet production data

Disposition	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963 ^{1/}
----- Million metric tons -----										
Production:										
Wheat and rye ^{2/}	58.9	63.7	81.5	72.6	92.3	86.0	80.6	83.2	87.5	61.6
Utilization:										
Waste ^{3/}	2.9	3.2	4.1	3.7	4.6	4.3	4.0	4.1	4.4	3.0
Seed ^{4/}	11.8	11.9	12.9	12.5	11.8	11.3	11.8	12.5	12.4	12.4
Industrial use ^{5/}	2.4	2.4	2.5	2.6	2.6	2.7	2.8	2.9	3.0	3.1
Total	17.1	17.5	19.5	18.8	19.0	18.3	18.6	19.5	19.8	18.5
Domestic food consumption ^{6/}	37.3	37.9	38.6	39.3	40.0	40.6	41.4	42.1	42.7	43.4
Net trade ^{7/}	2.8	1.5	5.8	4.1	6.4	6.2	5.5	6.3	4.0	3.0
Total	57.2	56.9	63.9	62.2	65.4	65.1	65.5	67.9	66.5	65.0
Residual (production minus utilization) available for stocks, feed, and other uses.	1.7	6.8	17.6	10.4	26.9	20.9	15.1	15.3	21.0	-3.4
Accumulated residual	1.7	8.5	26.1	36.5	63.4	84.3	99.4	114.7	135.7	132.3

^{1/} Estimates for utilization items only.^{2/} Official Soviet production data.^{3/} Waste is assumed at 5 percent of production.^{4/} Seeding rate of 1.5 centners per hectare for wheat and 1.4 centners per hectare for rye assumed. Seed is taken from one year's crop for following year's sowing.^{5/} Based on Khrushchev's stated figure of 4 million tons of grains for industrial uses in 1954. It is assumed that wheat and rye account for 60 percent. Furthermore, it is assumed that industrial use increased to 5 million metric tons by 1962.^{6/} Domestic consumption 190 kilograms per capita of wheat and rye is assumed. The midyear population of the following year is used.^{7/} Net trade for the following year, except for 1962 and 1963 for which only exports considered.

Table 6.--Soviet Union: Wheat and rye balance, 1954-63. USDA estimates

Disposition	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
----- Million metric tons -----										
Production:										
Wheat	36.5	42.1	53.9	49.7	62.6	51.7	46.3	52.3	54.4	40.0
Rye	15.6	16.5	14.1	14.5	15.7	15.2	13.2	15.2	13.7	12.0
Total	52.1	58.6	68.0	64.2	78.3	66.9	59.5	67.5	68.1	52.0
Utilization:										
Waste ^{1/}	3.2	3.0	3.5	3.3	3.9	3.3	3.0	3.4	3.4	2.6
Seed ^{2/}	11.8	11.9	12.9	12.5	11.8	11.3	11.8	12.5	12.4	12.4
Industrial use ^{3/}	2.4	2.4	2.5	2.6	2.6	2.7	2.8	2.9	3.0	3.1
Total	17.4	17.3	18.9	18.4	18.5	17.3	17.6	18.8	18.8	18.1
Domestic food consumption ^{4/}	37.3	37.9	38.6	39.3	40.0	40.6	41.4	42.1	42.7	43.4
Net trade ^{5/}	2.8	1.5	5.8	4.1	6.4	6.2	5.5	6.3	1/4.0	3.0
Total	57.5	56.7	63.3	61.8	64.9	64.1	64.5	67.2	65.5	64.5
Residual (production minus utilization) available for stocks, feed, and other uses.	-5.4	+1.9	+4.7	+2.4	+13.4	+2.8	-5.0	+0.3	+2.6	-12.5
Accumulated residual	-5.4	-3.5	+1.2	+3.6	+17.0	+19.8	+14.8	+15.1	+17.7	+5.2

^{1/} Waste is assumed at 5 percent of wheat and rye production. ^{2/} Seeding rate of 1.5 centners per hectare for wheat and 1.4 centners per hectare for rye assumed. Seed is taken from one year's crop for following year's sowing. ^{3/} Based on Khrushchev's stated figure of 4 million tons of grains for industrial uses in 1954. It is assumed that wheat and rye account for 60 percent. Furthermore, it is assumed that industrial use increased to 5 million metric tons by 1962. ^{4/} Domestic consumption of 190 kilograms per capita of wheat and rye is assumed. The midyear population of the following year is used. ^{5/} Net trade for the following year, except for 1962 and 1963 for which only exports considered.

1954-63 decade. The balance based on USDA estimates shows a much smaller residual, and it is negative for 1954 and 1960. If the residuals are made cumulative over the whole period, those derived from Soviet sources amount to a huge figure of about 135 million metric tons. In the balance based on USDA estimates, the residual totals less than 18 million. Since there was a deficit of 12.5 million tons in 1963, the residual at the end of that crop year amounted to only a little over 5 million tons. The implication of the balance based on the official Soviet figures is that unaccounted for grain would be equal to more than 2 years' needs, provided, of course, that the utilization estimates are approximately correct.

It is difficult under such conditions to see why the Soviet Union would have spent large amounts of gold and foreign exchange for wheat if it had stocks anything like those that the balance based on official figures would indicate. Khrushchev stated, after the imports were announced, that "If we had the wheat we would not be buying it".^{2/} Conversely, the balance based on USDA production figures indicates only modest stocks, particularly in the light of the sharp production decline in 1963. Thus, the USDA estimates reflect the USSR's need for heavy imports of wheat during 1963-64.

The balances were constructed on what seem to be minimum assumptions for waste, seed, and the feeding of wheat and rye grain, of edible quality, to livestock. We are well aware that there are other utilization assumptions which could be made. The subject of utilization of agricultural commodities in the Soviet Union is under intense study and will be the subject of a separate publication. But, it is important to point out that the information which can be gleaned from Soviet sources is conflicting. (See appendix A. page 14).

For 1964, USDA estimates indicate that bread grain utilization requirements were between 65 and 66 million metric tons. This included an assumed 3.3 million tons exported to the grain-deficit Communist countries. With production estimated at close to 70 million tons, this would have left only between 4 and 5 million tons for stockpiling purposes or other uses. Such a margin would most likely be considered inadequate, since stocks were doubtless running very low following the crop failure in 1963.

The 1965 situation, at least in its broad outlines, is now fairly clear. In many regions of the country the grain crop has suffered from weather conditions comparable to those of 1963, especially in the new lands regions. In some regions of European Russia drought has hurt crops while in others heavy rains caused damage. For the total 1965 bread grain crop the outlook is not as bad as in 1963, but considerably below the level of 1964. The output of wheat and rye in 1965 is estimated at this juncture to be roughly 5 to 7 million tons short of estimated requirements. The imports of wheat reported through August 1965 appear to be covering this gap.

^{2/} Pravda, October 27, 1963

There have also been a number of policy changes, especially with respect to procurements, which may result in the Government's purchasing a somewhat smaller share of the domestic wheat and rye crops this year than in past years, which is dealt with more fully in the section on procurements. This may account for larger grain needs this year than might be expected from the gap indicated above. In any case, it is clear the large imports of wheat during 1965-66 are the result of the Soviet Union's inability to satisfy its requirements from domestic sources.

USSR Grain Procurements and Imports

So far, we have analyzed imports by relating them to total production and utilization of bread grains. But there is another analytical approach--through examination of Soviet Government procurements and their utilization.

Exports and imports of grains in the Soviet Union are a function of the supply of grain available to the Soviet Government and its needs for grains, although the total output of grains is a major conditioning factor. Out of each year's harvest of food grains (primarily wheat and rye, but also smaller quantities of millet, buckwheat, and rice) the Soviet Government procures (purchases) a major portion of the total. These procurements are reported by the Soviet Union in terms of a standard accounting weight (zachotny ves) which is supposed to measure the grain in terms of a uniform moisture content, and to exclude excess trash and other foreign matter. Out of these procured food grains the Government must meet the following needs: (1) The supply of grains for human consumption by that portion of the population, including the military, dependent upon state supplies -- about three-fourths of total flour and groats production at present; (2) a major proportion of the industrial uses of food grains; (3) all exports of food grains by the Soviet Union; and (4) a variety of uses which can best be identified as "returns to the farm" for seed and other purposes. The Government's supply is augmented by imports.

There are difficulties in dealing with procurements, just as there are in dealing with total production. Because procurements are reported in accounting weight^{3/}, the weight of the reported grain procured can differ greatly from the physical weight of the grain. For example, planned procurements of grain in 1963 were to be ⁷⁴ million tons in accounting weight and 82 million tons in physical weight.^{4/} Actual procurements were 44.8 million tons. Since a large portion of the moisture and foreign matter are eliminated in procurements, there should be a fairly close relationship between a ton of grain in terms of zachotny ves and a ton of grain as estimated by USDA

For the years 1950-53, 1955, and 1958 through 1962 we have Soviet statistics of the quantities of grain procured by type. For other years the data indicate only total grain procurements and the amount of wheat procured. Figures reported, along with estimates where official statistics are lacking, are

^{3/} There is some question regarding whether procurements are always given in accounting weight, but this is generally assumed to be the case, and Soviet statistical handbooks so state.

^{4/} Zakupki sel'skokhozyaystvennykh produktov 1963, No. 3, p. 4.

given in table 7. These data over the past 8 years, beginning with the peak grain harvest year of 1958, are instructive in a number of important respects.

Table 7.--Soviet Union: Grain procurements by type, 1958-64

Procurements	1958	1959	1960	1961	1962	1963	1964	1965
<u>Million metric tons</u>								
Total grain ...	56.6	46.6	46.7	52.1	56.6	44.8	68.2	<u>1/</u> 55.9
Food grains:								
Wheat	41.9	34.2	30.2	33.3	34.6	22.7	38.7	
Rye	5.6	6.4	5.8	7.2	7.5	(5.1)	(5.7)	
Other	1.6	.6	1.4	1.8	1.5	(0.5)	(2.0)	
Total ...	49.1	41.2	37.9	42.3	43.6	(28.3)	(46.4)	
Feed grains ..	7.5	5.4	8.8	9.8	13.0	(16.5)	(21.8)	

1/ Reduced procurement plan announced in the new program for agriculture after the fall of Khrushchev. Additional purchases at higher prices are contemplated.

2/ Figures in () are estimated on the basis of crop conditions and reported output. Both 1963 and 1964 were bad years for rye production.

3/ Other food grains include millet, buckwheat, and rice.

Only in 1964 did total grain procurements exceed the level of 1958, and only in 1962 did they match that level. The new program, announced by the present Soviet leadership, calls for reduced fixed procurements of grain for 1965 and the remainder of this decade. This indicates the heavy pressure that was exerted upon farms in recent years, and explains in part why it has been necessary to return some of the procured grain to the farms. The new program makes it clear, however, that this level of grain procurements will not cover the Government's needs for grain. In an effort to augment State grain supplies regular procurement prices were raised and a premium of 50 percent is to be paid for extra quota deliveries of wheat and rye.

It is evident from table 7 that food grains as a percentage of total procurements have been falling rapidly since 1958. At no time, not even in the very good year of 1964, did procurements of food grains reach the level of 1958. This is important, because the needs of the Soviet Government for food grains have been increasing fairly rapidly throughout this period for a variety of reasons discussed below. Another important thing to notice is that the drop in wheat procurements between 1962 and 1963 was 11.9 million tons, approximately the amount of wheat purchased as a result of the 1963 crop failure. This points up the relationship between state procurements and imports and exports. Finally, even though 1964 was a good year and total grain procurements were 20 percent above the highest previous year, 1962, reported pro-

curements of wheat were only 12 percent above 1962 and total food grain procurements estimated at only 6 percent greater.

On the basis of procurement figures alone, even with a good grain year in 1964, the Soviet Government evidently was in only a slightly better position regarding food grains than it was at the end of the 1962 harvest. Regardless of the Government's stocks in 1962, it was necessary to import over 11 million tons of wheat to cover the deficit from the 1963 harvest. It would stand to reason, therefore, that should the Soviet Union suffer another poor harvest or a harvest even somewhat below that of 1964, imports would again be necessary. They would vary in magnitude with the extent of the crop shortfall, any economies achieved in utilization, and possibly with the level of world prices.

Utilization of Food Grain Procurements

The Soviet Government is no more generous with information about the utilization of its procured supplies than it is about the utilization of grain in general; but the major uses can be fairly closely approximated -- human consumption, industrial uses, and exports. The major unknown is the volume of stocks; this is kept secret by the Soviet Government. However, since the Soviet Government is responsible for the major supply of food grains -- a large part of civilian consumption, military needs, exports, and other uses -- it is reasonable to assume that stocks would never be permitted to decline to zero and that every effort would be made to maintain several million tons as an irreducible minimum. In 1963, Khrushchev indicated that in his view 80 to 100 percent of a year's needs would be sufficient stocks, but stocks have undoubtedly been far below this level in recent years.

The conclusions reached on the basis of total output and its utilization and on the basis of food grain procurements are reinforced by an analysis of the major uses of procured food grains.

In table 8, estimates of basic utilization items are matched against the amount of food grains procured. This is done so that the uses are deducted from the year's procurements from which they are primarily obtained. For example, most grain exports appear in the Soviet statistics in the year following the year they are procured. This is also true of much of the grain milled into flour or groats. Thus, the crop is procured in the last half of the calendar year and consumed mostly during the following year. Industrial uses are deducted from the procurements on an annual basis, since they are assumed to differ only slightly from year to year and the utilization lag is shorter. Total utilization (line 6, of table 8) indicates the utilization out of that year's procurements; the residual (line 7) indicates how these annual surpluses and deficits cumulated as time progressed.

Demands upon the Government supply of food grains (line 6) have increased substantially during this period because: (1) The population has increased rapidly -- by 24.2 million from January 1, 1958, to January 1, 1965 -- and the urban population has increased even more rapidly -- 26 million during the same period. These additional people rely almost entirely upon the State for their grain; (2) the Government carried out a fairly rapid conversion of collective

Table 8.--Utilization of Soviet Government procured food grains, without considering imports, 1958-65

Item	Line No.	1958	1959	1960	1961	1962	1963	1964
		<u>Million tons</u>						
Procurements of food grains	1	49.1	41.2	37.9	42.3	43.6	28.3	46.4
Utilization								
Milled for food ^{1/}	2	29.6	29.4	33.9	36.3	36.9	38.0	39.0
Gross exports ^{2/}	3	6.9	6.4	6.2	6.4	5.3	3.0	3.0
Industrial uses ^{3/}	4	1.5	1.6	1.7	1.8	1.9	2.0	1.5
Returns to farms ^{4/}	5	-	-	-	-	1.4	-	2.0
Total	6	38.0	37.4	41.8	44.5	45.5	43.0	45.5
Gross residual after utilizing year's harvest	7	+11.1	+3.8	-3.9	-2.2	-1.9	-14.7	+0.9
Cumulative residual	8	11.1	14.9	11.0	8.8	6.9	-7.8	-6.9

^{1/} Based upon Soviet Government Grain Procurements, Disposition, and Stocks, 1940, 1945-63, RAND Memorandum RM-4127-PR, November 1964, p. 58. The amounts indicated here are millings of Government procured grain. The sources are carefully documented in the study and verified by other statements in the Soviet press and other Soviet sources. 1964 is projected.

^{2/} From Soviet export publications -- includes wheat, rye, flour converted to grain, and rice.

^{3/} Estimated on the basis of Soviet sources for the early 1960's. F. T. Zemlyanskii, *Ekonomicheskaya effektivnost ispol'zovaniya otkhodov pishchevoi promyshlennosti v sel'skom khozyaystve*, Moscow, 1964, p. 18. These are considered minimum industrial uses of state procured food grains.

^{4/} For seed and other uses. There were undoubtedly returns during other years than those shown.

farms to state farms during this period, which might have thrown a greater burden upon the procured grain supplies; (3) the Government has undertaken to increase its capacity for producing flour and groats and has, as a consequence, taken on a progressively larger share of total flour and groats output ^{5/}; (4) demands for industrial products made from food grains have increased, and the government has not been able to convert as rapidly as planned to nonfood raw materials. This has been partly accentuated by the very poor potato crops in

^{5/} Milling on private account has been declining.

1962 and 1963, because potatoes are another major raw material for these same products; and (5) the policy objective of increasing exports has placed a greater burden on the procured supplies.

Relatively little is known about other uses of Government grain. It was reported at various times that a considerable proportion of the procured grain had to be returned to the farms because of shortages due to excessive procurements. Khrushchev stated that 22 percent of grain procured from the 1959 harvest in the Russian republic (RSFSR) had to be returned to farms after procurement operations were completed. ^{6/} Brezhnev has stated that it was necessary in 1962 to return to farms 1.4 million tons of grain for seed, and in 1964, 2 million tons were returned for that purpose. ^{7/} There are undoubtedly other such returns which we cannot estimate. There is good reason to believe that much of these returns for seed were food grains, especially wheat. The Government exerts the greatest pressure on farms to meet and overfulfill wheat procurement goals; therefore, wheat, dominates procurements.

With these points in mind, table 8 indicates that total utilization of food grains from procured grain in 1958-64 increased from 38 million tons annually to over 45 million tons (line 5), while procurements of food grains declined or remained at a level substantially below that of 1958. The effect of this upon the supply of government food grains from domestic sources is clearly indicated by the two residual lines (lines 7 and 8). On an annual basis, the residual fluctuated considerably, but during the first part of the period the fluctuations were on the surplus side; after 1960 they became deficits. In 1963, the deficit was enormous, and the 1964 procurements permitted only an insignificant surplus, less than a million tons. Over the whole period -- without considering what stocks may have been before 1958 -- the cumulative residual (line 8) indicates that a surplus of food grains existed until 1962, but this "surplus" was being narrowed because of the deficits which were recurring on an annual basis after 1959. The impact of the 1963 harvest forced the cumulative residual into a net deficit position, which the 1964 procurements only slightly improved.

This deficit in the cumulative residual is not as great as the 11 million tons of imports, and there is no reason why it should be. There was probably some depletion of stocks. But we do not know what these stocks were in 1957. ^{8/} We cannot, on the other hand, be certain that we have accounted for all the utilization of food grains up to 1963. This is especially true for returns to farms for 1959 and other years. Obviously, the situation reflected in table 8 is altered by imports, and this problem is dealt with in Appendix B.

The Outlook

Unless a severe belt-tightening policy is adopted by the Soviet Government, which seems unlikely, Soviet grain requirement will increase in the years

^{6/} Stroitel'stvo Kommunizma v SSSR, v. 4, p. 365.

^{7/} Izvestiya, December 10, 1964.

^{8/} A study which attempts to estimate the utilization of total grain procurements in the Soviet Union concludes that total grain stocks were drawn down in 1957. Soviet Government Grain Procurements, Disposition, and Stocks, 1940, 1945-63, RAND Memorandum RM-4127-PR, November 1964, p. 58.

ahead with the continuing population growth of about 3 million a year. With the reduction of meat supplies, the present demand for bread grains may be enhanced. Conversely, the efforts to increase meat output in coming years will require even greater amounts of grain, and some wheat and rye may be used for this purpose. Under such conditions, whether the imports will continue, the Soviet Union will be self-sufficient, or the historic export position will be resumed, will depend upon the ability of Soviet agriculture to raise its low per acre yield, and increase procurements on this basis. For if there is one thing upon which Soviet and Western specialists agree, it is that no further large expansion of acreage is feasible after the past decade's addition of more than 100 million acres to crops. It is necessary, therefore, to look to higher yields for an increase in output.

Even the USSR's overestimated official average yield for 1958-62 (which included the excellent year of 1958 but did not include any strikingly low years) was only 16.1 bushels per acre. In the United States, the average during the same period was 24.9 bushels, and in Canada 17.7 bushels. But Canada's average included 1961, a very poor year, which greatly depressed its yield level. Climatic difference undoubtedly militate against achieving the high yields prevalent in the United States and in many West European countries. Yet, it is widely recognized that there are considerable potentialities for raising Soviet yields. The leverage of the huge grain acreage, which in 1964 reached 330 million acres, magnifies even a moderate increase in yields into a large additional output.

Government plans, both under Khrushchev and his successors, have been directed towards raising crop yields. Increased inputs of fertilizer, herbicides and machinery, improved grain varieties, and greater economic incentives to farmworkers and managers have been specified by Government Programs. Prices paid by the State to farms for wheat and rye were sharply raised in 1965 by 20 to 100 percent, depending primarily on the geographic regions and types of farms. Moreover, a 50 percent premium will be paid for wheat and rye delivered to the State in excess of planned quotas (after the farms have fulfilled their delivery goals for all grains, not just wheat and rye). However, implementation of such programs may fall far behind and they may be quickly modified in important respects or even reversed -- as similar ones have in the past. The adverse effects of the built-in deficiencies of the collective farm system, which has not been essentially changed, must also be kept in mind. Nevertheless, it seems realistic to assume that yields will be raised moderately above the present low level by the end of the decade. If we should assume an increase of the wheat yield by 1970 to 9 centners per hectare (13.5 bushels per acre) from the 1958-62 USDA estimated average of 8.3 centners -- certainly a modest increase -- we would obtain, for the present area of 70 million hectares (175 million acres) a projected 1970 output of 63 million metric tons. Because rye is grown in the humid zone to a greater extent than wheat and should benefit more from an increased use of chemical fertilizer, we assume a somewhat greater increase in the yield by 1970, namely to 9.5 centners per hectare (15.2 bushels per acre) compared with the 1958-62 USDA estimated average of 8.6 centners. Assuming an area of about 17 million hectares (about 42 million acres) we would obtain 16 million tons of rye. Adding 63 million tons of wheat and 16 million tons of rye gives us a projected bread grain supply of 79 million tons in 1970. This compares with estimated requirements of about 71 million tons,

based on the present assumed rates of utilization, adjusted for increased population, acreage, etc. and assuming continuing exports of about 3 million tons a year to the Communist countries. This would provide a surplus of about 8 million tons, which would make possible substantial exports, a significant increase in stocks, and/or increased use of wheat and rye for livestock feeding, which has been a serious bottleneck in the Soviet farm economy.

For much of the remainder of the present decade, stockpiling may take precedence over major exports. However, by 1970, barring exceptionally unfavorable weather and assuming increased yields, substantial stocks should be accumulated, permitting it to resume its role of a major exporter.

Although stagnation in output over the past half decade has been due to a number of causes, such as, the collective system of agricultural organization and management, the absence of adequate inputs and incentives and other factors which tended to keep crop yields down, the most direct cause of the large imports of wheat during 1963 and 1965 was unfavorable weather.

Much will depend upon weather during the period 1966-70, though improved technology may lessen to some extent its effects. If a series of poor weather years should be bunched together during the next five years, there is reason to expect wheat imports to supplement shortfalls in production, to continue at a high level. If it should develop that several good weather years occur during the next five years, a very substantial increase in grain output could materialize, making imports unnecessary.

Appendix A

Seeding rates of from 150 to 200 kilograms per hectare for grain have been indicated in Soviet sources. It is not always clear whether the figures refer to wheat and rye.

Soviet official grain output is reported in terms of "bunker weight" -- the weight of the grain as it come from the combine -- and is known to include excessively large amounts of moisture and trash. To eliminate this waste matter and moisture from the statistics would involve at least a 10 to 15 percent deduction, but it would fluctuate from year to year, region to region, and by type of grain.

The problem of feeding of wheat and rye grain is undoubtedly the most significant. Soviet publications have seldom, if ever, directly indicated that wheat and rye grain, of edible quality, is fed to livestock. Nevertheless, there is some information available which indicates that wheat and rye are fed and that the amounts involved might be substantial in certain years. However, what these amounts might be from year to year cannot be estimated. The reported use of bread and flour purchased in State stores to feed livestock has been frequently condemned by the Government particularly in 1963. Such use would reduce the amount available for human consumption in our balances.

Whenever the feeding of wheat and rye has been acknowledged in the Soviet Union, it has also been stressed that this was considered otkhod, or waste, which would imply that it was not grain of sufficient quality to permit its use

for other purposes, such as human consumption, industrial uses, seed, exports, or stocks. The fact that the use of bread and flour for feeding livestock was prohibited makes it somewhat difficult to see why large-scale feeding of edible wheat and rye grain would be allowed.

USDA estimates of wheat and rye output are based upon estimates of the barn yield of these grains, taking into consideration the sown area, the climatic conditions of each year, the general cultivation conditions, and the availability of various inputs. They have also been checked against these minimum utilization assumptions. Obviously, if the seeding rate is actually higher and the amount of wheat and rye grain (of edible quality) used for livestock feed is substantial, the USDA estimates would be too low. On the other hand, the excess moisture and trash recorded in the "bunker weight" measurement of grain output, inflation of the output figures for other reasons, and feeding of wheat and rye which was actually nothing more than waste, would not alter the estimates.

Per capita annual consumption of wheat and rye in terms of grain in the 2 balances is held constant at 190 kilograms. A number of factors could have altered this level of consumption during 1963 and 1964, but these are difficult to evaluate. Grains other than wheat and rye appear to have been added to the flour and bread supply during 1963, and the general quality of the bread available indicated that the milling rates were altered to permit the output of more flour from a given amount of grain. Also, there were efforts to reduce wasteful uses of bread in restaurants and its use as animal feed. Bread appeared at times to be difficult to obtain, although no serious shortages were reported. These factors should have tended to reduce the consumption of wheat and rye. Also large quantities of meat were available during 1963-64 as a result of heavy slaughtering due to feed shortages; this too might have tended to reduce the consumption of wheat and rye. Serious shortfalls in potato production in both 1962 and 1963 might have had the opposite effect. Potatoes are the most common substitute for grain in the Soviet diet.

By mid-1964, the quality and quantity of the bread supply apparently was improved, but meat supplies were considerably reduced and it was not until late in 1964 that the supply of potatoes and vegetables was augmented from that year's crops. There appears to be justification for believing that per capita consumption of bread grains may have increased during 1964. In view of these conflicting trends, the consumption of wheat and rye as grain was held constant in tables 5 and 6, although this undoubtedly obscures some changes over the period.

Appendix B

The effect of imports upon the Soviet Government's food grain supply obviously alters the situation reflected in table 7. This is taken into consideration in table 9, which adds the imports of wheat, rye, rice, and flour and groats, in terms of grain, to the residuals derived in table 7. Table 9, therefore, has the last two lines of table 8, and adds additional lines; gross imports, the net residual (residual plus imports) on an annual basis, and the net cumulative residual; and the net cumulative residual, applying the imports of the 1963-64 crop year entirely to the utilizations of 1963 and the imports during the crop year 1964-65 entirely to the utilization of 1964. Imports are added to the balance on a calendar year basis in all but the last line -- that is, imports during calendar 1963 are added to procurements during that year. Methodologically, there is room to question the logic of this, but for 1958-62, it is not crucial, since imports were small and fairly uniform. For 1963 and 1964, however, it would seem more appropriate to apply the large imports directly to the year's deficit they were designed to offset -- that is, to 1963-64 and 1964-65.

The results of taking imports into consideration are essentially the same as those when they are excluded, except, of course, that the residual figures are raised and -- depending upon how exports are dealt with -- they operate differently in 1963 and 1964. It must again be stressed that these tables do not indicate the total level of stocks in the hands of the Soviet government. They simply indicate the relative position year-by-year and over the period in terms of the "surplus" and "deficit" encountered from each year's procurements and utilization of food grains.

In table 9, the "surplus", which appears after 1964 procurements are fully utilized, is less than that which appeared after the 1962 procurements were fully utilized (line 5). In line 6, it is substantially lower. Whatever stocks may have been in 1962, they must have been fairly close to what the Soviet Government considered an irreducible minimum because, as a result of an 11.9 million tons drop in wheat procurements in 1963, the Soviet Union imported about 11 million tons of wheat. Furthermore, the situation in 1964 was only as good as it was -- and no better than in 1962 -- because of large imports.

The net cumulative residual after fully utilizing the 1964 harvest is even smaller if the imports of wheat during 1963-64 are entirely shifted over to the 1963 procurement-utilization period (line 6). This would raise the net cumulative residual figure for 1963 to 8.5 million tons and reduce the figure for 1964 to 4.1 million tons. This is because 8 million tons of the 1963-64 imports are added to the 1963 supply and deducted from the 1964 supply, but the approximately 3.2 million tons imports during 1964-65 reported so far must be, by the same logic, added to 1964's supplies. The results of doing this appear in the last line of table 6. It is clear from this that the net cumulative residual after full utilization of the 1964 harvest is minimal and would be almost zero had the Soviet Union not contracted for imports of over 3 million tons during 1964-65.

Table 9. -- Soviet Union: Net surplus or deficit in the Soviet Government's food grain supply

Item	Line No.	1958	1959	1960	1961	1962	1963	1964
		<u>Million metric tons</u>						
Gross residual after utilizing each year's harvest	1	+11.1	+3.8	-3.9	-2.2	1.9	-14.7	+0.9
Cumulative residual ...	2	11.1	14.9	11.0	8.8	6.9	-7.8	-6.9
Gross imports	3	0.9	1.0	0.6	0.7	0.4	3.7	8.0
Net residual (procure- ments-utilization + imports)	4	12.0	4.8	-3.3	-1.5	-1.5	-10.0	+8.9
Cumulative	5	12.0	16.8	13.5	12.0	10.5	0.5	9.4
Net cumulative residual if 1963-64 imports added to 1963 supplies: and 1964-65 imports added to 1964 supplies:	6	12.0	16.8	13.5	12.0	10.5	8.5	4.1

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