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**DIRECTORATE OF  
INTELLIGENCE**

# Intelligence Memorandum

*Outlook for the 1972 Soviet Grain Harvest*

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**CENTRAL INTELLIGENCE AGENCY**  
Directorate of Intelligence  
August 1972

**INTELLIGENCE MEMORANDUM**

**OUTLOOK FOR THE 1972 SOVIET GRAIN HARVEST**

**Introduction**

1. This memorandum summarizes the development of the 1972 Soviet grain crop and offers a preliminary estimate of its size. The implications of the harvest for the livestock program and Soviet imports of grain are then explored.

**Conclusions**

2. Because of a combination of winterkill and drought, the preliminary estimate of 1972 Soviet grain prospects is for a decline in the crop to about 135 million metric tons of usable grain, 13 million tons less than the 1971 harvest. To stave off the consequences of this shortfall, the USSR has already bought more than 20 million tons of grain from the West for delivery in fiscal year (FY) 1973, up 12 million tons over imports of the previous year.

3. Following the loss of one-third of its winter grain crop to a January cold wave, the USSR mounted a successful drive to replant spring grains on the areas of winterkill and to extend the total area sown to grains. Hopes of at least maintaining the harvest at the 1971 level of 148 million tons, however, were destroyed by insufficient soil moisture in some of the major grain regions at the beginning and during the early part of the growing season. High temperatures and untimely and heavy rains during the harvest of early maturing grains contributed to a sharp decline in production in the Ukraine, North Caucasus, and the Volga Basin.

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Note: This memorandum was prepared by the Office of Economic Research.

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4. Even with the importation of 20 million tons of grain the Soviet Union will be hard pressed to meet domestic needs and, at the same time, to continue supplying its client states at the average level of recent years. The surge in the use of grain as livestock feed in the campaign to alleviate domestic meat shortages is expected to continue. Finally, because of drawdown of wheat stocks for use as feed, carryover stocks of wheat suitable for consumption as food are believed to be at a minimum.

#### Discussion

##### Background

5. The USSR harvested 150 million tons of usable grain in 1970 and 148 million tons in 1971.<sup>(1)</sup> Although these were the two best crops in Soviet history, they were not enough to support the livestock program which has been so insistently advanced by Party Chairman Brezhnev and other Soviet leaders. To fill the gap between domestic production and total requirements for food, livestock feed, and exports to client states, the Soviet Union has been purchasing large quantities of grain over the past fiscal year. The USSR had apparently decided to seek additional supplies of grain from the West on a long-term basis before a combination of severe cold and sparse snow cover threatened the 1972 winter grain crop. By February of this year the Soviet Union had arranged to buy 3.5 million tons of grain from Canada for delivery in FY 1973. The commitment in May to purchase \$200 million of grain - about 3.5 million tons - from the United States in FY 1973 as part of the recently concluded 3-year grain sale seemed to reflect a decision to ensure an adequate supply of livestock feed until the USSR could boost its own grain output decisively.

6. In July and early August, however, after Soviet officials were in a better position to appraise the 1972 grain crop, the USSR negotiated further purchases of unprecedented quantities of grain from US companies. These new contracts, taken together with additional orders for Canadian and French grain, place total purchases for FY 1973 at more than 20 million tons (compared with 8 million tons in FY 1972) and will require hard currency outlays - cash and credits - of more than \$1.2 billion (compared with \$500 million in FY 1972). The Soviet decision to import grain in this volume reflects a serious shortfall in bread grain production in 1972 and a continuation of the strong upward trend in the use of grain as livestock feed, coupled with a minimum level of carryover stocks of grain from previous harvests.

1. For a definition of usable grain, see Table 2.

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The Area Sown to Grains

7. In the fall of 1971, about 35 million hectares of winter grains were sown, some 4.5 million hectares less than the average in the preceding five years. These fall-sown grains – mostly winter wheat and rye – usually supply more than 30% of all production. As the winter progressed, evidence accumulated that the winter grains had suffered extensive winterkill. The USSR's mid-year plan fulfillment report pinpoints the loss at nearly one-third of the area planted in the fall, or 8 million hectares more than last year's loss (see Figure 1). A good deal of the remaining winter grain area, moreover, was substandard in terms of expected yields. To compensate for the damage incurred by the winter grains, the USSR seeded 11.3 million hectares more in spring grains than in 1971 (see Table 1) which, when combined with losses of fall-sown crops, provided a net gain of 3.3 million hectares in total grain acreage over 1971. Even with this expansion in total acreage, however, the Soviet leadership knew that to prevent a drop in grain production in 1972, yields in the spring grain areas would have to be better than in 1970 or 1971, two of the best years on record. Given average yields for spring and winter grains, it requires an increase of 1.5 hectares sown to spring grains to overcome the loss in production from 1 hectare of winter grains.

8. In order to compensate in part for these differences in yields between winter and spring grains, Soviet planners changed the composition of spring sowings. Instead of attempting to increase the spring wheat area to offset the losses of winter bread grains (wheat and rye), the USSR planted more feed grains (barley, oats, and corn) which have higher yields than spring wheat. The Soviet strategy in overcoming the losses of last winter compared with the reactions to the comparable winterkill in 1969 indicates how agricultural priorities have changed. In 1969 the spring wheat was increased by about 4 million hectares; this year the increase was less than a million hectares. The Soviet Union probably chose to emphasize the higher yielding – but lower value – feed grains this year because the demands of the livestock program for ever-increasing supplies of grain could not be deferred for the sake of preventing a fall in the production of bread grains.

Crop-Development Through Early July<sup>(2)</sup>

9. In the European USSR, unusually warm weather accelerated the spring sowing schedule by about two weeks, while in the important spring grain areas of West Siberia and Kazakhstan (the "New Lands") seeding was delayed somewhat but not past the usual planting period. The growing

2. The progress of the grain crop is described in greater detail in the Appendix.

Table 1

USSR: Comparison of Potential Grain Harvest Areas <sup>a/</sup>

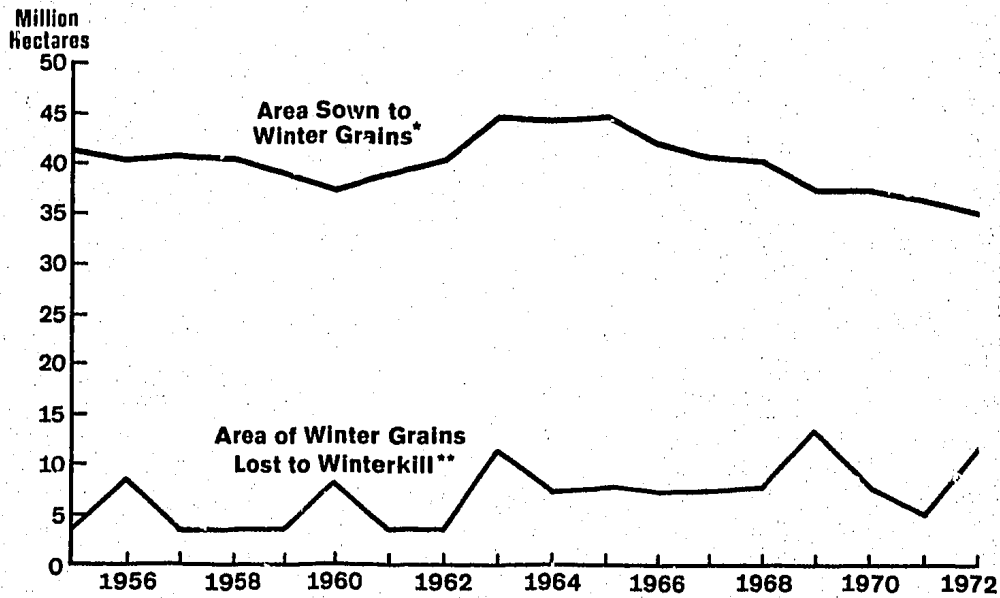
Million Hectares

	<u>Winter Grains</u>		<u>Spring Grains</u>						
	<u>All Grains</u>	<u>Of Which:</u>		<u>Of Which:</u>					
	<u>Total</u>	<u>Total</u>	<u>Wheat</u>	<u>Rye</u>	<u>Total</u>	<u>Wheat</u>	<u>Corn</u>	<u>Barley</u>	<u>Oats</u>
1971	119.0	31.6	20.7	9.5	87.4	43.9	3.3	20.5	9.7
1972	122.3	23.6	14.7	8.1	98.7	44.8	5.1	25.1	12.2
Net change	3.3	-8.0	-6.0	-1.4	11.3	0.9	1.8	4.6	2.5

a. Because the estimated area is given as of 1 July, it is net of winterkill in the winter grain areas. The mid-year reports usually show a slightly larger sown area than do the final statistical reports because about 1% to 2% of the standing crop at mid-year is not harvested in late summer and early fall.

### History of Winterkill in the Soviet Union

Figure 1



\*Sown in the preceding fall for harvest in the given year.

\*\*Also includes a few million hectares of fall sown grains used as green forage crops for livestock in the spring.

#### Area of Winter Grain Lost to Winterkill as a Percent of Total Area Sown to Winter Grains.

Year	%	Year	%	Average	%
1955	8	1963	25	Average 1955-60	12
1956	21	1964	16	Average 1961-65	15
1957	8	1965	17	Average 1966-70	22
1958	6	1966	17	1971	13
1959	8	1967	18	1972	32
1960	21	1968	18		
1961	8	1969	35		
1962	8	1970	20		

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season began badly from another standpoint, however. Much of the European USSR had below-normal supplies of soil moisture. In Kazakhstan and Siberia, soil moisture reserves were about the same as in the good crop years of 1970 and 1971.

10. Weather conditions have foreclosed the prospects for average or above-average grain yields in the major grain regions in the Ukraine, the North Caucasus, and along the Volga. Rainfall has been below normal in many regions and less than the average of 1970-71 in almost all of the USSR's grain districts (see Figure 2). The shortfall was greatest in the winter grain areas of the Ukraine and in the spring grain belt extending from the west bank of the Volga through the western part of Kazakhstan. In the eastern and southern regions of the Ukraine, the Lower and Middle Volga, and the Northeast Caucasus, soil moisture levels at the end of June were below or close to the lowest levels reached during the past decade. Meanwhile, higher-than-normal temperatures were speeding the development of the grain crop, particularly in the Ukraine and North Caucasus. In some of these areas, extreme temperatures combined with a lack of rain prevented the normal development of the grain kernels.

11. When harvesting began in early July, the USSR had to deal with some special problems which threatened to reduce the crop. The warm weather advanced the maturation of some of the spring grains -- particularly barley -- to the extent that it ripened at the same time as the winter grains in many regions. The difficulties presented by the expansion of the usual harvest area were compounded by the effects of a rash of heavy rains which flattened and tangled the grain, making it hard to cut and increasing the likelihood of larger than usual harvest losses.

#### Preliminary Estimate of the 1972 Grain Harvest

12. The 1972 grain crop can be projected on the basis of the sown area and the analysis of the development of the crop since March. The projection is stated in terms of usable grain; the differences between the official Soviet measure of gross production and usable grain are shown in Table 2. The estimate, of course, is preliminary since the final outcome of the spring grain harvest will depend partly on the weather in August and September.

13. Soviet winter grains production is tentatively estimated at 28 million tons, or 24 million tons less than the 1971 crop and 13 million tons less than the 1966-70 average (see Table 3). On the basis of the rainfall and temperature so far, yields of spring grains should be down appreciably in the Volga and Urals regions and off somewhat from last year's mark

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Table 2

Grain Production in the USSR a/

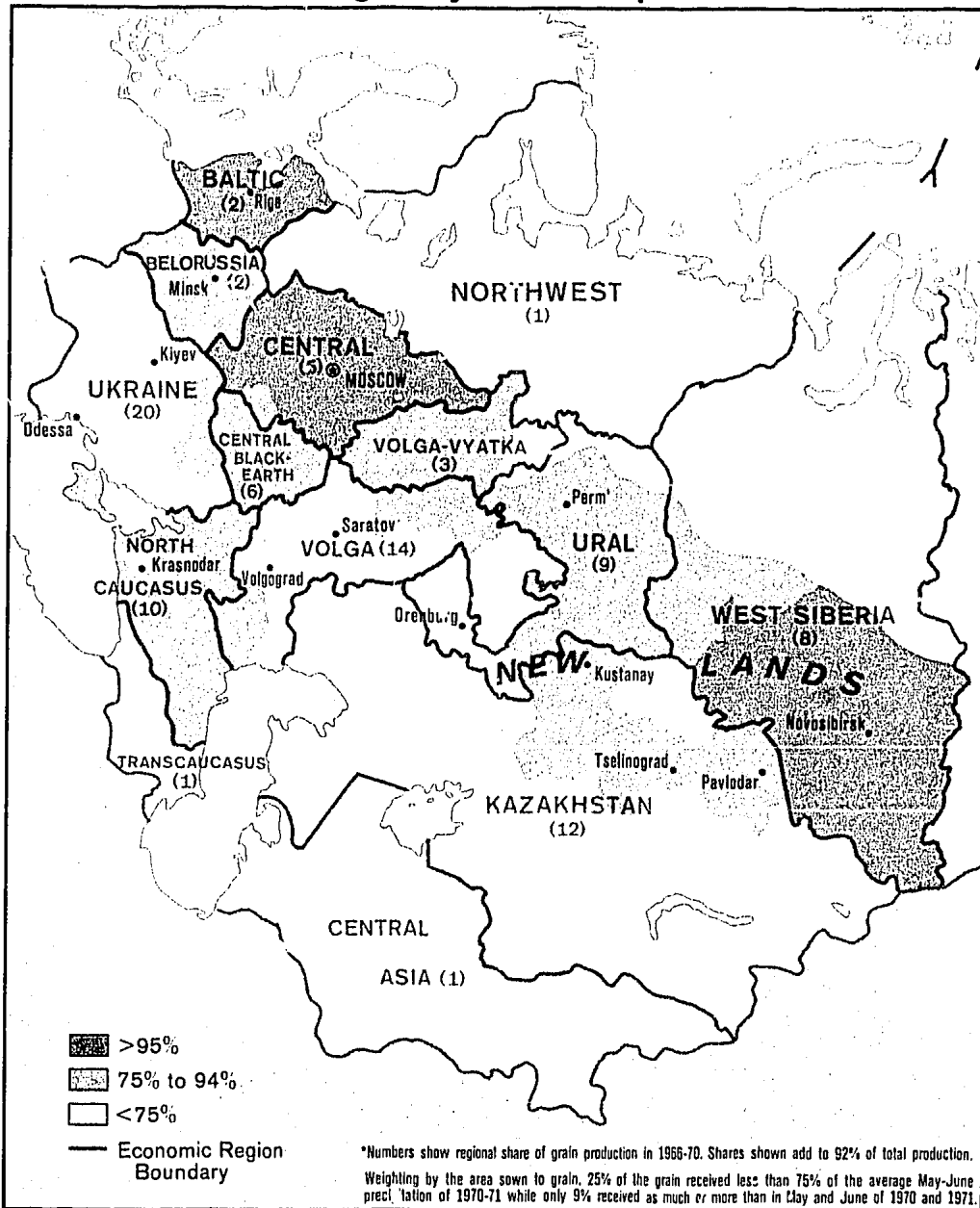
	Million Metric Tons	
	<u>Official Claims of Gross Production</u>	<u>Estimate of Net Production <u>b/</u></u>
AVERAGE, 1956-60	121	105
1961	131	110
1962	140	109
1963	108	92
1964	152	120
1965	121	100
AVERAGE, 1961-65	130	106
1966	171	140
1967	148	122
1968	170	135
1969	162	128
1970	187	150
AVERAGE, 1966-70	168	135
1971	181	148
1972	(plan) 190	(forecast) 132-137

a. Including pulses.

b. Estimate of usable grain. Net usable grain is estimated as the officially claimed gross output minus excess moisture, unripe and damaged kernels, weed seeds and other extraneous materials, post-harvest losses incurred in loading and unloading grain between the grain harvesting combine and storage facilities, and suspected biases in the official reporting of grain production.

Figure 2

**Precipitation in Major Grain Growing Regions in May-June 1972 as Percent of Average May-June Precipitation in 1970-71\***



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Table 3

Soviet Grain Production a/

	Million Metric Tons					
	Official Claims of Gross Production			Estimate of Net Production		
	<u>Total</u>	<u>Winter Grains</u>	<u>Spring Grains</u>	<u>Total</u>	<u>Winter Grains</u>	<u>Spring Grains</u>
Average, 1966-70	167.6	50.8	116.7	135	41	94
1971	181.0	63.0	118.0	148	52	96
Estimate, 1972	165-171	35	130-136	132-137	28	104-109

a. Because of rounding, components may not add to the totals shown.

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in Kazakhstan and West Siberia. The net result -- a potential harvest of about 104 million to 109 million tons of spring grains -- would be 8 million to 13 million tons more than in 1971. Nevertheless, the combined total of about 135 million tons of winter and spring grains would be 9% less than 1971 production and 10% less than the 1970 crop.

Implications of a Short Harvest for the Livestock Program  
and Foreign Trade

14. A harvest of 132 million to 137 million tons of grain would not be a disaster, but it would be a decided setback. By attempting to shift from a diet heavy in starch -- bread and potatoes -- to one richer in meat and dairy products, the Soviet leaders are counting on substantial increases in the supply of feed grains. With production of 148 million tons of grain in 1971 and 132 million to 137 million tons in 1972, the grain crop would have to average about 166 million tons in 1973-75 in order to meet the goals of the 1971-75 Plan for grain production.

15. The requirements of the livestock program have also made inroads on the USSR's reserve stocks of wheat. In 1969 and 1970, about 9 million tons of wheat were released from government stocks for livestock feed. The use of such reserves of wheat for livestock feed is believed to have reduced them close to the level considered vital as a strategic reserve. The 1972 wheat crop will not be large enough to permit rebuilding reserves or the use of wheat as feed. In fact, the total estimated production of bread grain (wheat and rye) -- 25 million tons less than the 1971 crop -- will barely meet requirements for flour and exports. If the USSR is no longer able to feed livestock 20 million tons of wheat as it has in recent years, the projected increase of about 8 million to 13 million tons in the production of corn, barley, oats, and other feed grains will not save the situation. Soviet agriculture needs more grains for livestock than last year, not less.

16. By deciding to purchase more than 20 million tons of foreign grain for delivery in FY 1973, the USSR made sure that a sharp downturn in the grain crop would not force it to carry out distress slaughtering of livestock on a large scale, as occurred in 1963-64.<sup>(3)</sup> By concentrating on buying wheat (16.5 million tons out of a total of about 20.5 million tons so far) the USSR is able to divert more of its domestic grain to the livestock sector, to ensure the fulfillment of its commitments to supply client states, and to guarantee sufficient wheat of milling quality for the flour industry.

3. As a result of the 1963 crop failure and the subsequent shortage of feed, hog inventories declined by 42% and cattle inventories by 2%. The pre-1963 inventory of cattle was regained by 1965, but the number of hogs did not reach the 1963 level until 1972.

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When the purchases were made, however, the USSR was counting on a good to excellent crop in the New Lands. Although the prospects in these regions were still good through July, the crop is about a week late, and the outlook could deteriorate. If the harvest in the New Lands seems questionable, the USSR could well buy more feed grains than already purchased for FY 1973.

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## APPENDIX

Progress of the 1972 Grain CropSeptember 1971 to March 1972

Winter grains (winter wheat, winter rye, and winter barley) have a special importance in the Soviet grain balance. On the area that survives the winter, yields are not as variable as they are for the principal spring grains, and the yields of winter wheat are almost twice that of spring wheat. The major winter grain areas are the North Caucasus and the Ukraine (predominantly winter wheat) followed by the Volga, Central, and Volga-Vyatka Regions (predominantly winter rye). Last fall, a lack of soil moisture hindered the sowing of fall grains, and the area seeded fell short of the plan of 37.5 million hectares by 2.5 million hectares.

The January Freeze

In the late fall and early winter, above-normal precipitation favored the germination and early development of the fall-sown grains in most areas. Supplies of soil moisture were normal or above normal except in Belorussia. Little snow fell over the winter grain regions in December and January, however, leaving the wintering plants with much less than their normal protection.<sup>(1)</sup> Then in mid-January, an unusually severe cold spell set in, ruining a large share of fall plantings as the ground froze to a depth of as much as 5 feet. In the eastern and northeastern Ukraine and in the North Caucasus, the January temperatures were much lower than in 1963 and 1969 when 25% and 35%, respectively, of the sown winter grains were never harvested as grain.

The party and agricultural leaders in the affected areas expressed considerable alarm. There were frequent references to "difficult" conditions and appeals to the farms to ascertain as quickly as possible the extent of the losses. The regions hardest hit seem to have been the Central Black Earth Region, Belorussia, the eastern Ukraine, and parts of the North Caucasus. In February and March, however, temperatures were generally much warmer than in 1963 and 1969. Consequently, the USSR did not experience this spring what it feared above all in terms of its potential effect on the winter grains -- strong freezing in the early spring after the fields had thawed in late February and early March.

1. According to the USSR's meteorological service, on 13 January the snow was less than 2 inches deep in Bryansk, Kursk, Voronezh, L'vov, Kiev, Sumy, Poltava, Odessa, Nikolayev, Krasnodar, and Stavropol' -- the capitals of major grain-growing oblasts.

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### Assessment of Winterkill

During the winter and early spring, estimates by Western observers of the extent of winterkill ranged from one-fifth to more than one-third of the total sown. The Central Statistical Administration's report on mid-year plan fulfillment, which was published in late July, settled the question of the extent of the winterkill. The report stated that a total of 122.3 million hectares of grain was available for harvest in 1972. Since previous reporting established that 98.7 million hectares were sown to spring grains, winter grains survived on 23.6 million hectares of the 34.9 million hectares sown last fall. The loss of 32% (11.3 million hectares) of the winter grain area to winterkill or to fodder use was the second largest loss since 1950; only 1969 was a greater disaster.

### April to July

Year-to-year variation in the weather during the growing and harvest seasons is the major cause of the wide annual fluctuations in Soviet grain yields. The most important considerations are the following:

- Extensive cultivation of small grains is limited to areas having a frost-free period of 90 days or more. Given the relatively short growing season in the majority of Soviet grain producing regions, if spring is late, heavy frosts in the late summer or early fall may prevent the maturation of the crop.
- For proper germination and crop development, sowing must be carried out in seedbeds having sufficient soil moisture, and there must be enough precipitation during the growing season. It is especially important that rainfall be up to standard in May and June for the winter grains and in June and July for the later-maturing spring grains. Afterward, too much rain will cause harvesting losses and will reduce the milling quality of the grain.
- Temperatures must be high enough in April and May to start the crop off and, later, to permit its development. Excessive temperatures, especially if accompanied by strong winds, deplete reserves of soil moisture. Hot weather when small grains are in the heading to ripening stages can interfere with pollination, accelerate maturation unduly, and result in shrunken kernels of low weight and quality.



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### Sowing

Spring tillage and seeding of grains were carried out earlier than usual this year in the southern regions of the European USSR as unusually warm weather permitted the Ukraine and the North Caucasus to accomplish spring seeding 1 to 2 weeks ahead of the usual schedule. The Ukraine had planted three-fourths of its small grains and pulses by 10 April and one-third of its corn by 25 April. In a normal year, this would not have been accomplished until 25 April and 10 May.

Spring was also early in the spring grains regions of the Volga Basin and the Urals, permitting fieldwork to begin ahead of schedule. Farms in West Siberia and North Kazakhstan, however, delayed seeding until 15 to 25 May, the generally-accepted optimum period. The warm spring did prompt early germination of weeds which were then destroyed by tillage before seeding.

### Soil Moisture and Rainfall

At the end of April, the midpoint of the sowing season, reserves of soil moisture were below normal in Belorussia, much of the Ukraine, and the Central Black Earth Region, the Central Region, and in the Lower Volga Basin. In comparison with the soil moisture available in the bumper grain crop years of 1970 and 1971, the situation was especially mediocre. On the other hand, soil moisture reserves were above normal in Siberia and Kazakhstan and only marginally below the average end-of-April soil moisture in 1970 and 1971.

Since April, rainfall has been sparse in the major grain regions -- below normal in most regions and less than the average of 1970-71 in almost all of the USSR's crop districts (see Figure 2 above). Weighted by the area sown to grain, 25% of the grain received less than 75% of the average May-June precipitation received in 1970-71, while only 9% received as much as or more than in May and June of 1970 and 1971. The shortfall was most striking in the winter grain areas of the Ukraine and the Volga Region and in the spring grain belt extending from the west bank of the Volga through West Kazakhstan.

Crop development was so swift throughout most of the European USSR that some of the June rainfall did not help the winter grains in the Ukraine and the North Caucasus. Indeed, by late June and early July, even spring grains in these areas had for the most part progressed beyond the stage where additional rain would improve yields.

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### Temperatures

The principal reason for the accelerated development of the grain crop was the prevailing above-normal temperatures. By late March the abnormally low winter temperatures had given place to warm weather throughout most of the country. April was a very warm month. Temperatures were especially high in the Ukraine and North Caucasus but also high in the New Lands areas of Kazakhstan and Siberia. During April, temperatures in some parts of European Russia were as much as 20 degrees above long-run norms, and by the end of April the unusually warm air had shifted to the east of the Urals.

May began on a cooler note, particularly in the New Lands east of the Urals. Temperatures were generally normal during all of May and June. In mid-May, however, above-normal temperatures returned to the southern part of the European USSR where they prevailed until the end of June and at times engulfed most of the area west of the Urals. Thus the temperature favored the early germination of spring grains and the rapid development of both winter and spring grains in the European USSR. The hot weather in the Ukraine, however, promoted rapid evaporation of scanty stores of soil moisture. In contrast, cool weather in Siberia and North Kazakhstan in July delayed the development of the grain crop, causing some concern that the harvest could not be completed on time.

### Harvest Conditions

In early July the harvest was well under way in the North Caucasus and the Ukraine, and the exceptionally hot weather was ripening cereals from the lower Volga to the Southern Urals. Some special developments caused difficulties in gathering the grain in the southern regions.<sup>(2)</sup> The warm dry weather, by advancing the maturation of the grains, concentrated the farms' workload at harvest time. In many areas the winter grains were sparse and stunted; torrential rainfall in recent weeks caused severe lodging

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2. This year's special problems were aggravated by the usual organizational failures. The Soviets complained again of shortages of spare parts for the grain combines and of tires for the trucks which haul the grain to elevators. For the fourth year in a row, a special decree was issued in May, entitled **On Measures to Ensure the Gathering of the Harvest and the Procurement of Agricultural Products in 1972**. As in the past, the decree authorizes the transfer of men and machinery from other sectors of the economy to the agricultural sector. It also provided for special wages and bonuses to those participating in harvest and transport work and increased investment funds to cover the construction of grain elevators and storehouses.

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of grains in other areas.<sup>(3)</sup> Both of these conditions make harvesting more difficult, erode the quality of the grain, and increase the likelihood of substantial harvest losses.

Mid-July rains delayed the harvest in the Ukraine and the Central Black Earth Region; Belorussia and the North Caucasus also had problems with lodged grain. In contrast, in other areas warm and dry weather continued through mid-July, easing the harvest tasks.

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3. Lodged grain results when stalks break or bend and form a flattened or tangled mass which is difficult to cut.