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21887

USSR: Long-Term Outlook for Grain Imports

A Research Paper

ER 79-10057
January 1979

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Key Judgments

The long-term Soviet quest for self-sufficiency in grain output is incompatible with the leadership's commitment to expand supplies of meat rapidly. Because the meat program—the centerpiece of Soviet consumer welfare policy—has been taking precedence over the self-sufficiency goal, the USSR has perforce continued to import sizable quantities of Western grain. Over the next several years Soviet requirements for foreign—and especially US—grain will likely range from 15 million to 25 million tons annually. But the tailing off of Soviet oil production will seriously restrict the USSR's hard currency import capacity after 1980, presenting the Politburo with some particularly difficult decisions.

Last July, President Leonid Brezhnev announced targets for meat and grain production in the 11th Five-Year Plan (1981-85). The goals themselves are roughly consistent with self-sufficiency in grain and include: (a) an estimated 1985 target of 260 million tons for grain, 50 million tons more than annual average production in 1976-77; and (b) a 1985 goal of 19.5 million tons of meat, nearly 30 percent more than actual 1978 output of 15.2 million tons.

To achieve the targeted grain output, the Soviet leadership is counting on either a continuation of the relatively favorable weather conditions of the past decade or a more rapid growth in yields based especially on accelerated growth in use of fertilizer. We believe, however, that weather conditions are likely to be less favorable than they have been and that grain yields are not going to advance at a pace faster than that which recent trends indicate. We therefore estimate that grain output in 1985 will be more than 20 million tons below target.

In turn, the official goal for meat production—already too low to satisfy the suppressed demand for meat products at prevailing prices—cannot be met without sizable grain imports. If per capita meat production grew at the planned annual rate—about 1.5 percent per capita in 1981-85—the gap between the amount of meat demanded and the amount supplied would widen, not narrow, because of (a) the high Soviet income elasticity of demand for meat, (b) Moscow's commitment to hold retail meat prices constant, and (c) shortages of other consumer goods, which will lead to an even higher pileup of unspent rubles.

Laying aside the wide variations above and below the trend of individual Soviet grain harvests, we believe that the USSR will need to import at least 15 million tons of grain annually by 1985 to support the meat target of the 11th Five-Year Plan. If meat production were to grow at the same rate as the anticipated growth of real consumer money income, annual import requirements for grain would be considerably higher, perhaps 25 million tons.

Through the next two years at least, the USSR should be able to finance the purchase of the up to 30 million tons of grain that could be required annually even with average harvests. Whether it would be willing to spend the hard currency to buy more than this amount if the harvests turn out badly is doubtful. After 1980, Soviet foreign exchange earnings will shrink as the availability of oil for export declines. Shortages of hard currency will become an increasing constraint, forcing the leadership to make hard choices between keeping consumer grumbling in a tolerable range, maintaining other imports—especially machinery and technology—at levels necessary to reach industrial goals, and importing oil to meet East European needs. By 1985, grain imports of 15 million tons would use up roughly $2.5 billion (1978 dollars) in scarce foreign exchange earnings; imports of 25 million tons could cost $4 billion. Accordingly, the conservative nature of the meat goal announced in July may have been the result of a deliberate Politburo decision to trade off consumer aspirations for what was perceived as necessary restraint in future grain purchases.

The United States probably will continue to supply about one-half of the grain bought by the Soviet Union. Other suppliers almost certainly will not be able to increase their exports substantially in response to growing Soviet demand, especially for feed grain, such as corn. Nonetheless, the USSR will retain its advantage as a large buyer in a free market, able and willing to disguise its requirements and intentions regarding grain imports. The United States is likely to be treated as a residual supplier (after the commitment under the 1976-81 US-USSR long-term agreement is satisfied), and by contracting with US traders for optional origin grain, the USSR should—as in the past—be able to buy large amounts of grain in a short time at advantageous prices.

Preface

This memorandum assesses likely future Soviet demand for Western grain through 1985 and the US role in meeting this demand. The analysis focuses on long-term trends in Soviet grain production and utilization.* It draws heavily upon earlier detailed studies on grain production and other aspects of Soviet agriculture, which are cited as appropriate. It does not treat variations in Soviet demand for Western grain caused by annual fluctuations in weather conditions around a postulated trend. Soviet policies regarding grain stocks, which can also affect purchase levels in any given year, are similarly not incorporated.

* Grain statistics in this report, unless otherwise noted, are presented in standardized terms, and are comparable to generally accepted world statistics. The USSR reports grain production on a "bunker-weight" basis, that is, as the grain comes from the combine before preliminary cleaning and drying is done and before handling and transportation losses occur. Because bunker weight includes excess moisture, trash, dirt, weed seeds, and grain admixtures, all of which are reduced to acceptable standards in several stages from farm to user, gross production must be discounted. We apply an 11-percent rate for waste and losses. This includes an estimated 3-percent loss during handling and an estimated 8-percent loss from the bunker-weight measurement. The 8-percent rate is an average of 10 years of estimated discounts based on officially reported data.

USSR: Long-Term Outlook For Grain Imports

Background

The current leadership has a long and well-documented commitment both to agricultural self-sufficiency and to an improvement of consumer welfare, in particular by upgrading the diet. The three five-year plans embracing the period 1966-80 reflect these commitments. New fixed investment in agriculture during the 1971-75 plan period grew at an average annual rate of 9.7 percent, faster than the rate achieved in 1966-70; by the mid-1970s, it accounted for 26 percent of total investment and was more than five times the share of US investment for agriculture. Quantities of fertilizer applied to crops increased rapidly, rising to 75.7 million tons (standard units) in 1975.[1] Reclamation—mostly irrigation and drainage—also commanded a substantial portion of investment, highlighted by the development of areas in European Russia where adequate precipitation can be counted on to minimize the variance in production.

These and other programs indicate that, while growth in investment and in the flow of industrially produced materials such as fertilizer had not always reached planned targets, the resources allocated to agriculture have been impressive. The farm sector has responded with major increases in production of grain, meat, and other commodities.

Despite the leadership's continuing commitment to agriculture and the ensuing sizable increases in output, the rate of progress achieved by the farm sector has not kept up with demand. Moreover, instituted schemes have not substantially reduced the farm sector's vulnerability to weather. As a result, the effort to maintain momentum in improving the quality of the Soviet diet has necessitated large imports of grain and other farm products in recent years.

[1] No comparable statistics on fertilizer used on all grain for the United States and the USSR are available. We estimate, however, that on wheat the USSR currently uses about three-fourths the quantity of nutrients per hectare used in the United States. For a discussion of comparisons of international usage of fertilizer see CIA ER 77-10557, *The Impact of Fertilizer on Soviet Grain Output, 1960-80,* November 1977, pp. 13-15.

The 10th Five-Year Plan: 1976-80

The Directives of the 10th Five-Year Plan laid down specific goals for Soviet agriculture through 1980. No changes in the basic agricultural policies of the past decade are apparent.

The Directives include:

- A sharp slowdown in the growth of aggregate investments into agriculture in keeping with a cutback in growth of overall investment.

- Continued rapid gains in fertilizer production and use.

- Strong growth in output of grains and several other major crops.

- Increased, but relatively modest, output targets for livestock products.

Although agriculture is planned to continue to take roughly one-fourth of new fixed investment in 1976-80, yearly growth in the amount of funds channeled to agriculture will be cut substantially. In keeping with a general tightening of investment funds throughout the economy, investment in agriculture is to grow at an average annual rate of only 3.4 percent, down sharply from the 9.7 percent recorded during 1971-75. Growth in stock of plant and equipment on farms will slow from the 11.3-percent yearly rate of 1971-75 to 8.4 percent during 1976-80. Fertilizer deliveries are the only inputs scheduled to continue to increase at past rates. By 1980, 120 million metric tons will be sent to farms, that is, three-fifths more than the amount delivered in 1975.

The value of net agricultural production is slated to grow at an annual average rate of 4.5 percent during 1976-80; 3.8 percent if average production for 1974-76 is substituted for the poor 1975 base year. This rate far exceeds the growth achieved during 1971-75 and is in large part predicated on plans for 1976-80 grain production to average 220 million tons, with a 1980 output of 235 million tons. Actual output for the first three years—a record 223.8 million tons (bunker weight) in 1976 followed by 195.5 million tons in 1977 and a new record 235 million tons in 1978—has been nonetheless slightly below the plan for average annual output. Even if the 1980 target is achieved, production in 1979 would have to be 211 million tons in order to fulfill the five-year plan.

Output targets for livestock products, particularly meat, were reduced in the wake of the distress slaughtering stemming from the poor 1975 grain harvest. Despite the 9-percent drop in meat output registered in 1976, we believe the USSR will both reach the planned annual average production for the five-year period as well as the 1980 target of 17.3 million tons.

Preliminary Goals of the 11th Five-Year Plan: 1981-85

On 3 July 1978, President Brezhnev presented a detailed report on agriculture to the USSR's Communist Party Central Committee. He called for continuing the priority of agriculture and outlined some general objectives for the 11th Five-Year Plan (1981-85). He stated that target figures would "be rather high" and that top priority will be given to meat production.

Brezhnev's grain target for 1981-85 implies a goal of roughly 260 million tons (bunker weight) in 1985.[2] A 1985 meat production target of 19.5 million tons was also announced. Assuming 1980 plans for meat output are achieved, the 1985 meat production target implies a 1.5-percent annual growth in per capita meat output in 1981-85.

The 1985 grain and meat targets are consistent with the long-avowed Soviet goal of self-sufficiency in grain.[3] The Brezhnev targets, however, appear unrealistic on two counts.

- *The grain goal is high.* To achieve the targeted grain output, the USSR is either counting on (1) a continuation of favorable weather conditions of the past decade or (2) more rapid growth in technical progress—especially in the use of mineral fertilizers—than we consider likely. As discussed below, based on our estimate that weather will return to a long-term average, we estimate that average grain output during 1981-85, with no reduction in area sown to grain, will be roughly 15 million tons (bunker weight)—and by 1985, 22 million tons—below the announced target.

- *The meat production target is low.* Assuming household incomes grow by at least one-half of past rates and the regime continues to meet its explicit commitment to hold meat prices constant, planned growth rates for meat production will result in an ever-widening gap between supply and demand. The growth in this gap raises the potential for increasing consumer discontent, an outcome that the leadership is most anxious to avoid.

Outlook for Grain Production in 1979-85

The amount of grain the USSR will be able to produce depends on several factors that, to a great extent, are interactive. In the Soviet Union, weather has proven the most important variable affecting output. "Technical" variables include the amount of land under cultivation and the intensity of cultivation; intensity is, in turn, influenced by irrigation, fertilization, seed varieties, mechanization, and other farming technologies employed. In projecting future grain output, we have examined the likely pace of technological im-

[2] Brezhnev called for an annual average grain output on a bunker weight basis in 1981-85 of 238 million to 243 million tons. To achieve an average of 240.5 million tons in 1981-85, given our 1980 grain production estimate of 213 million tons, would require an annual growth of 4 percent culminating in a 1985 output of 259 million tons. Alternatively, should the USSR reach its 1980 production target of 235 million tons, the 1981-85 average could be achieved by an annual growth rate of 0.8 percent yielding a 1985 grain production target of 244 million tons.

[3] The quantity of grain production implicitly planned for 1985 should be adequate to meet all domestic needs including *planned* meat production.

provements and derived point estimates for production based on two scenarios regarding future weather conditions.

Technological Improvements

It appears that little or no change will be made in area sown to grain in 1979-85. Area sown to all crops in 1985 is planned to be only fractionally higher than it was in 1975. Fallow land has been reduced to a minimum, and there is, in fact, little potential for bringing new land into production. Moscow probably will not shift existing pasture and fodder-producing acreage into grain production.[4] A reduction in pasture, for example, would force the USSR to alter current livestock-raising practices significantly. Similarly, it is unlikely that land used to produce industrial crops, such as cotton and sugar beets, would be shifted into grain production.

Soviet planners are counting on increased fertilizer applications to provide roughly one-half the planned boost in grain output during the current plan period (1976-80). On balance, we expect planned fertilizer applications to grain will be achieved by about 80 percent.[5] New production capacity needed to meet output goals is slow in coming on stream. Even if production targets for 1980 are met, planned applications to grain cannot be made unless transportation and storage losses—currently 10 to 15 percent—are reduced, and prospects for reduction are dim. It is unlikely that planners will attempt to make up for this expected shortfall by shifting available fertilizer to grain at the expense of other crops. A reduction in allocations to nongrain feed crops would reduce the supply of other important feedstuffs, and cotton, a major fertilizer user, is a hard currency earner.

Moscow also plans to boost grain production by means of other "technological" advances such as improved mechanization, expansion of irrigated areas sown to grain, and the development of better varieties, which would increase yield and reduce variation resulting from fluctuating weather conditions. However, in the past the Soviets have generally underfulfilled plans for gains in yields via such means. Even if new seed varieties now being tested prove out, for example, no major improvement in overall yield would occur for several years.[6] Construction bottlenecks and the growing energy shortage imply an inability to meet present targets for improving mechanization. Overall, we have assumed that the Soviets attain one-half the planned gains from technological improvements other than fertilizer.[7]

The Role of Weather

Weather will continue to be the key determinant of Soviet agricultural production. A recent detailed review of the evidence underlying changes in grain output over the past two decades led to the finding that more than one-half the increase in grain production between 1962 and 1974 was the result of improved climate.[8] A comparison of the climate since 1960 with a long-term average shows that the stable period of increased moisture in the late 1960s and early 1970s in the grain-growing steppes and near-desert regions was unusual. It also indicates that a steady improvement in the climate of major grain-growing regions occurred between 1960 and 1970. Continued improvement is unlikely because the amount of moisture the atmosphere can transport from the North Atlantic to the Soviet grain belt is limited. In fact, the dryness associated with the sharp downturn in the 1975 crop combined with other global climate changes could have signaled the end to a period of dependable moisture in these areas and a return to the more "normal" conditions of the early 1960s—that is, years of nearly normal weather interspersed with years of above-normal and subnormal weather. The first two and a half years of the current five-year plan period

[4] The historical pattern of planting indicates that the Soviets consider pasture and fodder-producing acreage to be as important to the livestock program as grain-producing areas. This trend has and is expected to continue, despite the fact that an overall net gain in feed units could be obtained from a shift to grain from nongrain feed crops (other than corn for silage). Grain yields nearly twice the number of feed units per hectare as perennial hay in many oblasts of the RSFSR.

[5] Additional rationale for this estimate is presented in *ibid.*, pp. 9-11.

[6] For a discussion of activity in Soviet wheat variety development, see CIA OSI-STIR-75-27, *Inadequacies in Soviet Wheat Varieties and Breeding Research*, November 1975.

[7] Plans for gains in yields from improved cropping practices, introduction of higher yielding varieties, use of pesticides and herbicides, expansion of sowings on irrigated land, and other components of "technology gains" have generally been underfulfilled. As there is no way to quantify the effect of these shortcomings on grain production, the assumption is necessarily arbitrary. For an expanded discussion of these problems see CIA, ER 77-10557, pp.11-13.

[8] See CIA, ER 76-10577U, *USSR: The Impact of Recent Climate Change on Grain Production*, October 1976, p. 14.

continue a fluctuating weather pattern. Favorable weather in 1976 resulted in a record crop of nearly 224 million tons (bunker weight), while output in 1977 was close to our long-term average, indicating nearly normal weather. In 1978 again, with a few exceptions, crop conditions were unusually favorable and a new record grain crop was attained.

Estimating Output

Given the estimated Soviet ability to boost output via technological improvements, annual average grain production is likely to range between 190 million and 212 million tons by 1980 and between 212 million and 236 million tons by 1985.[9] The range in the estimates is weather-determined. Under favorable weather conditions, output will tend toward the upper end of the projected range. However, should weather conditions revert to a longer term average, which we believe likely, production will tend toward the lower end of the range.

It will be difficult for the USSR to increase grain production above the projected 1985 level of between 212 million and 236 million tons. Raising yields above trend would necessitate accelerating growth of inputs—skilled labor, fertilizer, pesticides, and mechanization—to the agricultural sector. In fact, competing needs for ever-scarcer resources may constrain the amounts that can be allocated to the agricultural sector below the levels implicit in our output projections.[10]

- Movement of labor back to agriculture in order to boost output is unlikely. Instead, the sharp drop in the rate of growth of the overall labor force in the 1980s will increase pressures to continue to transfer labor from farms to nonagricultural sectors.

- Increasing shortages of steel and the need to conserve energy will limit the growth in mechanization.

- The expected decline in oil production will make it difficult to increase, if not maintain, fuel allocations to agriculture as well as allocations of natural gas to production of nitrogen fertilizer.

- Increased pressure on more slowly growing investment funds makes it unlikely that Moscow will step up land improvement programs.

[9] Standardized weight. In Soviet bunker weight, or gross weight, the range would be between 213 million and 238 million tons in 1980 and between 238 million and 265 million tons in 1985.

[10] For an analysis of the unusual resource constraint on Soviet economic growth, see U.S. Congress, Joint Economic Committee, *Soviet Economic Problems and Prospects*, August 1977.

Outlook for Utilization

Grain demand for domestic uses, excluding feed, is relatively stable and is estimated to remain at roughly current levels over the next several years.[11] The analysis assumes that the USSR does not plan to change the level of grain stocks in the 1979-85 period. Annual seed requirements and industrial uses are expected to remain at about 27 million and 5 million tons, respectively.[12] Food uses will require roughly 60 million tons annually through 1985. The steady decline in per capita consumption of grain products is being offset by lower extraction rates associated with quality improvements. In particular, more high-quality white bread is becoming available, and the trend is expected to continue.[13]

If, as seems likely, Moscow continues the present pattern and level of exports, annual grain shipments to client states will average roughly 4 million tons. Since the 1960s, Eastern Europe, Cuba, and the Asian Communist countries have relied on the USSR for various proportions of grain import requirements. Amounts were specified in annually negotiated trade protocols, which we estimate to have averaged between 4 million and 6 million tons per year during 1971-75.[14]

[11] For a discussion of the methodology used, see CIA A(ER) 75-68, *The Soviet Grain Balance, 1960-73*, September 1975, pp. 9-15. See appendix B for OER estimates of USSR grain balances for 1973/74-1977/78 and the 1980/81, 1985/86 projections.

[12] Grain for seed does not vary significantly unless winterkill is substantially larger or smaller than average. According to one Soviet authority, during 1961-70, winterkill averaged about 5 million hectares a year.

[13] The extraction rate—the proportion of flour milled from a given quantity of grain—declined from 83.4 percent in 1965 to 79.5 percent in 1974. As a result, 52.8 million tons of grain were required to produce flour in 1974. Had the rate remained at the 1965 level, only 50.4 million tons would have been required.

[14] The USSR apparently is giving less weight to its long-term grain commitments and more to its current domestic requirements. Soviet clients—Eastern Europe in particular—have been increasing the share of total imports from non-USSR suppliers.

In August 1975, for the first time, Moscow suspended the remaining deliveries of grain to client states because of the very low domestic harvest. Trade protocols for grain in 1976 were not reported and possibly not even signed.

Grain for feed currently accounts for slightly more than one-half of total Soviet grain use; the future level of Soviet grain utilization will thus strongly depend on the rate of growth of the livestock sector.[15] Output of livestock products will, in turn, depend on several factors. Official concern with mitigating consumer discontent over meat shortages and providing additional consumer goods to spur productivity argues for a rapid boost in livestock product output. Yet Soviet desire for agricultural self-sufficiency limits the size of a livestock sector that can be supported without relying on Western grain. Moscow will probably be forced to choose a middle ground; importing substantial amounts of grain to support a rate of growth in meat output that will be tolerated by the public without expending an inordinate share of foreign exchange for grain. In the final analysis hard currency stringencies—expected in the 1980s because of a decline in oil production—may limit funds available for grain imports and thus may dictate the size of the livestock sector Moscow can maintain.

Consumer Demand for Meat

Meat production is recovering rapidly from the consequences of the disastrous 1975 crop shortfall. Nonetheless, current supplies remain inadequate, and reports of unusual shortages at the retail level continue despite record meat imports in 1977.[16] Moscow may reach its 1980 meat production target of 17.3 million tons, but achieving that goal will not reduce consumer frustration over meat shortages as long as current personal income and retail price policies continue.

The evidence suggests a Soviet income elasticity of demand for unprocessed meat on the order of 1.0, considerably above the income elasticity of demand estimated for other countries with comparable levels of economic development. Italy and Spain—West European countries considered to be at levels of development comparable to the USSR—have estimated income elasticities of demand of 0.71 and 0.67 respectively. The estimated income elasticity of demand for meat in Eastern Europe—Poland (0.7), Hungary (0.65), and Czechoslovakia (0.47)—is also below that for the USSR. In the United States, income elasticity of demand for meat is estimated at 0.24.[17]

The high income elasticity of demand for meat in the USSR is due to several factors. Meat consumption is well below levels of consumption for countries with comparable levels of economic development (see figure 1). The consumer has few alternative outlets for his rising discretionary income; quality consumer goods such as consumer durables, clothing, and shoes are in short supply, and housing space is rationed at heavily subsidized prices. An additional reason for the continuation of the large difference between supply and demand for meat is the official policy of maintaining retail prices at relatively low levels in state retail outlets.[18]

As a result of this policy, some excess demand finds expression in collective farm markets (CFMs), where prices are relatively free to respond to supply and demand. For example, in Moscow CFMs, average meat prices have risen by 30 percent in the past five years and now are about two and a half times the state retail level. Although CFMs account for less than 5 percent of all food sold, they are an important source of perishable foods for urban residents.

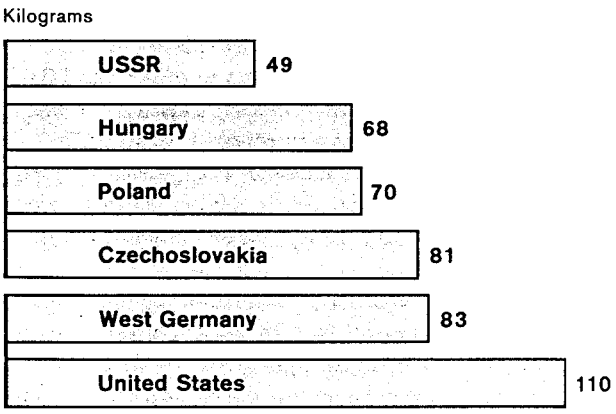
[15] While a change in the feeding technologies employed will change the relationship between the livestock population and grain utilization, Soviet ability to effect such changes during the period under discussion is limited. For a detailed discussion on this issue see appendix C, "Reducing the Internal Demand for Grain."

[16] Roughly 600,000 tons of meat were imported in 1977, up substantially from the annual average imports of nearly 300,000 tons in 1971-76.

[17] Food and Agriculture Organization of the United Nations, *Agricultural Commodity Projections, 1970-1980,* Volume II, Rome, 1971, table B. A more recent study—US Department of Agriculture; Economics, Statistics, and Cooperatives Service, *Alternative Futures for World Food in 1985,* Foreign Agricultural Economic Report No. 146, Washington, D.C., April 1978, Vol. 1, p. 88—presents income elasticities of demand for meat by type for several countries. The elasticities are reasonably consistent with those of the earlier FAO study.

[18] Because of the firm commitment not to raise state retail prices on food, Moscow prefers to shift a portion of rising agricultural production costs to the state budget. During the present five-year plan, for example, the state budget has allocated 100 billion rubles to cover the difference between state purchase prices for meat and milk and the retail prices fixed by the state. This is roughly equivalent to four times the total agricultural investment in 1975; 1.4 times agriculture's current contribution to gross national product.

Per Capita Meat Consumption in Selected Countries, 1975 Figure 1



Livestock Program

Under these conditions it is highly improbable that the USSR will be able to produce meat in sufficient quantities to satisfy consumer demand during the period under consideration. If the original planned 1976-80 growth in personal disposable income and meat production is met, for example, the implied gap between supply and demand for domestically produced meat in 1980 would be 8 percent (roughly one and a half million tons) greater than that in 1975.[19] The gap could be even larger; Soviet plans for income growth are consistently overfulfilled, and Moscow's ability to meet production goals is limited. Moreover, as overall economic growth slows, alternative outlets for discretionary income, such as automobiles, furniture, and other consumer durables, are not likely to be expanded as rapidly. The recently announced goal for 1985 meat production suggests the leadership is, in fact, aiming at a growth rate that, at best, will keep consumer frustration at tolerable levels; the 19.5 million ton output target translates to an average annual per capita growth of 1.5 percent in 1981-85, significantly below the 2.2-percent planned annual per capita growth in 1976-80. We believe this rate will lead to a futher widening of the gap between supply and demand and thus to increased consumer discontent.

[19] The projected demand for meat assumes an elasticity of demand with respect to income of 1.0 and continuation of the current policy of maintaining stable prices in state retail stores.

It is unlikely that Moscow will renege on its frequently reiterated promise to maintain meat prices in state retail outlets at current levels. At best, such action would reflect poorly on the ability of the Soviet system to provide for consumer welfare; at worst, Moscow would run the risk of engendering widespread consumer discontent.[20] As a result Moscow probably will be forced to expand meat production more rapidly. Two cases regarding future meat consumption are examined below (see figure 2).[21]

Our first case assumes that the USSR meets its 1980 and 1985 targets for meat production—17.3 million tons and 19.5 million tons, respectively. Such a 1985 production level would result in widening the gap between meat supply and demand by more than one and a half million tons [22] over the current sizable gap.

This pattern of planned growth would require roughly 121 million tons of grain for feed in 1980 and 132 million tons in 1985.[23] Total domestic requirements for grain in 1980 and 1985 would rise to 217 million tons and 228 million tons, respectively [24] (see table).

[20] On 1 June 1962, Nikita Khrushchev, citing the need to stimulate output of livestock products, increased retail prices of meat by an average of 30 percent. This action provoked civil disturbances so severe that Soviet Army units had to be used to quell the rioters. Similarly, Moscow is not likely to attempt to fill the gap with meat imports, although imports, possibly even at the 1977 record level, may continue. Even if hard currency availabilities permitted, purchases of 2 million tons or more would drive world prices to unrealistic highs in the short run.

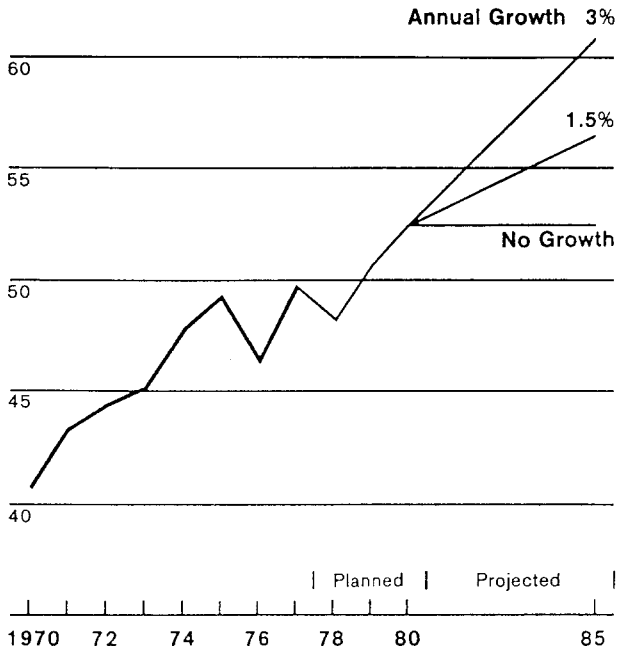
[21] In examining the impact of alternative livestock programs on the overall Soviet demand for grain, it is assumed that the mix of feed available does not change and that the relationship between feed input and product remains constant. Recent statistics indicate that the share of grain in total feedstuffs did not change appreciably in the first half of the 1970s. Similarly, feeding efficiencies have not improved noticeably.

[22] Assuming income elasticity of demand of 1.0 and average annual growth of per capita disposable income of 3.0 percent. (See footnote 25, page, 7.)

[23] See appendix B for a methodological note on deriving grain- for-feed estimates for 1980 and 1985.

[24] Standardized basis. In bunker weight, or gross weight, requirements for feed would be 136 million tons in 1980 and 148 million tons in 1985; total requirements would be 244 million and 256 million tons respectively.

USSR: Per Capita Meat Consumption[1] Figure 2



[1] From 1978 to 1985 consumption is assumed to equal production; no adjustment is made for possible imports which reached a record 617,000 metric tons in 1977. Statistics are adjusted to exclude slaughter fats and trim.

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Our second case assumes that 1980 planned output is achieved, but growth in per capita meat output during 1981-85 will be boosted to 3 percent per year in order to maintain the per capita gap between supply and demand at 1980 dimensions.[25] Under this scenario, livestock demand for grain would rise to 142 million tons with total utilization requirements reaching 238 million tons, 10 million tons more than under our first scenario.[26]

As explained in appendix B, these estimates assume a continuation of recent patterns in the supply of grain and nongrain feedstuffs. To the extent that Soviet plans for expansion of production of nonconcentrated feeds (silage, hay, and so on) are not achieved, grain and other concentrates may rise as a share of total feed units. In that event, we have underestimated the required quantities of grain for product output, and, hence, the expected level of imports.

[25] We estimate that per capita disposable money income will grow about 3 percent per year during 1981-85, roughly the upper end of the range estimated for per capita GNP. (See CIA ER 77-10436U, *Soviet Economic Problems and Prospects*, July 1977, p. 17.) Our estimate may be low. Historically, disposable income has grown more rapidly than GNP as shown in the following tabulation (average annual percent):

	1966-70	1971-75	1976-80 (Plan)
Per capita GNP	4.2	2.8	4
Per capita disposable money income	6.9	5.1	3.7

USSR: Projected Grain Balance

Million Metric Tons

	1980	1985
Assuming favorable weather		
Output [1]	212	236
Utilization [2]	217	228 to 238
Gap	−5	8 to −2
Assuming long-term average weather		
Output [1]	190	212
Utilization [2]	217	228 to 238
Gap	−27	−16 to −26

[1] Standardized weight. In Soviet bunker weight, or gross, terms, under favorable weather conditions, output would be 238 million tons in 1980 and 265 million tons in 1985; under a reversion to a long-term average, output would be 213 million tons in 1980 and 238 million tons in 1985.

[2] Includes an estimated 4 million tons of grain exports to Eastern Europe and other client states. See text pages 4-5, for discussion on ranges for utilization in 1985.

The USSR as an Importer of Western Grain

In sum we expect that, as in recent years, Moscow's need to minimize consumer discontent will necessitate substantial imports of Western grain in 1979-85. This estimate is predicated, in large measure, on the following assumptions:

- Weather returns to a long-term average.

[26] Standardized basis. In bunker weight, requirements for feed would be 136 million tons in 1980 and 160 million tons in 1985; total requirements would be 244 million tons and 267 million tons respectively.

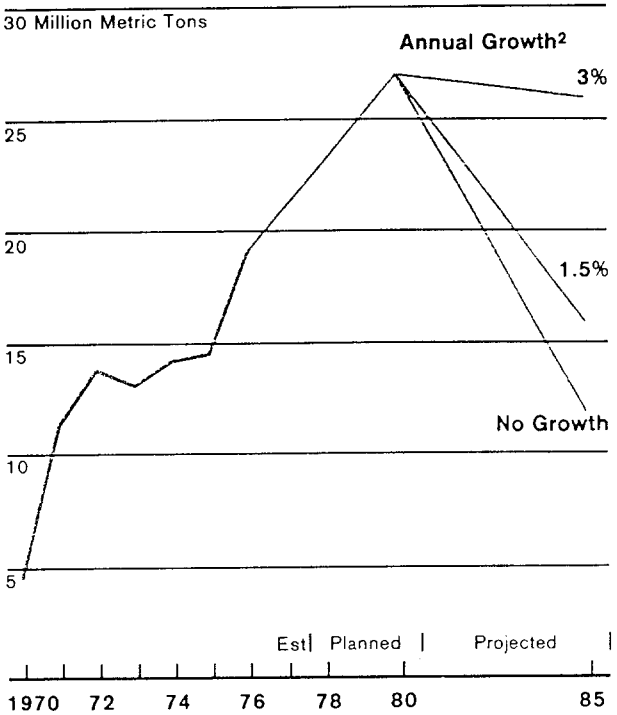
- Moscow continues to follow current policies regarding meat prices and the growth of disposable income.

- Consumer unrest will rise should the USSR drastically cut back the growth of per capita meat supplies.

While the volume of import demand in a particular year is likely to vary widely depending on world prices and the domestic harvest, given the assumptions stated above, the long-term average seems clear. On average, the need for Soviet annual grain imports could rise to as much as 27 million tons by 1980 and may stay close to this level through 1985. Only in the unlikely event that the government is successful in holding to its current plan to slow the annual rates of growth in per capita meat production markedly in 1981-85 would grain imports fall much below 20 million tons (see figure 3).

Much of the increased grain demand will probably be in the form of feedgrains, primarily corn. We do not anticipate a major increase in soybeans as feed enrichment; soybean imports will likely continue to vary with domestic oilseed production.

USSR: Grain Imports[1] Figure 3



1 Crop year begins 1 July of the stated year.

2 Growth in per capita meat production. Grain imports necessary to sustain a 3%, 1.5% or 0% increase in per capita meat consumption, assuming weather returns to the long-term average.

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Hard Currency Availability As a Constraint to Grain Imports [27]

Thus far Moscow has not been deterred by hard currency problems; for example, large amounts of grain were purchased in 1975/76 by selling gold and borrowing heavily on the Eurodollar market. Soviet demand for grain imports has been highly price inelastic, reflecting the high priority Moscow has attached to meeting domestic demand. Purchasing forays seem largely cued by the progress of winter and spring grain crops.

Grain imports have accounted for roughly 15 percent of total nonoil hard currency imports over the last five years. On an annual basis, imports since 1972 have ranged from a high of $3.2 billion in 1976 (more than 20 percent of total nonoil hard currency imports) to a low of $800 million in 1974 (10 percent of total nonoil hard currency imports). Soviet plans for meat production, assuming weather reverts to a long-term average and allowing for exports to Eastern Europe and other client states of 4 million tons annually, imply a need to import up to $3.4 billion in grain in 1980.[28] Although the rise in grain imports will come at a time when oil exports are expected to be on the decline (thus reducing the growth in overall import capacity), grain imports of this magnitude appear plausible through 1980 should Moscow decide to give a higher priority to its livestock program.

[27] Soviet port and storage capacity would not seem to be a constraint on grain imports. For additional details see appendix D.

[28] World market prices for grain (measured in 1978 dollars) are estimated to rise by an average of 5 percent annually in 1978-85. A 1977 base price for grain of $109 per ton was used. This figure is the mean of Rotterdam average 1977 prices of US wheat and corn.

Limitations on the availability of hard currency after 1980, however, could force the leadership to make hard choices with respect to the need for continuing to upgrade the consumer diet relative to industry's requirements for Western equipment, technology, and semimanufactured goods such as steel. The growing hard currency crunch will result from the expected decline in Soviet oil production beginning about 1980.[29] In 1977 oil exports for hard currency amounted to $5.5 billion, accounting for roughly one-half of total hard currency export earnings. Even allowing for an optimistic estimate of crude oil production and for domestic conservation measures, by 1985, the USSR—in order to meet anticipated oil export obligations to Eastern Europe and Cuba—is expected to become a substantial net importer on the hard currency account. Given estimates for the likely growth in nonoil exports and borrowing capabilities in the West, nonoil import capacity in 1985 will be reduced to well below current levels.

Such cuts will come at a time when Soviet need for imports from the West, both grain and nongrain, will be on the rise. Moscow thus will find it very difficult deciding which sectors have first claim on available hard currency and which to cut substantially.

Based on our estimate of Soviet grain output in 1981-85, Moscow will be hard pressed to maintain a constant gap between meat production and meat demand in 1981-85. To do so the USSR would have to increase per capita meat output by 3 percent annually in 1981-85 leading to a 1985 import requirement of roughly 25 million tons (costing roughly $4.0 billion).[30] Should the regime hold to its plan for 1985 meat output, roughly 16 million tons of grain imports would be required in 1985. While the $2.6 billion cost implied by this lower end of the import range for 1985 would be still difficult to bear, it is similarly difficult to conceive that the USSR, after accelerating the growth of meat consumption in 1977-80 to 3.1 percent annually and thus building up consumer expectations, can cut back the growth of per capita meat consumption below the recently announced plan levels. Should Moscow decide to hold per capita meat consumption through 1985 at the planned 1980 levels, substantial imports—12 million tons—would still be needed in 1985.

[29] For an extended discussion on the long-term outlook for Soviet oil production and its impact on foreign trade, see CIA ER 77-10436U.

[30] A 1985 price of $160 per ton is assumed based on the previously stated methodology.

Future Demand for US Grain

We believe that the United States will continue to supply at least one-half of Soviet requirements for foreign grain. The actual share will depend on the composition of grain import demands, relative prices, and the willingness and ability of other countries to increase grain exports to the USSR.

The ability and willingness of non-US exporters to supply the USSR with grain is probably limited to about 10 million tons annually, mostly wheat; an annual average of 6.8 million tons was supplied during July/June 1975/76-1977/78. Our estimate assumes that these exporters would want to maintain their current share of commercial sales to other traditional markets, which are expected to expand by 1985. While the European Community has a potential for expanding wheat output, it could use any increase to meet domestic requirements for feedgrain. Because of high production costs, EC grain can only compete in world markets if subsidized. We believe subsidizing wheat or barley exports to the USSR under a long-term agreement would be politically unacceptable to the EC.

Both Canada and Australia have only limited potential for expanding grain output because of unfavorable climatic factors. Recent OECD studies indicate that these two countries by 1985 could achieve a 4-million-ton total increase in wheat exports if a profitable commercial market existed.[31] A large share of this increase could be available to the USSR under long-term agreements. Some expansion of barley is also possible, but nothing on a large scale.

[31] See OECD, *Study of Trends in World Supply and Demand of Major Agricultural Commodities*, Paris, 1976, chapters III, IV, and XII; and T. K. Warley, *Agriculture in an Interdependent World*, United States, May 1977, p. 26.

We believe that Soviet grain import demand will continue the trend toward an increasing share of feedgrains. While the US could lose some share of its wheat market to other exporters—Canada and Australia—under long-term agreements, the same does not hold true for feed (coarse) grains.[32] Expanding feedgrain export capabilities—especially storage and grain export handling facilities [33]—will be slow among important non-US exporters such as Argentina, Brazil, and Thailand. Weather-induced fluctuations in production are relatively large, and there is no system of reserves to level out export availability. As a result these countries are not reliable suppliers of large quantities. For political as well as economic reasons, the USSR is not expected to buy substantial quantities of South African corn. The United States should, therefore, be able to maintain its share of the Soviet coarse grain import market, particularly corn, through 1985 so long as total grain imports do not fall below 15 million tons.

Nonetheless, the USSR will retain its advantage as a large buyer in a free market. The Soviets have shown little interest in multiyear grain import agreements with Free World exporters. The US-USSR Long-Term Agreement (LTA) was initiated and pushed by the US Government.[34] Other than to foster political relations, there are no strong economic advantages for the USSR to enter into such agreements. Theoretically, an agreement would guarantee supplies in times of scarcity, but in practice politics and production shortfalls could negate the guarantee.[35] Not being locked into multiyear contracts permits Moscow to use the element of secrecy advantageously. The USSR, operating as a grain buyer in a free market, has continually made effective use of its monopoly on information about domestic production developments, intentions, and import needs. This was illustrated by the bargain prices negotiated with US traders in the large grain purchases of 1972/73.

We have no reason to expect that in the future the Soviets will be more forthcoming in providing the market with advance information on their import intentions. They will use the United States as a residual supplier of grain (after meeting the LTA commitment) and contract with US traders for optional origin grains. This permits international traders to offer the USSR a better price as well as allowing Moscow to buy large quantities in a relatively short time for prompt delivery.

[32] The USDA's study, *Alternative Futures for World Food in 1985* (p. 73), indicates that the United States' share of total world exports of coarse grain would increase under all their assumed scenarios except alternative III (slow economic growth and restrictive trade policies of developed countries).

[33] Based partly on World Bank studies.

[34] The October 1975 long-term grain agreement stipulated that the Soviet Union would buy a minimum of 6 million tons of corn and wheat annually from the United States for five years beginning 1 October 1976.

[35] The US-USSR LTA, for example, contains a provision which would allow the United States to reduce sales if domestic grain production falls below 225 million tons.

Appendix A

Statistical Tables

Table A-1 Thousand Metric Tons

USSR:
Volume of Grain and Soybean Imports

	Total Grain [1]	Wheat	Corn	Soybeans
1971	4,220.5	2,300.0	880.8	0
1972	16,160.9	8,100.0	4,100.0	391.8
1973	24,479.3	15,200.0	5,400.0	482.6
1974	7,808.5	2,700.0	3,400.0	0
1975	16,658.4	9,146.0	5,548.0	348.6
1976	21,489.5	6,686.0	11,376.0	1,769.1
1977 [2]	10,832.2 [3]	5,649.0 [3]	3,983.1 [3]	795.4

Source: *Vneshnaya torgovlya SSSR v 1972 g.* and subsequent editions.
[1] Including flour in grain equivalent and rice.
[2] Estimated.
[3] Western trade statistics were used to fill gaps in Soviet data.

Table A-2 Million US $

USSR:
Value of Grain and Soybean Imports

	Total Grain [1]	Soybeans
1971	286	0
1972	954	53
1973	1,611	72
1974	828	0
1975	2,857	89
1976	3,159	431
1977	1,633	199

Source: *Vneshnaya torgovlya SSSR v 1972 g.* and subsequent editions.
[1] Including flour in grain equivalent and rice.

Table A-3

USSR:
Production of Major Crops and Livestock Products

	Average 1971-75	1976	1977
	Annual Percent Change		
Crops [1]	−1.9	22.1	−5.5
Livestock products [2]	3.6	−5.6	7.3
	Million Metric Tons		
Grain [3]	181.6	223.8	195.5
Potatoes	89.8	85.1	83.5
Sugar beets	76.0	99.9	93.3
Sunflower seed	6.0	5.3	5.9
Cotton	7.7	8.3	8.8
Vegetables	23.0	25.0	23.0
Meat (slaughter weight)	14.0	13.6	14.8
Milk	87.4	89.7	94.8
Wool	0.442	0.435	0.458
	Billion		
Eggs	51.4	56.2	61.0

[1] Based on average prices realized by all sellers in 1970; net of seed and estimated waste.
[2] Excluding changes in inventories of herds.
[3] Measured in "bunker weight," that is, gross output from the combine, which includes excess moisture, unripe and damaged kernels, and weed seeds and other trash. In order to compare Soviet grain output with that of other countries, a downward adjustment of 11 percent is in order.

Table A-4

Percent

USSR:
Growth of Agricultural Output [1]

1966	7.4
1967	−0.8
1968	5.4
1969	−2.4
1970	13.5
1966-70 Average Annual	4.5
1971	0.1
1972	−6.6
1973	15.1
1974	−1.3
1975	−8.4
1971-75 Average Annual	−0.6
1976	7.6
1977	3.4

[1] Total output of crops and livestock, including changes in inventory, but net of feed, seed, and waste, priced in average 1970 prices realized by all sellers.

Table A-5

USSR:
Production of Livestock Products

	Meat	Milk	Wool	Eggs (Billion)
	Million Metric Tons			
1970	12.3	83.0	0.419	40.7
1971	13.3	83.2	0.429	45.1
1972	13.6	83.2	0.420	47.9
1973	13.5	88.3	0.433	51.2
1974	14.6	91.8	0.462	55.5
1975	15.0	90.8	0.467	57.5
1976	13.6	89.7	0.435	56.2
1977	14.8	94.8	0.458	61.0
1980 plan	17.3	102	0.515	66.8
1985 [1]	19.5 to 21	116	0.570	75

[1] Projected. For meat, see pages 4-5. The ratio of feed required to produce milk and eggs to the feed required to reach the low end of the meat projection is the same as it was in 1977. Wool output is projected from the 1971-80 average annual rate of growth and rounded.

Appendix B

Feed Projections for 1980 and 1985

The quantities of grain required for 1980 and 1985 are obtained by linking a derived index of quantities of grain and other concentrates required with the officially reported series of grain fed, calculated from the series of concentrates fed.

Grain required for feed in 1980 and 1985 is obtained by:

- Multiplying officially reported concentrate units required per unit of meat output (by type), milk, and eggs, applied to quantities of product shown in table A-5, appendix A.

- Adding quantities of grain required to accommodate increases in inventories of the major types of livestock—cattle, hogs, and sheep.

- Adding quantities of grain required to maintain horses as draft animals. The results are set forth in tables B-2 through B-5 below.

An average of the officially indicated quantities of grain fed in the July-June periods for 1976/77 and 1977/78 was used as the base point. The amount of grain fed in each of these two crop years was strongly influenced by the very poor crop of 1975 followed by the record high grain harvest of 1976. Hence, it is assumed that an average of the two years provides a base point of "normalcy."

Although the computed series, expressed in tonnage was consistently higher than the officially reported series of quantities of grain and other concentrates fed until 1977—roughly 10 percent during 1972-75, for example—the trends are comparable. Thus, the computed index series of required grain fed derived for 1972-77 by the above method is in general agreement with the official series index of actual grain and other concentrates fed (see table B-1). The methodology assumes grain is a constant share of total feed units ingested by the various categories of livestock. The divergence between the computed index (based on requirements) and the actually reported series for 1976-77 can be at least partly explained by the rise of concentrates in the share of feed units consumed (see table C-2). For purposes of projecting grain requirements for 1980 and 1985, we have assumed that the share of grain and other concentrates in total feed rations will be maintained at roughly one-third of total feed units. If Soviet plans for expansion of production of nonconcentrated feeds (silage, hay, coarse feeds, fodder roots, pasture, and other minor feedstuffs) are not fulfilled, grain and other concentrates may rise as a share of total feed units. In that event, we have underestimated the required concentrates and, hence, the expected level of imports of grain.

Table B-1 Index: 1972 = 100

USSR: Comparison of Official And Computed Indexes Of Grain and Other Concentrates Fed

	Official [1]	Requirements [2]
1972	100	100
1973	104.5	102.4
1974	113.4	115.7
1975	111.2	108.8
1976	107.6	99.2
1977	123.1	110.6

[1] Based on the official series of concentrates actually fed (*Narodnoye khozyaystvov 1977g.*, p. 270 and earlier editions). The official series is lagged by one-third, an arbitrary adjustment to allow for the interval between feeding and producing final output. That is, one-third of the officially indicated quantity fed in 1973 is assumed to be associated with grain requirements for the product produced in 1974. Hence, the quantity fed in 1974 is comprised of one-third of the officially claimed tonnage for 1973 and two-thirds of the comparable figure for 1974.

[2] Based on product output, increases in herd inventory, and numbers of horses (see table B-5).

Table B-2

Million Head

USSR: Livestock Herds

	Inventory Changes [1] 1 January to 31 December			Horse Inventory [2]
	Cattle	Hogs	Sheep and Goats	
1972	1.6	−4.8	−0.7	7.3
1973	2.3	3.4	3.8	7.1
1974	2.8	2.3	2.7	6.8
1975	1.9	−14.4	−4.1	6.8
1976	−0.7	5.2	−1.8	6.4
1977	2.4	7.4	1.3	6.0
1980 [3]	1.7	3.0	6.0	5.8
1985 [3]	1.5	2.8	1.0	5.6

[1] Data for 1972-77 are from *Narodnoye khozyaystvov 1977g.*, p. 253, and earlier editions. Data for 1980 are based on a linear extrapolation in growth of herds necessary to meet Tenth Five-Year Plan goals for average annual herd numbers; the inventory change for the single year 1985 is based on average annual inventory changes in 1981-85, estimated to be comparable to those for 1976-80.
[2] Horse numbers are on 1 January. It is assumed that after the relatively rapid decline in 1972-77 (average of 250,000 per year), horse numbers—now at a record low—will level off with only minor annual decreases by 1985.
[3] Estimated.

Table B-3

Million Metric Tons

USSR: Inventory Changes Expressed in Liveweight [1]

	Cattle	Hogs	Sheep and Goats
1972	0.5	−0.5	−0.03
1973	0.8	0.3	0.1
1974	0.9	0.2	0.1
1975	0.6	−1.4	−0.2
1976	−0.2	0.5	−0.1
1977	0.8	0.7	0.1
1980 [2]	0.6	0.3	0.2
1985 [2]	0.5	0.2	0.1

[1] Herd changes from table B-2 are multiplied by the average liveweight of animals purchased by state procurement agencies—cattle, 337 kilograms; hogs, 99 kilograms; sheep and goats, 37 kilograms—1975-77. Data are from *Narodnoye khozyaystvov 1977g.*, p. 269.
[2] Estimated.

Table B-4

Million Metric Tons

USSR: Concentrates Consumed by Changes In Inventory of Livestock and by All Horses [1]

	Cattle [2]	Hogs [2]	Sheep & Goats [3]	Horses [4]	Total
1972	0.9	−3.5	Negl	6.4	**7.3**
1973	1.4	2.1	0.1	6.2	**9.8**
1974	1.6	1.4	0.1	5.9	**9.0**
1975	1.1	−9.7	−0.2	5.9	**7.0**
1976	−0.4	3.5	−0.1	5.6	**9.1**
1977	1.4	4.9	0.1	5.2	**11.6**
1980	1.1	3.0	0.2	5.1	**9.4**
1985	0.9	2.8	0.1	4.9	**8.7**

[1] Feed units of concentrates required times units of liveweight equivalent of increases in herd inventories plus concentrates required to maintain the total inventory of horses. Only positive changes in herd inventories are summed; negative changes are already accounted for in product output.
[2] Feed units required per unit of liveweight. N. Burlakov, *Ekonomika sel'skogo khozyaystvo*, No. 5, 1972, p. 36.
[3] Feed units required per unit of liveweight. V. Nemchinov, *Voprosy ekonomiki*, No. 2, 1955, p. 18.
[4] Maintenance ration, estimated on the basis of information in E.A. Ruzskaya, *Perspektivy razvitiya i razmeshcheniya zhivotnovodstva v SSSR*, Moscow, 1959, pp. 209, 219.

Table B-5

Million Metric Tons

USSR: Total Concentrate Feed Units Required

	Product [1]	Horses and Inventory Change [2]	Total
1972	123.5	7.3	**130.8**
1973	124.1	9.8	**133.9**
1974	142.4	9.0	**151.4**
1975	135.3	7.0	**142.3**
1976	120.7	9.1	**129.8**
1977	133.1	11.6	**144.7**
1980 [3]	154.0	9.4	**163.4**
1985 [3] (I)	169.7	8.7	**178.4**
(II)	182.1	8.7	**190.8**

[1] Product output in table A-5, appendix A, multiplied by concentrates required per unit from Burlakov, *op cit*, p. 36. In this calculation, concentrate units required to produce mutton, goat, and other meat are assumed equal to those required to produce beef.
[2] Grain for maintenance of horses as draft animals plus grain required to accommodate inventory increases of other livestock. See table B-4.
[3] Estimated.

Table B-6

Million Metric Tons

USSR: Grain Balance [1]

Year [2]	Supply				Utilization						
	Production [3]	Waste and Losses [4]	Imports	Net Supply	Total	Feed [5]	Food	Seed	Industrial	Export	Stock Change
1973/74	222.5	24.5	11.0	209.0	192.6	94.5	59.4	26.7	5.0	7.0	**16.4**
1974/75	195.7	21.5	5.6	179.8	190.1	92.9	58.6	27.0	5.4	6.3	**−10.3**
1975/76	140.1	15.4	26.4	151.1	183.7	89.6	57.6	27.7	5.5	3.4	**−32.6**
1976/77	223.8	24.6	11.8	211.0	199.5	102.3	59.7	28.0	5.5	4.0	**11.5**
1977/78	195.7	21.5	18.4	192.6	209.1	112.7	60.0	27.7	5.5	3.2	**−16.5**
1980/81 [6]	213 [7]	23		190	217	121 [8]	60 [9]	27 [10]	5 [11]	4 [12]	NA [13]
1985/86 [6] (I)	238 [7]	26		212	228	132 [8]	60 [9]	27 [10]	5 [11]	4 [12]	NA

[1] CIA A(ER) 75-68, *The Soviet Grain Balance 1960-73*, September 1975, explains the construction of OER's grain balance and sets forth the balances for 1960-73. Subsequent years are added using the same methodology and sources, and incorporating new information as it becomes available. The OER grain balance is in general agreement with that of the US Department of Agriculture with two exceptions. First, our estimates of grain required for food uses are larger. (See CIA A(ER) 75-68, pp. 20-22 for a discussion of the difference.) The second difference arises from applying a discount to official indicators of quantities of grain fed. (Although this was not done in compiling the balances in CIA A(ER) 75-68, the reasons for doing so are outlined in that report, pp. 13-15.) Recent information on quantities of grain used in alcohol production necessitated an upward revision in the industrial use series shown in CIA A(ER) 75-68, p. 24.

[2] Data are for the year from 1 July through 30 June.

[3] "Bunker" weight. See the preface for definition.

[4] Estimated at 11 percent—see CIA A(ER) 75-68, pp. 14, 18.

[5] Estimated quantity fed reduced by 11 percent for comparability with other uses.

[6] Estimated.

[7] See text, page 7.

[8] See appendix B.

[9] Grain demand as food is relatively stable and is estimated to remain at roughly current levels over the next several years. The downward trend in per capita consumption of flour has been in the past decade offset by the lower extraction rates associated with quality improvement. These trends are expected to continue.

[10] Area sown to grain is planned to remain at roughly the same level. Hence seed requirements are expected to continue at current levels.

[11] Assumed constant.

[12] Assumed total of commitments for supplying grain to East European and other client states.

[13] NA—not available.

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Appendix C

Reducing the Internal Demand for Grain

Although the quantities of grain required for seed, food, and industrial use are relatively fixed, the USSR potentially has substantial latitude for reducing grain demand by improving livestock feeding efficiencies. The current ratio between grain use and livestock output could be improved in several areas, including better feed quality, increased use of nongrain feedstuffs, increased emphasis on the "livestock complex program" and the private sector, and improved breeding. Soviet planners have long been aware of the potential for improvement in these areas.

Feed Quality

The average Soviet livestock feed ration is short on both "energy" feeds, those containing a high proportion of carbohydrate such as grain, and protein feeds. Overall quantities of feed remain 20 percent below announced standards, and Soviet researchers currently report that the protein deficit ranges from 20 percent to 30 percent.[36] By feeding more high-protein supplements, the USSR could increase the use efficiency of both roughage and concentrated feeds. For example, meat production could be increased substantially with no increase in total feedgrain use if rations comparable in protein content to those used in the US were available.

Soybeans are considered the most desirable protein feed supplement, but the Soviet growing environment probably restricts the output of soybeans to less than 1 million tons per year. Since self-sufficiency in protein feed supplies is an avowed aim of the leadership, the 1976-80 plan calls for expanded plantings of high-protein crops such as pulses, vetch, clover, and lucerne.

[36] A measure of protein deficiency is based on estimates of the protein intake required if an animal is to utilize the total calorie intake efficiently, that is, minimize the ratio of calorie intake to product output. This deficiency implies livestock are receiving only 70 to 80 percent of the amount required to minimize total feed intake per unit of output. For a discussion of the Soviet shortage of protein in feed, see USDA, ERS, FDCD Working Paper, "The Soviet Feed-Livestock Economy: Preliminary Findings on Performance and Trade Implications," December 1973, pp. 20-21. This report estimates that the 1970/71 protein shortage was equivalent to the protein supplied by 12 million tons of soybeans.

Table C-1

Nutrient Costs, June 1978

	Corn (No. 2 Yellow)	Wheat (No. 2 Hard Winter)	Soybean Meal (44% Protein)
	Percent		
Protein content [1]			
Crude	8.7	13.5	45.7
Digestible	6.7	11.3	42.0
Energy content [1]			
Total digestible nutrients	80.1	79.6	78.0
Net	80.1	79.6	79.6
	US $ Per Metric Ton		
Price	114.26 [2]	99.61 [3]	249.83 [4]
Nutrient costs			
Digestible protein	1,705	882	595
Digestible nutrients	143	125	320

[1] Morrison Frank B, *Feeds and Feeding,* 22nd ed., Clinton, Iowa, 1959, appendixes I and II.
[2] c.i.f., Kansas City.
[3] c.i.f., Chicago.
[4] f.o.b., Decatur.

Although there has been little progress in this area, Brezhnev emphasized its importance once again at the July 1978 plenum.

Western observers have long urged imports of soybean meal or of soybeans as a "simple and quick" solution.[37] Soybean meal is a much less expensive source of protein than grain (see table C-1) and would substantially increase the efficiency of the grain now being used. Moscow, however, has stubbornly refused to pursue this course of action. Soybean meal has never been imported, and the infrequent imports of whole beans have been related to shortfalls in domestic oilseed production. In other words, the vegetable oil content (or fraction) has been more important than the meal fraction.

[37] See D. Gale Johnson, *The Soviet Impact on World Grain Trade,* British-North American Committee, USA, May 1977, pp. 12-19.

The Soviet reluctance to import soybean meal even at favorable prices may stem from a realization that the mixed feed industry, given its rudimentary level with a lack of adequate mixing facilities and trained personnel, would not be able to utilize the meal efficiently.[38] Moscow may also feel that the need for energy feed outweighs the overall gain in feeding efficiency possible with soybean meal imports. Recently, the government has stressed the importance of the mixed feed industry and is devoting substantial sums to its development. Progress is slow, however, and it is unlikely that large quantities of imported meal could be successfully incorporated soon. Hard currency stringencies may ultimately force Moscow away from its policy of importing ever-increasing quantities of costlier grain in favor of a more rapid improvement of feeding efficiencies through use of protein supplements and mixed feed.

Substitution of Other Feedstuffs

The quantities of grain required for feed could be reduced if the use of substitute feedstuffs such as silage, feed roots, hay, and haylage were increased. A boost in other concentrated feeds—oilseed meals,[39] milling byproducts, and alfalfa and grass meals—could also reduce the quantity of grain required.[40] However, neither possibility is likely.

In recent years the USSR has emphasized the feeding of grain and other concentrated feeds. Since 1965, the share of concentrates (expressed in tonnage) in total feed has grown from 6.4 percent to 10.6 percent (see table C-2). Within concentrates, the share supplied by grain initially increased slightly but held roughly constant at 85 percent to 1975. The share of milling byproducts has declined while that of alfalfa and grass meals has grown.

[38] Possibly for the same reason, the USSR does not rely significantly on urea, a synthetic source of protein for ruminants, in feed rations. Because of its nature, successful feeding of urea requires that a small quantity be thoroughly mixed with a high-energy feed such as grain.

[39] The bulk of oilseed meal fed is from sunflower seed (about two-fifths) and cotton seed (about one-half). Soybean meal supplies on average only 5 to 6 percent, except in those years when soybeans have been imported to bolster domestic vegetable oil supplies.

[40] By Soviet definition, feeds of animal and synthetic origin are not included in concentrates. Quantities of these feeds are increasing but are not yet having a significant effect on feed rations.

Growth in other types of feeds—silage, feed roots, hay, and haylage—has been much slower primarily because these crops have been slighted in allocations of yield-enhancing fertilizer and pesticides. Indeed, supplies of both coarse and succulent feeds have grown by less than one-third in 1965-76,[41] and feed supplied by pasture has been roughly constant.

Ambitious plans to increase output of nongrain feed crops have consistently fallen far short of target. The Ninth Five-Year Plan (1971-75), for example, called for a 65-percent increase in output of succulent feeds but achieved a boost of only 12 percent. On the past record we do not anticipate any marked growth in production of these crops or a consequent change in the feeding pattern.

Livestock Complexes

The advent of large-scale livestock "complexes" has led to an increase in feeding efficiency.[42] For example, in recent years milk yields at dairy complexes averaged 11 percent above those on state farms and feed use per unit of production was 10 percent less. Daily weight gain for cattle at the better complexes runs as much as 30 percent higher with feed expenditures down by 15 to 20 percent. Presumably, the improved results are due to the balanced nature of the feed rations with respect to protein, vitamins, and trace elements as well as to provision of adequate quantities of both concentrates and roughages.[43]

[41] "Coarse" and "succulent" are Soviet categories. Coarse feeds have a fiber content in excess of 19 percent and include hay, straw, and stover. Succulent feeds are those with water content in excess of 40 percent. They include silage, green chop, potatoes, sugar beets, feed roots, melons, wet beet pulp, and distillers' mash.

[42] Complexes are large, standardized, highly automated facilities developed to concentrate the breeding, raising, and feeding of livestock, including poultry. Hog complexes, for example, are designed to produce from 12,000 to 108,000 hogs per year. A complex may also include living quarters and cultural facilities for workers.

[43] Animals gain weight more rapidly and require less feed per unit of gain when a balanced ration is used. In other words, a "pure" concentrate mix is not as advantageous as a balanced ration and results in overfeeding of concentrate relative to product output.

Table C-2

Percent

USSR:
Structure of Feed Supplies [1]

	Based on Tonnage					Based on Feed Units			
	1965	1970	1975	1976	1977	1970	1975	1976	1977
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Concentrates	6.4	9.1	9.5	9.4	10.6	31.4	31.8	31.6	34.4
Coarse feeds	16.1	15.4	19.1	17.7	17.2	17.2	20.7	19.4	18.5
Succulent feeds	40.9	39.7	40.3	42.3	44.2	27.8	27.4	29.0	29.4
Pasture	36.6	35.8	31.1	30.6	28.0	23.6	20.1	20.0	17.7
Concentrates	100.0	100.0	100.0	100.0	100.0	NA [2]	NA	NA	NA
Grain	82.4	85.0	85.2	85.4	85.9				
Milling byproducts	12.9	11.1	9.2	8.5	8.7				
Oilseed meal	4.5	3.0	3.0	3.0	2.6				
Alfalfa and grass meals	0.2	0.9	2.6	3.1	2.8				

[1] Derived from feed units per ton of feed fed on collective and state farms, roughly 70 percent of the total. The balance is fed by subsidiary agricultural units of nonagricultural enterprises and the private sector. Calculations assume the mix in each of the four feed categories has remained the same as that during 1968-70.
[2] NA—not available.

If plans to increase beef and milk production by these complexes to 14 percent of the total in 1980, pork production to 30 percent, and egg production to 80 percent are achieved, and if the complexes are fully operational and adequately supplied with good quality feed, grain required for feed in 1980 would drop by an estimated 3.5 million tons. A continuation of the trend to 1985 would result in a decline of 8.5 million tons.[44] Even these gains are unlikely because of the USSR's perennial difficulties in adapting to new methods of operation and new technology. More important, to the extent that the improved efficiency of these complexes is due to better balanced feed rations, there will be less protein and other desirable feed supplements available to regular collective and state farm livestock enterprises.[45] Hence, the gross grain "savings" from a rising share of output accounted for by complexes would be partially offset by reduced efficiency in the balance of the livestock economy.

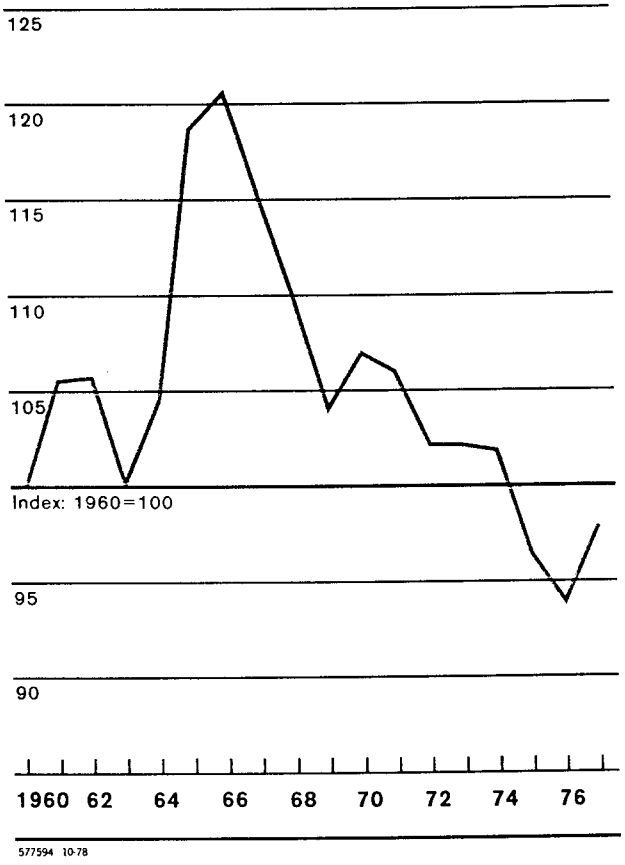
[44] These calculations are based on achieving planned 1980 output of meat, milk, and eggs, and assume output trends continue to 1985.
[45] That is, less than what would otherwise be available if the share of production accounted for by complexes remained at the current lower levels.

Private Sector

The recent swing to encouraging livestock production in the private sector could provide a substantial boost to meat and other livestock product output by 1980. In 1976, under relatively restricted conditions, the private sector produced 30 percent of all meat and milk and 40 percent of eggs. Output of meat was up in 1977 as private owners expanded their livestock holdings; the value of privately held livestock increased by 5 percent over 1976, the first positive growth since 1970 (see figure 4).

The socialized sector has been directed to provide individuals with a steady supply of feeds, including the crucial concentrates. Private farmers will most likely be sold grain rather than the better balanced mixed feeds, in part because complexes and large livestock-specializing state and collective farms have priority for mixed feed supplies and in part because of distribution problems. Complaints of the difficulties encountered by individuals in purchasing mixed feed have been common.

USSR: Value of Livestock in Privately Owned Herds Figure 4



If official statistics are to be believed, the private sector historically has been able to produce more than twice the value per unit of concentrate feed, such as grain, that state and collective farms produce. We can only explain these drastic differences between the private and socialized sectors by assuming that individual attention and careful feeding given privately held livestock results in greater feeding efficiency.[46]

[46] Apparently the increased efficiency is not related to a "composition effect" as the private sector also uses about one-half nonconcentrate feed per unit of output. The calculations are based on output by type of product and on quantities of concentrates and nonconcentrates fed as officially reported by the USSR Central Statistical Administration. The "efficiencies" may be overstated because the statistics on private sector feeding are based largely on family budget survey data and thus are subject to error.

On balance, stimulation of the private sector would appear to reduce the total demand for grain per unit of livestock output through more efficient use in the long run. Again, however, prospects for substantially increasing meat production in the private sector are dim. There has been a distinct downward trend in share of output—from 67 percent of total meat production in 1950 to 41 percent in 1960 and about 31 percent today. This trend will continue in keeping with the decline in rural population and possible increased demands on the individual worker's time as the farm labor force declines. In addition, growing farm incomes and the increasing availability of processed farm products make work in the private sector less attractive.

Breeding Programs

Some efficiencies could be gained through breeding livestock for specific purposes (for example, cattle for meat or milk instead of the prevalent dual-purpose animals, leaner hogs, and so on). Although considerable official publicity and investment outlays have been accorded breeding programs since the mid-1950s, results have been disappointing. Over the period under consideration, we do not expect substantial gains in this area.

Appendix D

Logistic Constraints

Soviet port and storage capacity would not seem to be a constraint on grain imports. Soviet ports currently can handle 36 million tons of grain imports spread over a 12-month period without serious problems. All ports used for grain imports are connected to the national rail network and some are also located near navigable rivers, providing inland access by barge. The Soviets have improved their operations since 1973, when a serious shortage of railcars occurred at some ports because of management and scheduling problems.

Current grain storage capacity is roughly 300 million tons,[47] and a major elevator construction program is under way. The 10th Five-Year Plan calls for construction of additional elevator capacity of 30 million tons, but only 8.8 million tons were completed during 1976-77. Nevertheless, we believe that the growth in storage capacity will be adequate to handle the domestic crop plus imports of 30 million to 40 million tons. Although storage facilities at dockside are somewhat limited, this should not be a restricting factor since Soviet methods for offloading grain can bypass the fixed grain storage facilities by direct loading into railcars, barges, or trucks for further movement inland.

[47] This statistic was quoted by a Soviet official to US Secretary of Agriculture Robert Bergland during his May 1978 visit to the USSR (US Department of Agriculture, *Foreign Agriculture*, 14 August 1978, p. 9). This figure may reflect a "rounding upward"; reported capacity was about 250 million tons in 1976, a volume consistent with earlier reported capacities and rates of retirement and construction. Continuing that methodology, we estimate current capacity would be about 255 million tons.