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AGRICULTURAL PROSPECTS IN CENTRALLY
PLANNED ECONOMIES

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AGRICULTURAL PROSPECTS IN CENTRALLY PLANNED ECONOMIES*

Philip M. Raup**

I. An Overview of the Current Situation

The contrasts among centrally planned economies are at least as great as those that distinguish countries loosely classified as capitalist or market-oriented in their economic structure. If we omit the smaller centrally planned regions--Cuba, North Vietnam, North Korea, South Yemen--we can identify three distinctly different examples of central planning in agriculture: The USSR

Eastern Europe

China

The agricultural prospects in these three areas are sharply divergent. The USSR has not had a good grain harvest since 1978/79, and in two years, 1981/82 and 1984/85, the harvest was exceptionally disappointing. The annual average production of wheat and coarse grains for the last four years--1981/82-1984/85, has been 166.5 million metric tons or 26 percent below the record output of 226.2 m.m.t. in 1978/79. Net imports as a result have averaged 38.75 m.m.t. over the past four years, or 18.8 percent of total utilization. If wastage and seed uses are deducted from total domestic availability, the import of 49 million tons of wheat and coarse grains by the USSR in 1984/85 will amount to 28.3 percent of total grain used for food and animal feeds. (These and subsequent production and trade estimates are from U.S. Department of Agriculture, FAS, Foreign Agriculture Circular, Grains, FG-14-84, November, 1984).

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The position of Eastern Europe is less threatening to domestic utilization, due primarily to the fact that the harvests of the past three years have been the three largest recorded. The consequential net imports in 1982/83 through 1984/85 averaged 3.2 m.m.t., in contrast to average net imports of 12.6 m.m.t. in the three years, 1978/79 through 1980/81. The prospects for increases in net imports from current low levels are not bright, due primarily to payment difficulties. Grain feed supplies are tight, and potential import demand is strong, but there seems little likelihood that the centrally planned economies of Eastern European will be able to afford to return to the high grain import levels of the 1978-81 period in the foreseeable future.

The Chinese position is one of sharp contrast. Production of wheat and coarse grains in 1984/85 was 180 m.m.t., a record high, and 38 percent above the average output of 130.2 m.m.t. in 1977/78 through 1979/80. While China in 1984/85 is expected to import 10.0 m.m.t. of wheat, she will actually be an exporter of just under one million tons of feed grains. One of the most noteworthy developments of the past year in the world grain trade was the arrangement whereby Japanese trade contacts will be used to promote the export of Chinese feed grains (Reuter's dispatch of October 19, 1984 from Tokyo).

To underline the rapidity of major changes in the world of agricultural trade, I ask you to imagine the disbelief with which I would have been greeted if I had predicted just 5 years ago that China would be an export competitor in the world market for feed grains in 1984.

II. A Summary of Some Key Features that Will Affect Future Prospects

A. The USSR

1. The Soviet Union is slowly acquiring the industrial base needed to supply agriculture with inputs that are substitutes for both land and labor. As a result, the potential for expanded use of industrial-type agricultural inputs is great, and growing.
2. The developing chemical industry can reckon with abundant feedstocks, especially of natural gas for nitrogenous fertilizer.
3. Off-the-shelf agricultural technology available in western Europe and North America is almost directly transferable to the USSR. This is especially relevant to materials handling and storage equipment, animal feeding, and plant and animal disease control.
4. The potential for greater efficiency in the storage, transport, and use of grains is very great. This topic will be explored in more detail in a subsequent section of the paper.
5. The major limitations to further agricultural advances are those imposed by the structural and managerial characteristics of Soviet agriculture. These will be difficult to remedy, in political terms, but could be removed at low cost in terms of the capital and resources required for change.
6. Agricultural labor shortages are critical, outside the Central Asiatic Republics, and will grow worse. It has been estimated that the normal intake of Soviet military forces of approximately two million per year would require almost the entire able-bodied

male population reaching draft-age in the mid-1980's. Farm to city migration and low birth rates make the potential farm labor supply problem especially acute in the Baltic republics, the RSFSR, the Ukraine, and Belorussia (Feshbach, 1982, A, p. 353). This will provide further stimulus to the substitution of capital for labor in agriculture. Soviet demographers have deplored this "deformation" of the rural age structure, and Brezhnev explicitly referred to it in his speech explaining why the May 1982 plenum on the food program was considered important (Feshbach, 1982B, p. 13).

7. Looking to a more distant future, a possibility of considerable importance to Canada concerns Soviet efforts to develop their forest resources. This is currently in its infancy, but the potential is enormous. It has been estimated that one-half of the annual growth of timber in all temperate forests in the world (940 million cubic meters) occurs in the forests of the Soviet Union (Petrov, 1971). Transport is the limiting factor, but completion of the Baikal-Amur Mainline railroad in the Far East and road construction in connection with the development of mineral and petroleum resources in Siberia are developments that will have the secondary effect of opening up formerly inaccessible forested regions. The Soviet Union as the leading forest products exporter is a long-term possibility. It is already the world's second largest exporter of softwood lumber (USDC, 1984, p. 129).

B. Centrally Planned Countries of Eastern Europe

1. The region as a whole has a considerable potential for improved agricultural output, especially in Poland, Yugoslavia, and Romania. Over half of total mineral fertilizer production in Romania is exported, for example, although the country has one of the lowest application rates in Eastern Europe (USDA, 1984A, p. 10). The private sector is dominant in Poland and Yugoslavia, accounting for 81 and 67 percent of agricultural output in the two countries. Inadequate supply of inputs to the private sector has inhibited the achievement of integration of the two sectors in Poland and Yugoslavia on the scale that has been realized in Hungary. The potential for further increases in total agricultural production is relatively high.
2. Financial constraints are severe, especially in Poland and Yugoslavia. These two countries owe over 60 percent of the net East European hard currency debt, and had accounted for just under half of total East European grain imports in the peak import year of 1980. A shortage of hard currency will probably retard any East European growth in grain imports throughout the 1980's.
3. The East European industrial base is well established, with a growing capacity to supply agriculture with industrial-type inputs. The rates of consumption of mineral fertilizer per hectare of agricultural land in Czechoslovakia and East Germany are among the highest in all of Europe, and all East European countries except Poland and Yugoslavia are net exporters of nitrogen fertilizers (Jacobs, 1982, p. 42, and USDA, 1984,A, p. 10).

4. Livestock (including poultry) products are a high fraction of total agricultural output--the highest among the three centrally-planned areas here being considered. The potential for effective use of bio-technology in animal production in Eastern Europe is large, and many of the skills required are well-represented in the region.
5. The demographic situation is almost unique. Excluding Poland, the five remaining countries of Eastern Europe have one of the lowest rates of natural increase in population in the world. Population growth in these five countries will contribute only about 6 percent to any increase in demand for agricultural products to the year 2000 (Population Reference Bureau, 1984). Any growth in grain consumption will depend almost entirely on grain usage in animal production.

C. China

1. An industrial structure that could supply inputs to agriculture in China is in its infancy. The primary contribution that could be made in this way is through improved transport. Use rates of natural fertilizers are already high, and can be expected to decline. Sales of commercial fertilizer increased 67 percent between 1978 and 1982 (Aubert, 1984, p. 13). A major unknown in appraising future trends in Chinese agricultural output concerns the rate at which production of mineral fertilizers can be expanded. Given the existing high rate in the use of labor to substitute for land and capital, the potential for the development of non-land, industrial-type inputs must be regarded as one of the highest in the world.

2. Increases in grain production from 1978 to 1982 came entirely from increases in yields, since the reported harvested area fell by 6 percent. While the data on harvested area must be regarded with some reservations, the fact remains that Chinese agriculture since 1978 has been remarkably responsive to yield-increasing technology (Aubert, 1984, p. 13). Stability in output has also been exceptional, leading to a ranking of China among the five countries of the world with the lowest level of fluctuation in grain production (Sievers and Weber, 1984, p. 10). A major reason lies in the fact that 45 percent of Chinese cropland is irrigated, and the multiple cropping index is 1.46, i.e. just under one-half of the cropland produces two crops per year.
3. Unlike Eastern Europe and western regions of the Soviet Union, China has no history of a wide-spread dairy industry that could supply frames for expanded beef output. As a result, the demand for meat will be met primarily through pigs and poultry. These are grain-intensive animals, and consequent pressures on feedgrain supply can be expected to increase.
4. The data that exist suggest that the income elasticity of demand for wheat in China is high. The practice of recent years of exporting rice and importing wheat, although dictated principally by deficient north-south transport, can be expected to continue. China in 1984 was a wheat importer and a feedgrain exporter. Although most experts attribute this to inadequate internal transport, the fact remains that there is a considerable potential for expanded feedgrain production. Admitting this, the long-run prospect is for expanded Chinese feedgrains imports.

5. Cotton production is a key component of Chinese agriculture, and recent output increases have made China self-sufficient. This has released foreign exchange for grain imports and in this way has played a role in determining the composition and the magnitude of the Chinese agricultural import mix.
6. The major unknown in appraising future prospects for Chinese agriculture concerns the durability of the reforms introduced after 1977. The existing tenure structure can be characterized as a composite of several variations of tenancy. It must be regarded as transitional. Its further evolution will be determined by the political transformation that will be triggered by the death or incapacity of Deng Xiaoping, who is now in his eighties. There seems to be general agreement that the agricultural reforms have progressed too far to be reversed. The danger for the remainder of the 1980's is that they may fall victim to a reaction from middle-level functionaries of the old regime, who see power and status eroding. The task now facing Chinese agriculture is to consolidate the impressive gains that have been achieved in the past six years.

III. Some Questions Raised by the Recent Expansion in World Trade in Grains

For many of the countries now importing grain, imports enable them to postpone a confrontation with the need to correct defects in their domestic economies. This is especially the case with the centrally planned economies. Grain imports have permitted the continuation of policies driven by political ideologies that are unsuited to agricultural development.

For some grain exporting countries, exports have also permitted them to postpone recognition of errors in their domestic policies affecting agriculture. This is especially visible in the European Economic Community, but can be detected in other grain exporters as well. Canadian exports postponed admission of the irrational nature of the Crows Nest Pass freight rate structure for western grain in Canada. Argentine grain exports provided an opportunity for their political leaders to levy a form of tax on agriculture to support urban and non-farm development. Foreign exchange earnings from U.S. grain exports have masked the rapid loss of competitiveness of the U.S. industrial economy in world markets.

In a framework that goes beyond the immediate interests of individual grain importing or exporting countries, we need to ask: Is it valid to assume that expanded world trade in grains is always desirable? Is it possible that world trade in grains is not an unlimited good?

IV. A Closer Look at the Prospect for Continuing Grain Imports by the USSR

In appraising agricultural prospects in centrally planned economies that affect agricultural trade, the dominant factor will be the course of events in the Soviet Union. Soviet imports in 1984/85 will be just under one-fourth of total world trade in wheat and coarse grains. What are the prospects that grain imports on this scale will continue?

To answer this question, we must begin by recognizing that, in a good year, approximately half of Soviet domestic grain supply comes from lands that lie either at the temperature or rainfall margins of agricultural use. Extreme climatic variability is a fact of life in the USSR, and will remain so. It will be rational for Soviet leaders to rely on world markets in years of short grain crops. This alone will introduce substantial variability into Soviet grain import demand. The more interesting source of variability, however, is rooted in production and utilization characteristics that are a result of the political and managerial climate of the Soviet economy. We can note the following features.

A. Production

1. Befitting its vast extent, there has been a long-standing pre-occupation with the land base in Soviet agricultural planning. Historically, the most noteworthy contributions of agricultural research in pre-revolutionary Russia were in soil science. Under Soviet leadership, this momentum was reflected in the Virgin Lands campaign of the 1950's, and in the decision to make massive investments in the Non-Black Earth soil regions in the 1970's. It reappeared in the decisions of the October 1984 plenum on agriculture to stress drainage and irrigation. In confronting its agricultural problems, the Soviet Union to date has placed primary reliance on what can be regarded as engineering solutions.

2. There has been a parallel preoccupation with grain supplies, resulting in a relative neglect of forage resources. The Soviet Union lies at latitudes and in climatic zones that dictate major reliance on grasses and on crops that will produce forage but not ripe grain. Socialist agriculture has not provided a hospitable structure for the effective utilization of crops that must be converted into food for human consumption at the site where they are grown. Forages will not bear the cost of transport beyond short distances, and are not storable in concentrated warehousing centers. Grain will, and is. A consequent stress on those crops that could guarantee immediately available food reserves for urban and industrial centers has been a handicap in accomplishing the shift to higher levels of consumption of animal products. Large-scale, concentrated feedlots demand a steady supply of feedstuffs, and imported grain has been the most direct means to meet this requirement. The Soviet Union has recognized this problem, and more stress has been placed on forage production in recent years, with some success. The fact remains that structural characteristics of Soviet agriculture dictate an unnecessarily heavy dependence on grain in satisfying consumer demand for meat.

3. The preoccupation with the land base in achieving agricultural output increases has been accompanied by a relative neglect of yield-increasing technology that depends on industrial-type inputs. Until well into the 1960's fertilizer use was primarily restricted to the "industrial" crops, especially cotton, and sugar beets. Usage on grain crops has gradually increased, and in 1980 Soviet reports indicated some use of fertilizer on 57 percent of the grain area. Application rates vary tremendously, and are especially low in the "Virgin Lands" area (Auburn and Young, 1982, p. 150). Industrial contributions to the agricultural infrastructure have also been neglected, and especially in road transport, refrigeration, and

storage. In general, meat and poultry production has been located with reference to consumption centers, not grain surplus producing areas. The grain can be transported over long distances, the meat cannot. This has reinforced the tendency to rely on grain imports to meet animal feed requirements in the more urbanized and industrialized regions.

B. Utilization

1. The most remarkable feature of a Soviet grain economy that depends heavily on hard-currency imports is the persistence of high rates of wastage and dockage. For the ten years from 1973/74 through 1982/83 waste and dockage averaged 24.2 million tons annually, or slightly more than average annual grain imports of 23.3 million tons. In five of the ten years waste exceeded 28 million tons (USDA, 1984, C). The causes are endemic in the agricultural structure, involving storage, transport, price policy, and the method of paying harvest labor. • Since procurement prices are fixed, there is no reward at the farm level for constructing storage in order to hold grain at harvest-time in hope of a higher price later in the season. Defective roads throw the transport burden on an over-stressed rail system, and pricing policy based on tons of grain delivered does not include adequate penalties for low quality grains. Harvest labor is paid on the basis of "bunker-weight" of grain as delivered from the combine, creating a strong incentive to operate the harvester in a manner that introduces weed-seed, badly-threshed grain, or grain with high moisture content, to increase weight. Harvest estimates are in "bunker weight" and much of the wastage is a reflection of the difference between the weight of grain as it leaves the field and the ultimate dry weight of cleaned and storable grain. A reform of pricing policies at the farm level could have a dramatic effect on waste reduction.

2. Seeding rates are approximately double those currently achieved in comparable climatic zones of Canada. Brooks has estimated that USSR seeding rates for small grains average 200 kilograms per hectare or roughly 180 pounds per acre (Johnson and Brooks, 1983, p. 161). For wheat, this is equivalent to three bushels per acre. Canadian research has determined that highest yields have been achieved with seeding rates of 90 to 140 kg./hectare or roughly half the Soviet rate, with lower rates (down to 40 kg./hectare) proving best in rainfall-deficient areas (Guitard, Newman and Hoyt, 1961; Pelton, 1969, and Baker, 1982). A part of the explanation for unusually high seeding rates in the USSR is weed control. A dense plant population is a partial substitute for shortages of weed-controlling chemicals. Another part of the explanation is that high seeding rates increase the quantity of straw even though they may achieve only marginal increases in grain yields. Since the grain goes to the state while straw stays on the farm and is an important feedstuff, managers have an incentive to strive for maximum straw yields (Raup, 1984). There is also a strong probability that seed quality does not measure up to established Soviet norms. The magnitude of the savings that could be achieved by lower seeding rates is suggested by the fact that annual seed requirements have averaged from 27 to 29 million tons during the past decade. If the Soviet Union could cut seeding rates in half it would be equivalent to cutting imports in half. In five of the ten years from 1973/74 to 1983/82 seed usage required 15 percent or more of total grain output (USDA, 1984, C). Seed requirements for wheat and barley in comparable climatic zones of western Europe and North America currently are being met with less than 5 percent of an annual crop.

3. Since 1971 the big increases in Soviet grain imports have been dictated by an increase in grain feeding of livestock and poultry. Feed use of wheat and coarse grain averaged 100 million tons annually in the four years 1972/73 through 1975/76, and 120 million tons from 1981/82 through 1984/85. After deducting seed use and waste, feed use of grain since 1980 has been the equivalent of 90% or more of total domestic availability (USDA, 1984, C). Efficiency in feed use is low, even by East European standards. A major reason is a preoccupation with numbers of animals at the expense of quality. Per ton of beef produced in 1982, the Soviet Union held 17.5 head of cattle in inventory. In comparison, per ton of beef output, Canada in 1982 held 11.0 head, the U.S. 9.1, the Federal Republic of Germany 10.1, and Hungary 12.5. Per ton of pork produced in 1982, the Soviet Union had 14.4 head of pigs in inventory, Canada 11.0, the U.S. 9.1, the Federal Republic of Germany 8.4, and Hungary 9.1. On average in the 1980's, the Soviet Union has had to maintain approximately 50% more animals per ton of red meat produced than has been required in the more efficient producing countries of North America and Western Europe, or than in Hungary (Raup, 1984). Too much of the feed used in the USSR has been required to maintain livestock numbers, at the expense of gains in weight. This creates an enormous potential for a reduction in grain import requirements through greater efficiency in animal feeding. Gray has estimated that the USSR in the late 1970's was on average using twice as much feed to produce a ton of pork as was required by Western European producers (Gray, 1982, p. 101).

V. Appraising the Possibility of Fundamental Changes in Soviet Agricultural Policy

Among the most interesting Soviet experiments at reform in the organization and management of agriculture are the attempts to create improved

incentives through "contract brigades". The contract brigades or autonomous links create conditions for farm workers that are similar to cash leases. Risk is shifted to the cultivator.

A parallel effort has been made to improve production on household plots. This involves contracts with private plot holders using animals, seeds, fertilizers or feeds supplied by the socialized sector. It is significant to note that these contracts are similar to share-cropping contracts that have had a long history in Europe and North America. A part of the risk is shared between the private plot holder and the collective or state farm.

The debate underlying these attempts to improve production incentives through alternative land tenure structures involves:

- a) Decision sharing
- b) Risk sharing
- c) Profit sharing

The fact that these experiments with various forward production contracts have been given greater emphasis in the past few years indicates the ferment underway in USSR agricultural policy.

Transport remains a critical weakness in Soviet agriculture. This is combined with defects in local government structure that have been most calamitous in their effect on road building. No local unit of government has fund-raising (taxing) capacity to finance the construction of local roads. As a result, the Soviet farmer is a captive of the railroads and the state grain procurement system.

There is a striking parallel between Soviet problems in agricultural pricing, input supply and output handling and the farm problem in the U.S. and Canada at the end of the 19th century, with railroads dominating transport and marketing in monopolistic hands. Current Soviet farm managers have

attitudes toward the government, and "Moscow", that would have been wholly understandable to farmers in Kansas, the Dakotas, or Montana in the 1880-1910 period, or to Canadian farmers in the Prairie Provinces.

The lessons of history in centrally planned economies in the past thirty years underline the significance of agriculture as the seedbed of economic policy changes. All of the pronounced shifts in economic policy that have occurred to date in centrally planned economies began with the food and agricultural sectors. This is illustrated by the dramatic changes in pricing, production, and structural policies that occurred in Poland in 1953, 1970, and 1980; in Hungary in the 1970's; and in China after 1978.

It seems reasonable to presume that this pattern is likely to be repeated in the USSR. In introducing the food program on May 24, 1982, Brezhnev stressed in his opening statement "the need to reduce food imports from the capitalist countries". (CDSP, June 23, 1982, p. 6). As a policy goal, this must rank second only to the maintenance of military strength in Soviet thinking. The disappointing harvest of 1984 and record imports of just under 50 million tons of grain in 1984/85 must increase the urgency of this task.

The USSR has suffered a sequence of poor harvests. Weather is not the only explanation, but it has unquestionably played an important role. The USSR is due for a cyclical improvement in weather. This potential may strengthen the willingness of political leaders to risk some structural changes that, with luck, could coincide with an improvement in the climatic factor.

The prospects for change in Soviet agricultural policy are relatively more promising than at any time in the post-Khrushchev era. There must be growing recognition in the USSR that incremental reform is unlikely to be effective. It has been tried before. If change does come, this paper has attempted to document the potential in the Soviet Union for a dramatic reduction in its dependence on imported grain.

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