U.S. & SOVIET AGRICULTURE: The Shifting Balance of Power

by Lester R. Brown

Analyses of the U.S.-Soviet balance of power usually focus on relative military strength—the number of tanks, planes, nuclear warheads, and other items in the so-called strategic balance. But many other factors determine a country's overall power and influence. Among the most basic is a country's capacity to feed its people. By this measure the Soviet Union appears to be in deep trouble.

This year the USSR will try to import 46 million tons of grain, more than any country in history (source, here and elsewhere: U.S. Department of Agriculture). Nearly a fourth of all Soviet grain for feeding both people and livestock will come from the North American breadbasket, most of it from the United States. There is now evidence that the Soviet Union has moved beyond the good year/bad year oscillations of the late '60s and early '70s, when it imported grain only after poor harvests. The fourth consecutive massive crop shortfall in 1982 signals a broad-based deterioration of Soviet agriculture that will create food shortages well into the future.

In contrast to poor harvests in Third World countries, which can lead to starvation, poor Soviet harvests largely threaten the nation's supply of livestock products. The Soviet food problem is a shortage of meat, not bread. The issue, therefore, is not starvation but worker morale, a question of whether the system can provide the *quality* of diet that Soviet leaders and planners since Khrushchev have promised and which Soviet citizens have come to expect.

A country's level of food production is determined in part by its natural resource endowment—the area of arable land, inherent soil fertility, rainfall, irrigation potential, and growing season—and in part by how wisely it manages its resources. The natural resource base reflects agricultural potential; effective resource management is the key to realizing that potential.

In one major natural resource—area of arable land—the Soviet Union enjoys a significant advantage over the United States. The Soviets currently plant over 500 million acres, exceeding by nearly half the 350 million acres planted annually in the United States. Measured only in cropland, the Soviet Union is in a class by itself among world food producers.

The Soviet advantage of 150 million acres, however, is partly offset by climatic differences favoring the U.S. Whereas most U.S. cropland lies between 34 and 45 degrees north latitude, Soviet cropland lies farther north, mostly between 48 and 55 degrees. In much of the Soviet Union, as in Canada, winter grain crops cannot survive. Over half of the wheat, the dominant Soviet crop, is spring wheat—wheat planted in May and harvested in September. This northerly location also means that the Soviet Union has less potential than the United States for double-cropping winter grains, such as wheat and barley, with summer crops, such as soybeans.

Rainfall differences also offset the Soviet advantage in arable land. The geographic distribution of rainfall in the United States is better than in the USSR, where heavier rainfall is in the north while the cropland with a longer growing season is in the semiarid south. Indeed, the south central Soviet Union is largely semiarid, similar to the southwestern United States. The geographic mismatch between rainfall and land, a perpetual source of frustration for Soviet agricultural planners, has led to an intense effort to develop irrigation in the southern semiarid regions.

An analysis of U.S. and Soviet grain and livestock production trends reveals much about the two economic systems. Although U.S. grain output from 1950 through the early '70s was consistently higher than in the Soviet Union, rising trends in overall grain production in the two countries during this period were remarkably parallel. A simple statistical comparison of grain production trends in the two countries, however, masks the different intent behind the food production efforts of each. From 1950 to 1972, when U.S. farmers produced more than could be absorbed by commercial markets at home and abroad, national agricultural policies attempted to constrain production to avoid burdensome surpluses. These efforts took the form of cropland diversion programs that paid farmers to idle as much as a seventh of U.S. cropland in some years. The Soviets, meanwhile, were striving for

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maximum production each year. In effect, though both countries moved forward in the postwar agricultural competition, the Soviets were traveling at full speed while the U.S. was applying brakes.

FERTILIZER, SOYBEANS, AND GRAIN

With the notable exception of production from an additional 20 million hectares of Soviet Virgin Lands planted during the '50s, crop production gains in both countries have come largely from raising land productivity. This effort to grow more on each hectare has been the U.S. farmer's biggest success, mainly the result of hybrid corn varieties responding to heavy applications of chemical fertilizer. Between 1950 and 1982, their grain yield per hectare climbed from 1.6 metric tons to 4.2 metric tons, nearly tripling over the thirty-two-year span. Soviet gains, on the other hand, went from 0.8 to 1.4 metric tons per hectare, an increase of only 75 per cent.

After land productivity, fertilizer use ranks high as an indicator of overall agricultural efficiency. Measured in terms of nutrient content, the Soviets used 26 million tons of fertilizer in 1981 and harvested 170 million tons of grain, while the United States used 21 million tons and harvested 315 million tons of grain. Thus the Soviets are producing roughly 6.5 tons of grain per ton of fertilizer compared with 15 in the U.S. Assuming that the share of fertilizer used on crops other than grain does not vary widely between the two countries, these ratios indicate a markedly more efficient use of fertilizer in the United States.

Market discipline is one reason for higher fertilizer efficiency in the United States. For a U.S. farmer, failure to match fertilizer use and crop needs leads to declining profits; without market forces to impose discipline, Soviet farmers often user fertilizer inefficiently, if not wastefully. In addition, the particular type of fertilizer produced in the Soviet Union often is determined by the ease of shipment and delivery, not by its ease of application or usefulness to farmers.

Principal Soviet Agricultural Imports, 1970-82

Year	*Total Grains*	*Oilseeds*	*Meat*	*Sugar*	*Edible Veg. Oils*
	(1,000 metric tons)				
1970	1,283	43	165	3,006	34
1971	755	45	225	1,539	34
1972	7,783	482	131	1,906	30
1973	21,776	768	129	2,822	23
1974	10,989	70	515	1,874	19
1975	5,230	424	515	3,240	27
1976	25,650	1,827	362	3,726	98
1977	10,300	1,455	617	4,745	84
1978	18,362	966	184	3,993	108
1979	15,063	1,814	611	4,060	199
1980	30,525	1,155	821	4,895	357
1981	34,000	1,459	980	5,126	604
1982 (prelim.)	44,100	2,100	1,100	6,000	800

Source: *USDA Foreign Agricultural Service, Economic Research Service, and Worldwatch Institute estimates.*

But even the impressive U.S. gains in grain output and productivity do not tell the whole story because they fail to show the enormous shift of U.S. farm resources to the production of soybeans, a crop now planted on 70 million acres and rivaling wheat and corn in its claim on U.S. cropland. The growth in United States soybean output since the '50s is in response to increased world demand for livestock products and associated demand for protein feedstuffs generated by the economic prosperity of the postwar era. While the United States chose soybeans to meet the need for protein supplements in livestock rations, the Soviet Union turned to sunflowers. U.S. soybean output, averaging 8 million tons annually in the early 1950s, climbed steadily for the next three decades, reaching 63 million tons in 1982. Meanwhile sunflower seed production in the USSR increased more slowly, reaching a peak of 7.4 million tons in 1974. Since then Soviet sunflower production has declined, probably falling below 5 million tons in the present crop year. As a result, Soviet livestock producers are unable to balance the caloric energy and protein content in rations for their livestock to achieve maximum efficiency in converting grain to meat.

U.S. soybean production is much more than a domestic success story. Introduced into the United States from China as a source of vegetable oil, the soybean has been transformed within a generation from a curiosity to a major crop, a leading export, and a key source of protein in livestock feed. The United States is not only the world's breadbasket; its vast export of corn and soybeans make it the world's feedbag as well.

Between 1960 and 1980 the Soviets increased the use of grain for livestock and poultry-feeding from 40 million tons to over 120 million tons—a remarkable gain and a major commitment of resources. Despite this tripling of feedgrain use, meat production only increased from 8.7 million tons to 15 million tons of meat for a population 20 per cent larger than that of the United States.

The Soviet shortcoming was not a failure to commit sufficient resources to livestock production but an inability to use those resources efficiently. Surprisingly, domestic grain use per capita in the United States and the Soviet Union today is roughly the same—800 kilograms per year, or four-fifths of a metric ton. While this amount of grain yielded the typical U.S. consumer 121 kilograms of meat per year, the average Soviet consumer had only 56 kilograms—less than half as much.

The deterioration of Soviet agriculture is not confined to the production of grains alone. It permeates the entire agricultural sector, affecting crop and livestock products alike. Output of virtually all major crops—including potatoes, sugar beets, oilseeds, fruits, vegetables—and of major livestock products peaked around 1978 and has since declined.

CONTRADICTIONS AND GOALS

During the past three Five-Year plans (1966-80), as well as the current plan (1981-85), investments have been heavy by almost any measure—a whopping 27 per cent of total Soviet investment in recent years.

Given such an investment, several questions arise about Soviet agriculture shortcomings: Why is agriculture deteriorating on so many fronts? Why have production trends actually been reversed? And why is this deterioration occurring now?

Evidence now points to a basic conflict between centralized agricultural planning and management and the evolution of a modern, highly productive agricultural system. Centralized agriculture and Soviet plan goals are incompatible. The more the Soviets try to modernize their agriculture, the more obvious the inherent contradiction will become.

In the Soviet Union, 500 million acres of cropland are divided in roughly equal amounts between 20,800 state farms and 26,000 collective farms. Each state farm averages just over 13,000 acres and each collective farm about 9,000. In the United States, where 2.4 million farmers cultivate some 350 million acres, each farm averages 144 acres of cropland. Including grazing and forest land, the typical farm averages close to 400 acres. As is often the case, however, these averages conceal a wide range of farm sizes. The 1974 census reported 225,000 farms of less than 50 acres. At the other end of the spectrum there were 150,000 farms of a thousand acres or more. The vast majority of U.S. farmers—some 2 million—were in the 50 to 1,000-acre category.

The Soviet Union employs a farm labor force of 26.1 million. Of this group over 26 million are farm workers directed by 46,800 farm managers, who in turn are directed from Moscow. By contrast, the U.S. farm labor force totals only 3.7 million. Some 2.4 million are managers of family farms, mostly owner-operators; fewer than 1.3 million are hired workers.

Individual farmers making day-to-day decisions in response to market signals, changing weather, and the conditions of their crops have a collective intelligence far exceeding that of a centralized bureaucracy, however well designed and staffed. For example, the Soviets already know how much phosphate fertilizer they are going to use in 1984 because it is spelled out in the 1981-85 Plan. An American farmer will not know how much phosphate fertilizer he will use in 1984 until he tests his soil in the spring of that year and decides which crops to plant. At that time the fertilizer manufacturer will be expected to meet the farmer's demand. Indeed, the fertilizer firm's success depends on its ability to do so. But it is the farmer who determines how much of what kind of fertilizer is used, not the fertilizer manufacturer or a planning office in Washington.

Long-term planning and centralization handicap Soviet farm management in many ways. Equipment needs in a modern farm system are diverse and complex. A centralized system such as the Ministry of Tractor and Agricultural Machine Building in Moscow simply may lack the information to design the range of farm equipment needed to match the diverse needs of modern agriculture practiced under the widely varying conditions of such a vast country. For example, one of the ministry's farm-equipment production units was responsible for developing eleven machines to combat soil erosion. It was able to develop only two. In 1981, *Ekonomicheskaya Gazeta* reported that of the 330 types of small-scale implements needed to grow fruit and vegetables on private plots only 140 actually were being manufactured.

U.S. and Soviet Meat Production Per Capita, 1980

	United States	*Soviet Union*
	(Kilograms)	
Beef and Veal	44	26
Pork	36	19
Mutton	1	3
Poultry	40	8

Source: *USDA Agricultural Service and Economic Research Service*

Despite the accelerated investment in farm-equipment manufacture over the past three Five-Year plans, Soviet agriculture is still plagued by defective equipment and poor maintenance. This helps to explain the frequent Soviet press reports of planting or harvesting delays caused by equipment breakdown. To compensate for equipment defects, Soviet farmers have become expert at cannibalizing one piece of equipment for the spare parts needed to keep a similar piece running. One of the most revealing numbers published in Soviet statistical yearbooks shows that fewer tractors were in use at the end of 1981 than were manufactured between 1976 and 1981, indicating a short life expectancy. The situation contrasts sharply with the United States, where farm tractors are often in use after twenty years.

In their single-minded focus on the expansion of food production the Soviets have neglected storage, packaging, and transport. Their press is filled with examples of the resulting waste: grain harvested but without a storage place; fields red with ripe tomatoes but lacking crates to transport them to market; potatoes left to rot because farm-to-market roads are impassable. An expert in Soviet affairs, Marshall Goldman, observes that "the dearth of marketing facilities is a reflection of Marxist ideology, which regards marketing as a nonproductive, even parasitic activity."

Soviet agriculture is facing serious human resource problems as well. Given the rather dreary life in the countryside, the more resourceful and ambitious young people have been migrating to the cities, where the lights are brighter and there are industrial labor shortages. In a study on rural-urban drift, Soviet economist B. N. Khomelyansky reports that 15 million workers left collective and state farms for the cities during the 1970s. The overwhelming majority were young men and women, well above average in skills, approaching their prime productive years. With such an exodus of young people, the rural labor force is not only thinning but graying as well. The aging population left on the land simply may lack the energy and motivation to raise productivity further.

(This is the first part of a two-part article.)