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THEORY AND PRACTICE OF SOVIET COLLECTIVE AGRICULTURE

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THEORY AND PRACTICE OF SOVIET COLLECTIVE AGRICULTURE

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For almost a quarter of a century I have had more than a passing interest in Soviet agriculture. While I feel that I now know considerably more about Soviet agriculture than I did when I was first seduced by its mysteries, I must admit that I am, if anything, rather less confident now that I have an adequate comprehension of the factors primarily responsible for the disappointing performance of Soviet agriculture than I have been at other times.

Disappointing Performance

Time does not permit full development of why the performance of Soviet agriculture since World War II can be described as disappointing. But a few major items can be given in partial support of the description. Let me note first that a slow rate of output growth is not the primary basis for calling the performance disappointing. Since the death of Stalin the annual growth rate of agricultural output has been of the general order of 3.5 percent. Compared to Western Europe, North America and Australia this is a very satisfactory growth rate. The basic shortcoming with respect to output growth has

been that it has not kept pace with the growth of demand at the prices to consumers, especially of meat and milk, that have been considered consistent with political stability. In 1975 the per capita consumption of food products with relatively high income elasticities - meat and fruits - is much lower in the Soviet Union than in other countries with comparable real per capita incomes.

Three major aspects of the disappointing performance of Soviet agriculture are the very high fraction of total investment devoted to agriculture, the high cost of farm products, and the instability of output. During the Ninth Five-Year Plan, which ends this year, approximately 25 percent of total investment in the economy was devoted to productive activities on farms. A comparable figure for the United States for the same period would be about 5 percent of gross investment, excluding investment in residential construction. In addition to the high rate of non-farm investment, very substantial investments in the farm input industries were carried out.

The high cost of Soviet farm output is reflected in the prices paid to farms, especially for meat and milk. Even though consumers are using upwards of 40 percent of their income to purchase food, subsidies to farms for meat and milk purchases are now of the order of at least 15 billion rubles or $22 billion at

the official exchange rate (Krueger). Accepting the official exchange rate ($1.30 per ruble) the average procurement cost of a hundredweight of hogs has been almost $100 and approximately $90 for cattle (Johnson p. 54). These prices are nearly double the highest that we have seen in the United States in the last two or three years.

The last of the shortcomings of Soviet agriculture is the wide variability in crop output, especially grain and feed output, from year to year. The economic and political costs of this instability cannot be clearly specified, but it is not hard to imagine they are large.

The high average prices and costs of livestock products appear to reflect abnormally large feed and labor input per unit of output. Even though there have been heavy investments in livestock building and equipment during the last decade, there is no evidence that feed use per unit of output has declined, though there has been some reduction in labor input (Johnson 1974).

Sources of the Shortcomings

Many explanations have been given for the various shortcomings of Soviet agriculture. These have included the large scale of the socialized farms on the one hand, and the tiny scale of private agriculture that still utilizes a major fraction of the

total labor input on the other hand; the low level of incomes received by workers; inadequate transportation; poor quality of farm inputs; the quality of land and climatic limitations; ineffectiveness of the marketing and storage systems; and the socialized forms of agricultural farms. This paper is concerned with only one of these possible sources of an inefficient agriculture - the collective farm.

I should note that I have long thought that a significant part of the poor performance of agriculture could be explained by the collective farm system and certain inherent features of that system. I am now not so certain of that view, and the remainder of this paper deals with a model or models of a collective or cooperative farm. I believe that it is possible to support the view that while one can find some reasons - actually two reasons - why a collective farm might not be as efficient as private agriculture, I conclude that an adequate explanation of the poor economic performance of Soviet agriculture is to be found elsewhere.

A Model of a Collective Farm

An analytical model must start with certain key assumptions. I have not found any official Soviet analytical conception of the collective farm, but this is hardly surprising since the establishment of collective farms appears to have had three primary objectives that

largely outweighed any niceties of organizational forms. These objectives were the liquidation of the kulaks, the achievement of effective political control over the countryside, and the creation of large-scale production units as a means of achieving greater output than was possible on millions of small-scale farm units. The emphasis could as easily have been given to state farms, and has been to an increasing degree in recent years. The choice of the collective form of organization may well have been dictated by considerations of peasant resistance to completely giving up the land promised them by the revolution, to the inability to fully bring the rural sector into the monetary economy, and to greater capacity of the collective rather than the state farm as a mechanism for the exploitation of the peasants.

Based on the collective farm statute and other information, one can state three assumptions that may serve as the basis for an analytical model of collective farms:

1. The collective farms should be large-scale units.

2. Land to be assigned to farms, rent free and in perpetuity, on the basis of the existing populations of the villages. Land cannot be bought or sold or transferred in any other way.

3. The farms to be organized as cooperatives, with management controlled by a meeting of the members and

with all major decisions, such as work rules, membership and distribution of income, to be approved by the members.

Anyone who knows anything about Soviet collective farms will immediately say that the third assumption is largely, if not wholly, incorrect, and that it was always assumed that the state had the right to extract differential rent associated with advantages of fertility of the soil and location. But for the moment I shall accept these assumptions and determine the possibilities of achieving an efficient allocation of resources within such a system.

If there are no additional economic restraints on the behavior of the cooperative, and if there are not significant economies or diseconomies of scale over the range of farm sizes, the form of organization would not result in economic inefficiency unless in the same circumstances privately organized firms would also be inefficient. In other words, if one assumes a competitive situation, a cooperative need be neither more nor less efficient than a private firm. This will be true even with the restraints on land assumed in the analytical model. However, if there is an additional restraint imposed, namely that there is some other input that must be supplied solely by the members of the cooperative - probably labor - then cooperative firms will not be efficient unless there is further

modification of the model.

But let me first look at some examples which have relevance to some of the conditions actually prevailing in the Soviet Union where inefficient use of resources is likely to occur. One of the assumptions of the model of a cooperative farm was that land was originally assigned to farms on the basis of the prevailing distribution of village populations and the supply of land farmed by the members of the villages. For a variety of historical, economic reasons there were substantial variations in the amount of land per worker, a circumstance not unique to Russian agriculture. We assume that the total net product of the farm (gross output minus current expenses) is divided among the members of the farm on the basis of the labor input. Land, as such, receives no payment and cannot be sold or rented in or out. Labor can be acquired only by the addition of new members, and new members cannot be charged an entrance or membership fee. To simplify the analysis, it is assumed that there are no private plots, though this assumption is not critical to the analysis. It is also assumed that the state either collects no rent or does so as a given percentage of output.

Two caveats are required for the statement that the cooperative form of organization would be as efficient as a private firm in a competitive situation. First, if the members of the cooperative firm cannot sell the value of their rights in the

cooperative, investment will not be optimal. There will be no way that existing members can assure themselves of receiving the full benefits of an investment. This feature of cooperatives, which seems to be nearly universal, would primarily affect long-term investments. If the full fruits of an investment could be realized within a fairly brief period - say two to five years - the impact would be much smaller than if a significant part of the investment could be realized only after a decade or more. This feature of collective farms may partially explain why soil erosion is such a major problem, or why land reclamation projects such as drainage seldom achieve their goals, or why such a significant percentage of irrigated land is abandoned each year.

Second, a farming cooperative may quite freely choose a method of distributing its net income that leads to some inefficiency in the use of resources. As numerous writers (Helmberger, Ward, Domar, Oi and Clayton) have shown, if the net income of a cooperative is divided according to the amount of a particular input contributed by the members, the payment to that input generally will exceed the value of its marginal product. In a situation in which there are no restraints on the amount of that input used, the input will be used to excess. Assuming that all of agriculture were organized in cooperatives, the only inputs are land and labor, and no rent is collected by the government, the output of farm products

would be "too large" if the distribution of earnings among members was the only or primary source of inefficiency. However, if this effect is to be important, a reasonably elastic supply function of labor to agriculture would be required.

The critical question is whether a system of farm cooperatives operating subject to these conditions would move toward a more efficient allocation of resources than imposed by the original assignment of land. Assume that there are only two inputs - land and labor. As long as land is an important factor of production, adding other inputs does not modify the result significantly. Figure 1 depicts the situation of two different cooperatives. Each farm has, at the time of organization or some subsequent time (the labor-land ratio was changed significantly by World War II), a given amount of land and a given membership with a specified number of able-bodied workers. It is further assumed that the elasticity of supply of work from the members is zero. Cooperative "A" had a relatively favorable man-land ratio, while "B" had a less favorable one. It is assumed that there are no other factors that affect productivity; thus for the same labor-land ratio the average revenue product and the value of the marginal product of labor would be the same on the two co-operatives. Relaxing this assumption, as noted later, is likely to increase the extent of inefficiency.

Cooperative "A" members would have significantly higher incomes and higher value of labor marginal product than Cooperative "B" members. Agricultural output could be increased if the members of "B" were admitted to "A" until the value of the marginal product of labor were equalized. But there is absolutely no incentive for "A" to permit this readjustment. The consequence would be a loss of income to the existing members of "A" and the loss could be substantial. This result is a realistic one. Even though there are and have been substantial income differences among collective farms in the same community, there have been almost no additions to the membership of high income collectives by transfers from other collectives.[1]

In Figure 1 it was assumed that the collectives had the same productivity functions. But if the income differences are of the magnitude indicated, it is unlikely that similarity would hold for long. The high income collective could make investments in its land that would increase the marginal product of land (for a given current labor input) to a much greater extent than the low income collective. This is depicted in Figure 2 by an upward shift over time of the marginal product curve for labor. Of course, if there

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1. In recent years high income collective farms have "voluntarily" combined with low income farms.

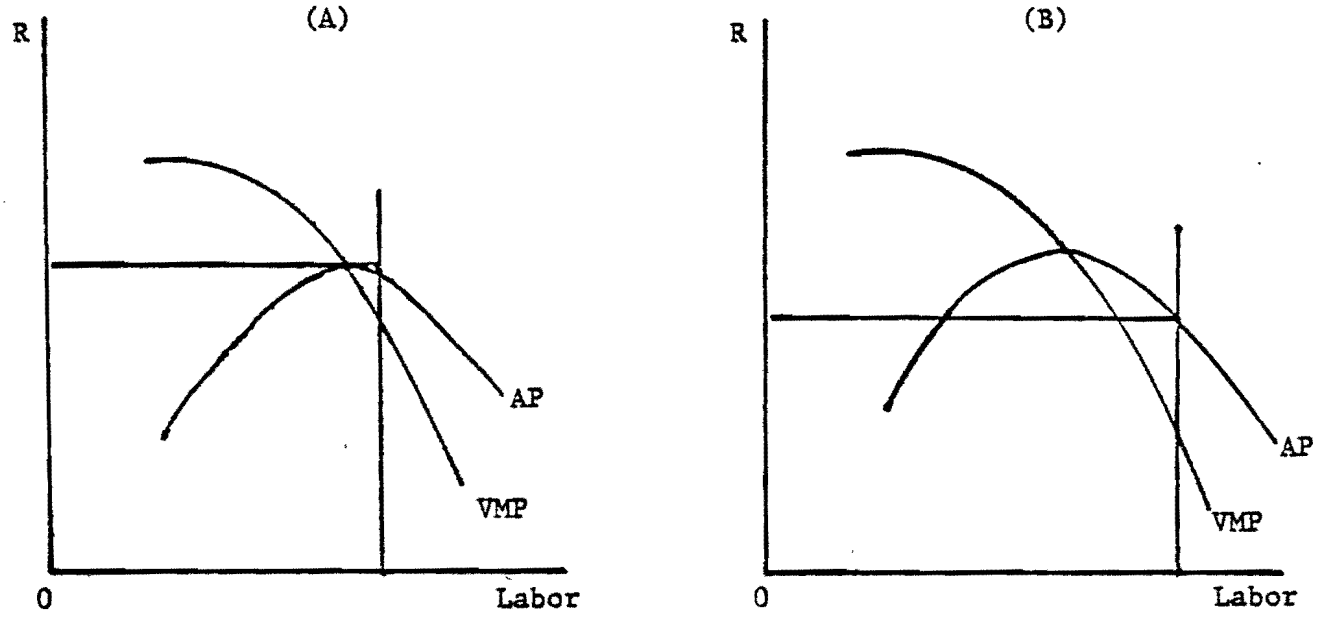

Figure 1

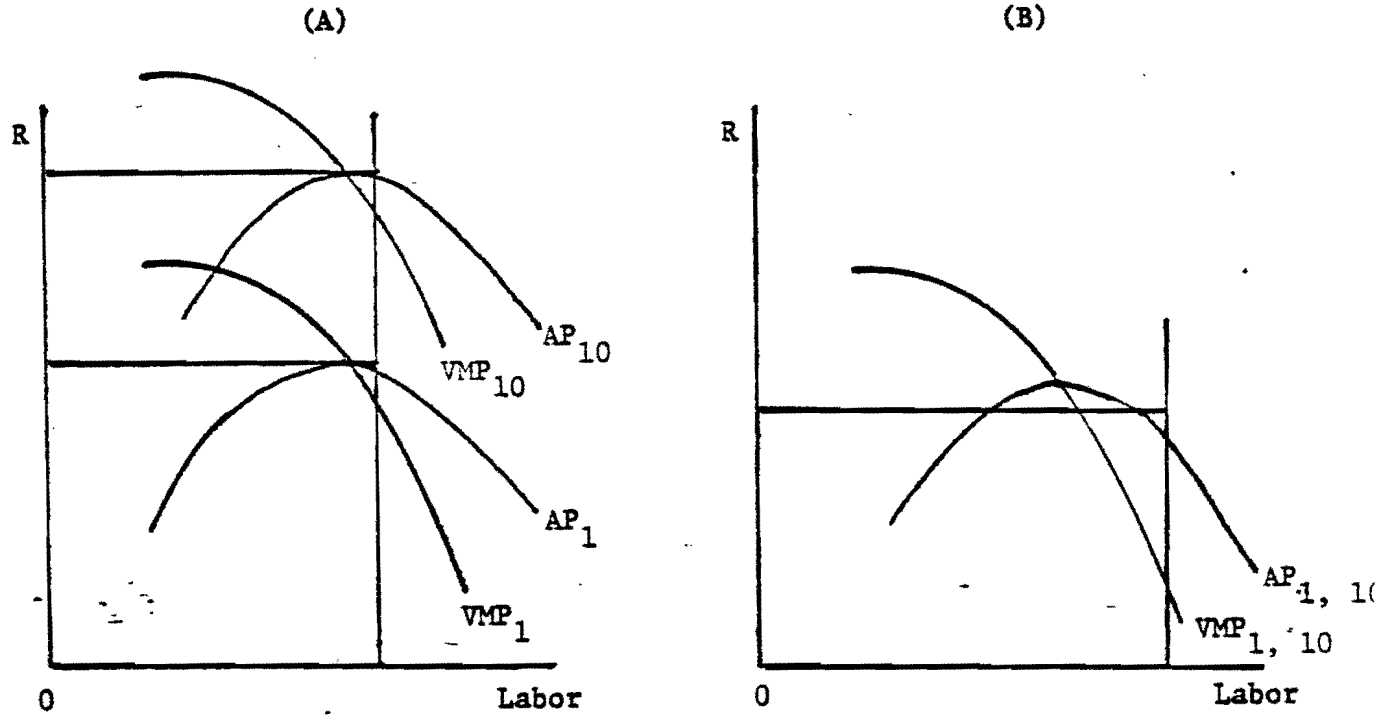

Figure 2

were an efficient capital market, the low income collective could keep pace with the high income collective, though it would not be able to narrow the income differential except by reducing the size of its membership. Further, it is probable that over time the high income collective would improve the quality of its labor force relative to the low income collective. This would occur in two ways: More schooling for the younger people, and higher retention of members with greater human capital. Thus income differences among collective farms could easily increase significantly over time.

Measures to Offset Immobility of Labor Among Farms

One possible solution to the inequality of income distribution caused by the unwillingness of high income collective farms to accept members from low income collective farms would be to permit the hiring of labor from other collective farms. This would not decrease the incomes on the high income collective farms in the short run (in fact, would increase income), but it would increase incomes on the low income collective farms. In the long run, when output effects occurred, and if prices were influenced by supply-demand relationships, there could be some further narrowing of income differentials due to declines in the real incomes for the members of the high income collective farms who have gained due

to the favorable man-land ratio and the effect of unnecessarily high output prices upon the returns to the resources they control. But this is not a solution that has been adopted to any significant degree.[2] Much of the hiring of labor for the traditional farm tasks has been of nonfarm people who, willingly or otherwise, make themselves available during the peak labor demand periods.

A solution that would be consistent with the basic theory of collective agriculture (with legal or self-imposed restraints on hiring labor) would be through differential mobility of farm people to urban communities. To the extent that regional and personal inequality of income has been reduced in agriculture in private market economies, differential mobility has been the major factor. Differential mobility has functioned through both actual migration and by the increase in off-farm work. In recent years, the Stalinist policy of restricting the nonagricultural employment of collective farm members has changed to one of encouraging collective farms through the development of "agrarian-industrial complexes" and by some other means. However, as my colleague, Arcadius Kahan, has shown, the amount of employment, and especially off-season employment, provided to farm workers has so far been very small.

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2. Diamond and Krueger (p. 330) estimated that in 1966 about 2 percent of total labor payments went to hired workers.

A third approach to offset some of the effects of the unequal labor-land ratios when mobility among farms is extremely limited is to charge or collect rent on land. There are two main approaches that have been considered as the means of collecting rent since the abolition of the machine tractor stations. One is through the price system, and the other is by making a direct rental charge.

A specific rental charge on land, if a part of an appropriate set of output and input prices, would go some distance toward reducing income inequality in agriculture without adverse effects upon resource allocation. If the rental charge were related to the value of the marginal product of land, a part of the source of the higher incomes of farms with relatively low man-land ratios would be captured by the state. However, a rental charge cannot fully offset the effects of labor immobility. Assuming that the quality of labor were everywhere the same, the amount of rent per unit of land collected on farms with a relatively high man-land ratio would be greater than on farms with a relatively low man-land ratio for land of equal productivity.[3]

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3. This assumes that products with the same labor intensity were produced when man-land ratios differ. Such is not likely to be the case. However, it is highly unlikely that shifting toward labor intensive products on the farms with high man-land ratios could give rent per unit of land and marginal products of labor equal to those of the low man-land ratio farms.

It is not surprising, of course, that charging rent would not remove all or even most of the income inequality when land cannot be rented in or out, and labor cannot move freely among farms. The high man-land ratio farms, even though paying higher rent per unit of land, would not be able to acquire more land by renting (or buying). Thus the Soviet economists who favor charging rent would probably be disappointed in the resulting effects upon income distribution. If the rent charged per unit of standard land were set equal to the rent on farms with the lowest man-land ratios, some improvement in income equality would be achieved. My impression is that this is what at least some Soviet economists have in mind. This practice would then leave some of the rent for distribution as labor payments on farms with high man-land ratios. However, even this may be disappointing starting from the current situation, since the marginal productivity of land on the current high income per worker farms may well be substantially higher than on the low income per worker farms due to the long-term effects of higher quality management and greater investments in land improvements on the higher income farms.

The approach taken since the abolition of the MTS has been to capture rent through the use of differential prices. The general practice has been to differentiate prices regionally, though there are some cases where regional prices have been differentiated

according to productivity or incomes of groups of farms within a price region. I shall consider first only the regional differentiation of prices. It should be added that price differentiation has been accompanied by minimum and guaranteed payments to workers per day of work. These minimum payments are relatively uniform both within and among regions, at least this is the impression that one gets from the limited amount of data that has been published.[4]

Once minimum wages have been established by regions, output prices must be established that cover production costs on most farms. The criterion for establishing zonal prices was to cover average production costs plus some unspecified percentage of net income or profit. Land costs are not included in production costs. It is possible that regional or zonal price differentials and the minimum wages have reduced regional income differences. However, the reduced income inequality, whether large or small, has certainly been at the cost of some efficiency. If land and labor were the only inputs used in agriculture, the added inefficiency other than that due to labor immobility would be small. However, purchased inputs have come to play a fairly important role in Soviet agriculture. Regions with

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4. The minimum wages on collective farms were to be established equal to wages on state farms in the same region. Variations in state farm wages, based on republic averages, ranged from 81 to 128 percent of the union average in 1970 (Teriaeva, 52-3).

high output prices would tend to increase their use of purchased inputs, such as fertilizer, relative to regions with low output prices. Thus the real value of marginal product of fertilizer would be significantly lower in high price than in low price regions. I am assuming, probably inaccurately, that the decisions on the amounts of inputs to use are made by the farms. If this is not the case, then the added inefficiency from regional price differentials would be minimal.

It is uncertain how seriously the objective of reducing regional income differentials is actually taken. Most farm products now carry substantial premia for above procurement plan deliveries. These differentials, which are of the order of 50 percent for many products, can result in substantial income inequality due to inequities in establishing the delivery quotas, either regionally or among farms in the same region. The objective of the price premia is to increase output and marketings, and it is possible that this objective receives more weight than reducing income inequality.

If this price system is not complex enough, in some republics an experiment is underway to differentiate prices within a regional price zone (Kalnyn'sh). This is done by dividing farms into four groups according to their costs of production and differentiating prices so that higher prices are paid to relatively high

cost farms and lower prices to relatively low cost farms. This is a witch's brew that could hardly be more effective in discouraging efforts to reduce production costs. If farms are reclassified among groups, as it appears they are, cost reductions will sooner or later be followed by price reductions. In fact, during some period of time it would be profitable to expand output through high cost means in order to obtain a higher price during some subsequent period.

It is possible that zonal price differentials and minimum wages were adopted for a primary reason other than reducing income differentials within agriculture. The highest zonal prices are in regions that have many disadvantages for farming. Without the minimum wages and higher prices, agriculture might well have disappeared in some areas. With the current emphasis on expanded food production, policy makers may well have felt that they simply could not accept a decline in food output in any part of the Soviet Union.

Private Plots

I have so far ignored the existence of private plots farmed by collective farm workers. In a competitive situation with market prices equating supply and demand for both outputs and inputs, private plots would present no problem in the organization of a collective or cooperative agriculture. Private plots present difficulties only because certain prices are below market levels or

because of significant inefficiencies in the functioning of the cooperative enterprises.

If the output of the private plots and collective farms were priced at equilibrium market levels (at both producer and consumer levels) there would not be a significant encouragement to withhold labor from the cooperative enterprise during critical periods - if the labor on the cooperative received the value of its marginal product.

The continued importance of private plots in marketable output and in the incomes of collective farm members in the Soviet Union is a clear indication that the cooperative sector operating as it does within a policy situation is inefficient in the use of resources. Data for 1970 indicate that on collective farms only 47 percent of income was derived from the collective; the remainder came from private plots and other receipts. In the source the importance of private plots alone was given only for the Georgian Republic. In this republic "more than 50 percent of the family budget" came from private plots, and only 22 percent from the collective farm (Teriaeva, p. 51).

Scale of Collective Farms

Up to this point I have argued that the cooperative form of enterprise need not introduce significant inefficiencies. The

only important negative factor is the area of long-term investment. In arriving at this conclusion, I have implicitly assumed that workers receive the value of their marginal product as payment for their labor. I shall now comment briefly on the possible inefficiencies that may have resulted from the Soviet penchant for large units.

The average size of a collective farm is indicated by its average sown area of approximately 3,000 hectares and an average of something over 400 households and approximately 500 workers (Laird). These are large farms, but are they so large that with appropriate forms of internal management they should be inefficient?

In any case, I have no doubt that if there were the willingness to delegate responsibilities within the farms, whatever handicaps scale may bring to agriculture could be fully offset. Farming offers the opportunity to a greater extent than most manufacturing activities to separate production activities into discrete functions or spaces with little or no interference with the rest of the functions and processes. Grain production can be largely separated from livestock production, if desired, and in much of the farming in the United States this has occurred to a considerable degree.

Given the nature of farming there are very real problems

of relating reward to performance when the units are large. The magnitude of this problem is undoubtedly exaggerated by the assumption that where there are "n" workers, each worker views the reward from added effort in terms of 1/n share of the results of that added effort. But there is almost certainly some validity to this definition of the effort or work problem that seems to plague collective farms in the Soviet Union.

One can easily imagine, at least if one is not a Soviet idealogue, a number of approaches to decentralizing activities within a collective farm that would be consistent with the concept of a collective farm, and that would bring a much closer correspondence between reward and effort than now exists. The collective farm could remain as the primary unit for marketing output and purchasing inputs and for making a variety of decisions where externalities and economies of scale exist. Examples of such externalities and scale economies are irrigation, drainage, erosion control, roads, electricity, processing of certain products, maintenance of spare parts inventory, repair services and provision of credit. If the collective farm were permitted to charge rent to each of the smaller divisions or units, there would be adequate resources for the provision of a wide range of social services and for technical assistance to each of the operating units.

Collective Farms and the Soviet Economy

While I believe that there could be improvements in the performance of Soviet collective farms if the farms were smaller or if the internal organization were changed along the lines suggested in the previous section, I am not convinced that the poor performance of Soviet agriculture is primarily due either to its being a socialized agriculture or the large scale of the units within that structure.

On the basis of the simple model developed earlier, and accepting the objective of Soviet planners to reduce income inequalities in agriculture, I put forward - admittedly quite tentatively - the following considerations that I believe largely explain the poor performance of Soviet agriculture:

1. The output price system provides farms with inappropriate signals and incentives for an efficient use of agricultural resources.

2. The production, marketing and transportation systems for agricultural inputs do not provide appropriate farm inputs in adequate quantities and qualities and in a timely manner to the farms.

3. The unwillingness of Soviet officials and planners to permit the collective farms reasonable

scope of decision-making clearly inhibits efficient resource use.

4. Rules and practices that prevent or inhibit labor migration within agriculture reduce significantly the efficient use of resources, and have resulted in inappropriate measures being taken to eliminate income disparities within agriculture.

5. The pattern of time preference evidenced by a variety of decisions implies an exceedingly high rate of discount of the future. The very great emphasis on a high level of output and marketing in the current year results in decisions that increase output variability through reducing summer fallow to a wholly inadequate level, and apparently minimizes carryovers of grain and feed, thus making livestock production a vulnerable sector.

There are interrelationships among these sources of inefficiency in Soviet agriculture. Some of them grow out of the predilection of Soviet planners to plan in terms of quantity objectives rather than to plan through the price system. Thus with the very limited correlation between prices received and supply prices throughout the entire economy, it would be very difficult to

devise a price system for agriculture that would result in the appropriate level and mix of output. Once it is accepted that high income collective farms can prevent new members from entering, or the high income collective farms cannot charge new members an entrance fee, the efforts to reduce income disparities through differential prices will increase average production costs for all of agriculture.

Short of the Soviet Union's adopting a market price system, with prices being determined by supply and demand, modified by a system of taxes and subsidies to reflect the planner's objective function, I see little possibility for removing the major sources of inefficiency in Soviet agriculture. If a private agriculture had to operate within the same economic setting as the present collective farms, I doubt if it would perform much better. Faced with the task of meeting the demands of millions of individual farms, the current input supplying sectors would probably break down entirely, and it is not at all clear that the marketing sector would be adequate to cope with millions of sellers. How, one might ask, could "firm plans for purchasing farm products" be administered in such a setting? I do not think they could be.

Concluding Comments

I do not want to imply that what I have presented applies

to the agricultures of the other communist nations. It may or it may not. I have, in part, been led to rethink my position with respect to the potential performance of a socialized agriculture by the lack of any significant difference between the performance of primarily private agricultures in Poland and Yugoslavia and in the countries that have almost completely eliminated the private sector. While I believe that private ownership and control of farms is an important value, it is apparently not sufficient to cope with all of the problems that appear to arise in a centrally planned economy.

Can one conclude that the unwillingness of Soviet planners to experiment with the collective farm structure is an indication that nothing short of a really radical change in the structure of the economy would make any difference? I have no way of knowing the answer to that question, yet my analysis indicates that such may be the case. One very important experiment was the elimination of the machine tractor stations. This was a major change, not only affecting machinery services, but also requiring a major revision of procurement and a significant credit program to make possible the transfer of machinery to the collective farms. Partial analysis clearly supported the decision taken by the Soviet planners. Yet actual experience indicates that nothing really changed, and I

suspect that if we had access to the required data we might find that there were instances in which the MTS were well managed, and there were good relations between the MTS and the collective farms the MTS served that farm output declined and costs increased after the abolition of the MTS. This is not to say that the MTS should have been continued, but only to indicate that where there were numerous sources of inefficiency removing one of the sources - even an important one as I believe the MTS were - may not improve anything since the new approach to performing the same tasks may be no more effective than what it replaced.

My main conclusion, then, is that while Soviet agriculture may well increase its output at a reasonable rate in the future, as it has during the past two decades, it will continue to be a high cost agriculture and a continuing source of difficulty to Soviet planners. Thus I do not believe that the radical changes that would be required to improve the efficiency of Soviet agriculture will be made. Finally, I am now reasonably well convinced that the socialized nature of agriculture is not the primary or even an important source of the inefficiency and high cost so prevalent in the Soviet Union.

THE 10TH FIVE-YEAR PLAN, AGRICULTURE AND PROSPECTS FOR SOVIET-AMERICAN TRADE*

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The materials that are included are intended primarily as background and a statement of major conclusions. A small number of tables are included that summarize some of the major features of the 10th Five-Year Plan for agriculture and which also provide some indication of recent performance in increasing agricultural output.

Attached to the tables and my summary notes is a paper entitled "Theory and Practice of Soviet Collective Agriculture." This paper, which is really an essay and not a research paper, represents an effort on my part to understand why Soviet agriculture remains a high cost agriculture. As I note, Soviet agriculture is high cost in two different senses--the very large fraction of national investment devoted to agriculture and the high prices that the state must pay to farms to obtain a not entirely satisfactory level of output, especially of meat products.

One criticism that has been made of the paper is that I entirely ignore the natural resources--the land and the climate--in the Soviet Union as a factor contributing to poor performance. All that I wish to say here is that the natural resource conditions were deliberately ignored because I believe them to be largely irrelevant as a factor in the high

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*Notes for talk to be given at the Conference on Soviet Agriculture, "The Future of Soviet Agriculture," at the Kennan Institute, Washington, D.C., November 16, 1976.

cost of Soviet agricultural products. Furthermore, for the levels of yields per unit of land now achieved in the Soviet Union I do not believe that soil and climatic conditions have been a major factor in restraining output growth. Nor do climatic conditions that prevail in the Soviet Union require the large year-to-year variability in total farm output that actually exists. Much, though not all, of the variability is the result of deliberate policy decisions and a different set of policies could be adopted that would result in much less output variability and with relatively little or no loss of output in the intermediate or long run.

The attached tables (which I have taken from a recent paper by David Schoonover of the Economic Research Service[1]) present some of the major components of the 10th Plan for agriculture. I think the output objectives of the plan can be described as pessimistic. If the plan objectives are met there will be very little improvement in per capita food consumption, in terms of either quantity or composition. Except for vegetables, melons and fruit there would be no noticeable increase in any major component of food consumption. It is a striking commentary on the plan that per capita grain consumption is to remain unchanged or increase very slightly. At the level of per capita income of the Soviet Union, stable per capita grain consumption would not occur in an economy in which consumer preferences had a significant influence upon food consumption.

In terms of the interrelationships between grain and livestock production and purchased inputs and farm output, the agricultural plan appears to be quite realistic. If grain production reaches the plan

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[1] From his paper "Soviet Agriculture in the 1976-80 Plan," delivered at the annual meeting of the American Association for Advancement of Slavic Studies, St. Louis, Missouri, October 7, 1976.

Table 1.--USSR investments in agriculture, 1966-75 and plans 1976-80 1/

Investment	Performance		Plans	Increase over previous 5 years	
	1966-70	1971-75	1976-80	1971-75	1976-80
	-- Billion Rubles --			-- Percent --	
Total agricultural	82.2	131.7	171.7	60	30
Collective	33.6	47.1	56.0	40	19
State	48.6	84.6	115.7	74	37
Housing and amenities	8.6	12.2	18.0	42	48
Productive total	40.0	72.4	97.7	81	35
State farms, inter-farm enterprises, agroindustrial complexes	21.5	37.9	47.7	76	26
Irrigation and land relamation 2/	3/11.4	21.6	32.1	3/89	49
Electrification	n.a.	2.1	2.8	n.a.	33
Agricultural supply organization	n.a.	5.6	7.3	n.a.	30
Research and educational institutions and other investments	n.a.	5.2	7.8	n.a.	50

1/ Data for 1971-75 and plans for 1976-80 are from Gusev (6).
2/ Excluding reclamation by farms.
3/ Data for 1966-70 may differ slightly in terms of coverage; by definition for 1966-70, increase during 1971-75 was about 70 percent.

Table 2.--Production and agricultural supplies of fertilizer in the USSR, 1966-75 and plans 1976-80 1/

Item	Performance		Plans		Increase over previous 5 years	
	1971-75	1975	1976-80	1980	1971-75	1976-80
	-- Million tons --				-- Percent --	
Production:						
Gross standard weight	370.4	2/90.2	n.a.	3/143.0	68	n.a.
Nutrients	89.4	22.0	n.a.	4/35.0	72	n.a.
Deliveries to Agriculture:						
Gross standard weight	306.6	2/75.4	467.0	3/120.0	66	52
Nutrients	70.2	17.5	n.a.	n.a.	66	n.a.

1/ Includes feed phosphates.
2/ Includes 2.2 million tons of feed phosphates
3/ Includes 5 million tons of feed phosphates.
4/ (13).

Table 3.--Output of agricultural products in the USSR, 1971-75, and plans, 1976-80

Output	Performance	Plans 1/			Increase over previous 5 years	
	1971-75	1976-80	1976	1980	1971-75	1976-80
	-- Billion rubles --				-- Percent --	
Gross output:						
1973 prices	2/114	130-133	120	143	13	14-17
1965 prices	91	2/104-106	2/96	2/114	13	14-17
	-- Million tons --				-- Percent --	
Grain 3/	181.5	215-220	207	235	8	18-21
Cotton (unginned)	7.7	4/8.5	5/8.1	4/9.0	26	11
Sunflowerseeds	6.0	7.6	7.5	7.7	-7	27
Sugarbeets	76.0	4/95-98	n.a.	n.a.	-6	25-29
Potatoes	89.7	102	99	104	-5	14
Vegetables	22.8	28.1	26	30	17	23
Fruit and berries 6/	2/7.9	10.4	9.5	11.6	36	32
Meat 7/	14.0	15.0-15.6	13.3	17.3	21	7-11
Milk	87.4	94-96	87.0	102	9	7-10
Eggs 8/	51.5	58-61	53.0	66.8	44	13-18
Wool 9/	441	473	432	515	11	7

1/ Unless otherwise indicated, plans are from Gusev (6).
2/ Calculated.
3/ Gross weight including excess moisture and waste.
4/ (11).
5/ (9)
6/ Excluding grapes.
7/ Carcass weight, including slaughter fats.
8/ Billions.
9/ 1,000 tons.

Table 4--Per capita food consumption in the USSR, 1970 and 1975, and plans 1980 1/

Food	Consumption			Increase over 5 years		
	1970	1975	1980	1970	1975	1980
	-- Kilograms --			-- Percent --		
Grain and products 2/	149	142	144	-4	-5	1
Potatoes	130	123	115	-8	-5	-6
Vegetables and melons	82	87	113	14	6	30
Fruit	35	37	50	25	6	35
Sugar	39	41	43	15	5	5
Meat and products 3/	48	58	60	17	21	3
Eggs 4/	159	215	225	28	35	5
Milk and dairy products 5/	307	315	330	22	3	5

1/ Gusev (6).
2/ Milled equivalent.
3/ Including edible slaughter fats.
4/ Number.
5/ Milk equivalent.

Table 5.--Foreign trade in grain by the USSR, including U.S. shipments, 1960/61-1975/76 1/

Year	Exports		Imports		Imports from U.S. 2/	
	Total 3/	Wheat 4/	Total 3/	Wheat 4/	Total 3/	Wheat 4/
	-- Million tons --					
1960/61	7.0	5.0	0.7	0.6	0	0
1961/62	8.4	5.3	0.3	0.2	0	0
1962/63	8.3	5.7	0.2	0.2	0	0
1963/64	4.7	2.7	9.9	9.7	1.8	1.8
1964/65	3.8	2.2	2.2	2.2	5/	5/
1965/66	4.9	2.6	8.6	8.5	0	0
1966/67	5.2	4.4	3.3	3.1	0	0
1967/68	6.3	5.3	1.9	1.5	0	0
1968/69	6.9	5.8	0.7	0.2	0	0
1969/70	7.6	6.4	1.3	1.1	0	0
1970/71	8.3	7.2	0.8	0.5	0	0
1971/72	6.7	5.8	7.8	3.4	2.9	5/
1972/73	1.7	1.3	21.8	14.9	13.7	9.5
1973/74	5.9	5.0	11.5	4.4	7.9	2.7
1974/75	5.0	4.0	5.2	2.5	2.3	1.0
1975/76	0.5	0.5	25.6	10.1	14.5	4.0

1/ July-June marketing year data are from the Foreign Agricultural Service, U.S. Department of Agriculture.
2/ U.S. exports to the USSR.
3/ Excluding rice.
4/ Including flour.
5/ Negligible.

objective and significant increases occur in other sources of animal feed, the modest livestock objectives should be achievable.

Does the 10th Plan imply continuing grain imports, assuming the grain and livestock goals are met? Without knowledge about the expansion of other sources of feed it is difficult to say. Grain production is planned to increase by 18 to 21 percent while the increase in feed requirements for the 10th Plan compared to the 9th Plan is approximately 8 to 10 percent. But the relatively importance of grain in the total feed supply has increased during the past 15 years and with the emphasis upon large scale livestock complexes is likely to increase further. It is possible, of course, that the productivity of feed--output of livestock products per unit of feed--will increase during the plan. This factor could be large enough to offset the 11 million ton annual average of grain imports during the 9th Plan.

There is little evidence that livestock output per unit of feed increased from the mid-1950s through the early 1970s. But there is fairly strong evidence that the amount of grain fed per unit of livestock output increased during this period and it seems reasonable that this shift in the composition of feed will continue for the rest of this decade. Thus the greater increase in the goal for grain production than for livestock production does not, by itself, imply that the Soviet planners had assumed that net grain imports would be eliminated during the 10th Plan. According to Donald Crisler's estimates of the total feed fed to livestock the share of concentrates (primarily grain and grain byproducts) increased from about 24 percent of total livestock feed in 1961 to 31 percent in 1970.[1] If this

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[1] Donald Crisler, Livestock Feed Balances for the USSR, ERS, Foreign 355, p. 22.

percentage should increase by only four percentage points between the 9th and 10th plan periods (say from 34 percent to 38 percent) grain production would have to increase by 18 to 21 percent and grain imports be maintained at the actual level of the 9th Plan in order to provide feed for an 8 to 10 percent increase in livestock output.

The conclusion that net grain imports during 1976-80 were planned to be at approximately the same level as for 1971-75 is consistent with the US-USSR grain supply arrangement. If the Soviet Union imports between 6 and 8 million tons annually from the United States and maintains the same percentage of its grain imports from the United States as during 1971-75 (approximately 57 percent), the range of gross grain imports would be between 10.5 and 14 million metric tons. Obviously the Soviet Union may desire to return to its former role of major grain supplier to Eastern Europe and thus reduce its net imports below the levels indicated.

The above speculations assumed that grain production would equal the goal of the 10th Plan. I am dubious. Even with the very good grain crop that seems assured for 1976, average annual grain production in the range of 205 to 210 million tons seems a more reasonable expectation than 215 to 220 million tons. During 1971-75 there were three good crops (1971, 1973 and 1974) and one average or slightly below average crop (1972). A more reasonable expectation for a five-year period is two good crops, one average crop and two poor crops.

Of course, it is possible that even the modest livestock goals will not be met. If this should be the case, grain imports would not increase by the shortfall of grain production below the plan goals.

While the grain-livestock relationships in the plan may be reasonable, it is difficult to believe that if consumer prices for livestock

remain unchanged for the next five years, and this appears to be the intention, that per capita demand for meat and eggs will not grow by substantially more than the planned increases in per capita production. In 1975 per capita meat consumption exceeded that of 1970 by 21 percent; according to the 10th Plan per capita meat consumption in 1980 is to be but 3 percent greater than in 1975. While 1975 meat output was increased somewhat by the liquidation of swine and poultry herds, per capita meat consumption in 1975 was only 3 kilograms or a little more than 5 percent above 1974. True, per capita meat consumption in 1976 has been substantially below 1975 and 1980 per capita meat consumption may be as much as 20 percent above 1976. But such a comparison only emphasizes how far the Soviet economy has fallen short of meeting the demand for meat in 1976 and that supply will be significantly less than demand at the state store prices throughout the 10th Plan period. Short of large scale meat imports, the Soviet consumer will receive significantly less meat than she or he would be willing to pay for during the entire plan period.

Can the Soviet policy makers cope with a large shortfall of supply of meat relative to demand at fixed prices? None of the methods of coping is particularly pleasant--increasing official prices (thus abandoning a commitment that has been repeated numerous times), formal rationing, long queues at the state stores, ever widening differentials between the prices in the state stores and in the collective farm markets, and substantial imports of meat. And further substantial increases in the already high livestock prices will lead to further increases in the enormous subsidy for meat and milk production. All in all, the 10th Plan Period is unlikely to be a pleasant one for Soviet policy makers. And it couldn't happen to a more deserving group.

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