

STAT

Page Denied

STAT

METHODS OF CALCULATING AGRICULTURAL LABOR PRODUCTIVITY IN USSRVoprosy Ekonomiki, No 2
Moscow, 1956

I. Merinov

Systematic study of labor productivity in all branches of the national economy and in all enterprises is of great importance. Without a scientific analysis of labor productivity it is impossible to draw accurate conclusions characterizing economic progress in the USSR and to show the achievements of the socialist economy in its economic competition with capitalism. Systematic study of the change in labor productivity and the factors which affect it is a necessary prerequisite for the planned distribution of the labor force throughout the branches of the national economy, ministries, trusts, and enterprises. The study of labor productivity will also ensure the most efficient organization of each branch of production, each enterprise, and each production sector.

The problem of studying labor productivity in the kolkhozes and the sovkhoses has acquired especially great importance at present. The party and the government have always given and are giving a great deal of attention to the question of a steady increase in labor productivity in agriculture. In accordance with the directives of the 19th Congress of the CPSU, measures for increasing labor productivity in agriculture are included in the system of national economic planning. Therefore, the working out of scientifically sound and simple methods of measuring labor productivity in the kolkhozes and sovkhoses is the urgent and primary task of economists and statisticians.

To resolve these tasks the following most important problems involved in the measurement of labor productivity must first of all be elucidated: what scale must be used as a basis for measuring the outlays of labor, i.e., for determining the unit of calculation of the expenditure of labor time; and what distinguishes labor outlays in a given production branch from labor outlays in other branches. In addition, the type of workers employed in productive labor and the methods for calculating the consolidated indexes of labor productivity in the production of heterogeneous output in a given production branch as a whole must be determined.

Labor productivity is measured by the quantity of output per unit of labor outlay. Therefore, one of the basic questions in measuring labor productivity concerns the units of measure to be used for this purpose. Marx stressed that "the quantity of labor itself is measured by its duration, by labor time; and labor time, in turn, is measured in the specific units of time, an hour, day, etc."

In a planned system the distribution of labor among the branches of the national economy, as well as within branches, is shown in most industries in the form of quotas for the average number of registered workers and employees. This requires, first of all, the calculation of indexes showing the average number of registered workers actually employed. Indexes of the average number of registered workers constitute the basic scale for measuring labor time during the period for which these indexes are calculated. Thus, in the plans and the statistical reports for industry and construction, labor productivity is expressed, first of all, in the form of indexes of average output per registered worker for a specific period (a month, quarter, or year). Labor productivity in agriculture must also be expressed in the form of indexes of average output per worker engaged in agricultural production. Otherwise, it would be impossible to compare correctly the rates of growth of labor productivity in agriculture with the growth rates in other branches of the national economy.

STAT

Agricultural production is distinguished from industrial production by a number of factors. Production in agriculture in an overwhelming number of cases is expressed in a single harvest of agricultural products. In the case of animal husbandry production, cycles are of different duration in various branches of the industry so that the calculation of output is possible only for the economic year as a whole. Therefore, in agriculture, in contrast with most other branches of industry, labor productivity as a rule is calculated only on the basis of annual output.

The methods of calculating the average number of workers in the sovkhozes and the MTS are essentially the same as the methods used in industry and in other branches of the national economy. In the kolkhozes the average annual number of workers is determined from the data contained in the annual reports of monthly employment figures. The total of these monthly figures, divided by 12, gives the average annual number of kolkhoz workers actually employed in the collective economy of the kolkhozes. Under this method of calculating the average annual total, the average annual number of days worked per worker is about 250. To this average annual number of kolkhoz workers is added the average annual number of those MTS agricultural workers who are paid, not according to labor-days (trudodni), but at straight monetary piece rates (combine and threshing machine operators, weighers, etc.), and also the number of workers hired by the kolkhozes.

There is a theory that the average annual number of kolkhoz workers employed in the collectivized economy of the kolkhozes must be calculated on the basis of a fixed standard annual number of workdays per worker (for example, 270 or 290 days). It is impossible to concur with this. In the various industrial enterprises, sovkhozes, and kolkhozes the average number of days worked per worker differs for the same time period. Should identical average norms of working days be used in calculating the average number of workers and kolkhoz workers, then the effect of the variation in the utilization of worker and kolkhoz labor time would not be revealed in studying actual annual labor productivity. Consequently, the calculation of indexes of annual labor productivity in the kolkhozes would lose all significance.

Despite the fact that the method of calculating the average number of kolkhoz workers actually working in the collectivized economy of the kolkhozes closely approximates the method of calculating the average registered number of workers of state enterprises, in the kolkhozes (considering that all able-bodied kolkhoz workers must work on collective farms) it is expedient in practice to compute indexes of output per available worker. These indexes, in comparison with indexes of average output per worker actually working in the kolkhozes, make it possible to determine the results of utilizing labor reserves for increasing kolkhoz labor productivity. The degree of labor activity of the kolkhoz workers in the collectivized economy depends considerably on the development of diversified farming. In turn, labor productivity is closely related to the maximum use of labor reserves during the year. Therefore, the study of labor productivity has the greatest significance in connection with the utilization of labor reserves in kolkhozes with different industry structures.

In calculating this type of labor productivity index, all available kolkhoz workers who are obligated to work a minimum number of labor-days, as well as all other kolkhoz workers actually working in the collectivized economy of kolkhozes, are included. The latter group of kolkhoz workers may be shown in terms of able-bodied collective farmers by conversion through the average actual number of labor-days earned per able-bodied kolkhoz member. To the total number of available kolkhoz workers (assumed to be fully able-bodied) calculated by this method must be added the MTS agricultural workers and also the workers hired by the kolkhozes.

STAT

The second unit of measurement of labor time is the working day of the worker employed in the enterprise, regardless of the number of hours actually worked by him during the day. This unit of measurement is also important in agriculture. In agricultural enterprises, and especially in kolkhozes, the length of the working day is not fixed in hours and a corresponding account of labor time is not maintained. With the present status of accounting in kolkhozes and sovkhoses the day of actual work (man-day) is the only possible unit of measuring labor time. The length of the man-day in kolkhozes varies with the amount of daylight (for example, for an entire day in favorable weather during the periods of the hay and grain crop harvests to a few hours in inclement weather). Moreover, workdays in agricultural enterprises, as a rule, are longer in summer and shorter in the autumn and winter. The data of selected kolkhoz worker budgets show that on an annual basis labor time amounts to 8.5-9.0 hours per actual workday, including time for traveling to and from work and for breaks (lunch, etc.).

Some economists feel that in studying labor productivity in kolkhozes, labor-days instead of man-days should be used, and they identify labor-days with the expenditures of labor time, reduced to terms of simple labor. Such an identification is incorrect. The term "labor-day" takes into account qualitative differences in labor and makes commensurable expenditures of labor, i.e., actual expenditures of labor time, of varying intensity and productivity. From this it follows that the labor-day is a singular measure of the social value of the work of a kolkhoz worker in collectivized agriculture, but it is by no means a measure of the expenditure of labor time.

The question arises: why do the frequently published statistical data, calculated on a labor-day basis, show that output per labor-day is increasing yearly, that more output is produced per labor-day in the leading kolkhozes than in the lagging kolkhozes which operate under the same economic and natural conditions? The answer is that the data reflect an economic law under which worker productivity increases more rapidly than wages, and as the result of which the growth of output exceeds the increase in industrial wages and collective farm wage payments in terms of labor-days. Thus actual output per labor-day is higher in the advanced kolkhozes than in the lagging kolkhozes, and it increases from year to year. Moreover, indexes of the increase of output per labor-day will generally be lower than the indexes of the increase of daily labor productivity.

From the above it follows that the indexes of the growth of output per labor-day are not measures of labor productivity. An analogous situation exists in industry. Thus, for example, if the output per 100 rubles of payment is calculated, then the numeric value of these indexes will also increase from year to year; however, obviously the use of this method for measuring the increase of labor productivity in industry is inadequate.

The number of man-days worked in the kolkhozes at present is computed in terms of reported data on the total annual number of labor-days and according to the data of selected kolkhoz workers' budgets relative to the average number of earned labor-days per man-day by dividing the total number of labor-days by average daily labor-day earnings.

Parallel measurement of annual and daily labor productivity makes it possible to establish the effect of utilizing the working time of production workers on labor productivity. Obviously then, the more fully is labor time utilized, the higher will be the indexes of the growth of annual labor productivity in comparison with the indexes of the increase of daily earnings; and in the case of unchanging utilization of work time, both indexes will coincide.

STAT

In actual practice, industrial labor productivity statistics include calculations in the form of indexes of total output per man-hour. By comparing daily and hourly labor productivity the extent of the effect of the average length of the workday on labor productivity is determined. However, a study of hourly labor productivity in the kolkhozes and the sovkhoses cannot be organized at present because calculation of time worked in hours is not made.

In studying kolkhoz labor productivity, the role of the MTS must be considered because the level of labor productivity attained in the kolkhozes is the result of the joint productive efforts of the MTS and the kolkhozes.

In economic literature a theory is often expressed that in studying agricultural labor productivity one must consider MTS output to be solely the payment in kind and the money payment for MTS services. Such a division of kolkhoz output is artificial and only complicates the study of the problem of labor productivity in agriculture as a whole. The organization of production and labor in the kolkhozes represents in itself a single organic complex. The labor of MTS workers is supplemented by the labor of kolkhoz workers in all the processes which are carried on; MTS machines are utilized jointly with kolkhoz implements; and the role of the MTS is becoming more and more important in the development of kolkhoz production. In connection with this, the question of labor productivity must be studied on the basis of unity of the production process of MTS and kolkhozes, as well as the unified output of kolkhozes. This is very important in clarifying the operations of the basic factor in the growth of kolkhoz labor productivity; i.e., labor mechanization.

Also essential are the problems of more clearly defining the composition of the labor force, which must be taken into account in determining labor productivity. Labor productivity indexes in agriculture must be calculated by those methods of defining the composition of the labor force and labor outlays which are used in calculating labor productivity indexes in industry and construction. Of course, in industry labor productivity indexes are computed in the form of average output per average annual worker included in the total number of industrial production workers, and also in the form of the average output per man-day for the same type of labor. Therefore, in kolkhozes, MTS, and sovkhoses, labor productivity indexes must also be calculated on the basis of the labor time expended by workers who take part in agricultural production, i.e., in all branches of crop cultivation, animal husbandry, and the maintenance of draft animals, as well as in operations of a general nature which relate to agricultural production.

In relation to this, it must be noted that under the conditions of socialist production with its planned control of economy, progressive cooperation of labor, and mechanized and automatized production, the concept of a group of workers engaged in productive labor must be revised in the direction of broadening it considerably. In the actual computation of production outlays and the cost of output, both in industry and in all other branches of the economy, total current labor costs should include not only the wages paid for [direct] labor but also the wages of all other workers participating in production. Thus, special attention should be given to the question of the expediency of applying the system of measuring labor productivity on the basis of indexes of average output, calculated for all workers engaged in industrial enterprises, in construction, and in sovkhoses and kolkhozes whose wages are now included in production cost.

With conversion to the differentiated accounting and study of labor productivity in individual branches of agriculture, the calculation of labor productivity indexes per worker annually is inexpedient in the absence of reported data for calculating the average number of workers in the various branches. The

STAT

assumed data in such calculations would at best be highly approximative. Therefore, the study of labor productivity in terms of individual branches of agriculture and, even more, in terms of individual agricultural crops and individual branches of animal husbandry, can be based principally on calculations of labor time in terms of man-hours.

The following group of questions in the study of labor productivity deals with measuring output. Where a single product is being produced, the index of labor productivity is determined by the quantity of output per unit of labor time. In studying labor productivity in an enterprise as a whole, or in an industry, i.e., in the case of heterogeneous output, the question of reducing the various types of output to a common unit must first be resolved.

The solution of this problem, it is believed, must depend on the goals involved in studying labor productivity. In particular, in examining labor productivity in relation to the study of production outlays in the sovkhozes, it is most expedient to evaluate output in terms of the average unit cost of individual products, taking as the cost basis either planned cost or the cost of a specific base period.

Consider the following data, which are characteristic of labor productivity and production outlays for two specific periods in the production of sugar beets and wheat (the figures are hypothetical):

	<u>First Period</u>			<u>Second Period</u>		
	<u>Output (metric quintals)</u>	<u>Man-Days Required</u>	<u>Cost (rubles per metric quintal)</u>	<u>Output (metric quintals)</u>	<u>Man-Days Required</u>	<u>Cost (rubles per metric quintal)</u>
Sugar beets	24,000	7,200	2.50	30,000	6,000	2.40
Wheat	2,400	1,200	25.00	3,000	900	20.00

Production outlays for beets and wheat amounted to 120,000 rubles in the first, and 132,000 rubles in the second period. Total production outlays increased 12,000 rubles, or 10 percent. If the cost of production in the second period had been the same as in the first period, production outlays for the output of the second period would have equaled 150,000 rubles. Consequently the actual outlays in the second period amounted to 88 percent, i.e., 12 percent less than the sum which they would have amounted to had the level of the cost remained unchanged. In other words, the cost of producing sugar beets and wheat was reduced 12 percent on the average in the second period. The required labor for the production of beets and wheat amounted to 6,900 man-days in the second period, i.e., to 1,500 man-days, or 18 percent less than in the first period. The value of beets and wheat produced per man-day in the first period (in terms of first-period costs) was 14 rubles, 29 kopeks, and 21 rubles, 74 kopeks (in terms of first-period costs) in the second period. This exceeds the daily output in the first period by 52 percent. Thus, the latter index shows the increase in labor productivity for the second period in comparison with the first period. In analyzing the dependence of the change of production outlays on the change of labor productivity, this index will be the only correct index of the increase in labor productivity.

The relation between labor productivity and production outlays on the whole may be expressed by the following equation: $S = Tpq$, where S is the total production outlay, T is the labor input (in man-days), p is daily labor productivity (output) in physical terms, and q is the unit cost of production. These production

STAT

outlays for some types of products may be calculated by the equation: $S = Tpq$, and the change of production outlays in the second period, relative to the first period, may be expressed by the following equation:

$$\frac{\sum S_2}{\sum S_1} = \frac{\sum T_2 P_2 Q_2}{\sum T_1 P_1 Q_1}$$

The above index of the change of production outlays is derived from indexes of: (1) the change of labor input, (2) the change in labor productivity, and (3) the change of the average cost of individual products. In measuring the output of the periods being compared in terms of constant prices (i.e., in terms of the average cost of the first period, which in the given case is alone correct) the indexes are as follows:

$$\text{Index of labor input: } \frac{\sum T_2 P_1 Q_1}{\sum T_1 P_1 Q_1}$$

$$\text{Index of labor productivity: } \frac{\sum T_2 P_2 Q_1}{\sum T_2 P_1 Q_1}$$

$$\text{Cost Index: } \frac{\sum T_2 P_2 Q_2}{\sum T_2 P_2 Q_1}$$

Consequently, the index of production outlays will equal:

$$\frac{\sum T_2 P_2 Q_2}{\sum T_1 P_1 Q_1} = \frac{\sum T_2 P_1 Q_1}{\sum T_1 P_1 Q_1} \times \frac{\sum T_2 P_2 Q_1}{\sum T_2 P_1 Q_1} \times \frac{\sum T_2 P_2 Q_2}{\sum T_2 P_2 Q_1}$$

Substituting in this equation the data from the above example, we obtain the following relationship:

$$\frac{132,000}{120,000} = \frac{6,900 \times 14.29}{8,400 \times 14.29} \times \frac{6,900 \times 21.74}{6,900 \times 14.29} \times \frac{6,900 \times \frac{132,000}{6,900}}{6,900 \times \frac{150,000}{6,900}} =$$

$$\frac{98,601}{120,036} \times \frac{150,000}{98,601} \times \frac{132,000}{150,000} = 0.821 \times 1.521 \times 0.880 = 1.099$$

In other words, because labor productivity increases to 1 1/2 times the former level, 18 percent less labor was expended on the output of the second period, as a result of which there was a saving of 21,435 rubles; and in addition, as the result of the 12-percent cost reduction, 18,000 rubles was saved. Outlays on second-period output on the whole were 110 percent of actual outlays on first-period output, because with constant costs and no change in labor productivity, production outlays would have been equal to 150,000 rubles. This amounts to 125 percent of the cost of output.

In individual cases other methods of measuring heterogeneous agricultural output may be used. For example, the total output of fodder crops may be expressed in fodder units. Obviously, it is most expedient to produce those fodder crops, which under given conditions will yield the greatest number of fodder units, with the least labor outlay. This ensures the highest labor productivity.

STAT

However, methods of measuring heterogeneous output in terms of either money cost or fodder value are applicable in the solution of partial problems, i.e., in studying production outlays and conditions for the most advantageous fodder production. In studying labor productivity with the purpose of determining its role in the development of the national economy, it is necessary to base measurement of output on other methods. In this case it would be most accurate to take as the common measure of the heterogeneous output those value units which would reflect to the greatest degree the relationships of socially necessary labor input per unit for each product, i.e., the cost value unit (stoimostnyye otsenki edinitsy).

Wholesale prices and cost estimates which remain unchanged over a long period are used in industry and construction for the above purpose. This makes prices and costs comparable for a number of years and for different regions. In calculating the gross output of agriculture, the so-called "average commodity prices" (srednetovarnyye tseny) are employed. These are calculated on the basis of the actual selling prices of kolkhozes and sovkhoses, i.e., the prices at which agricultural products were distributed on the domestic market in 1951.

However, the constant prices of 1951 did not even reflect the actual relative costs of farm commodities in 1951 itself. During the last few years, conditions affecting the sale of agricultural products changed significantly, so that the new prices approximate more closely actual cost relationships. Therefore, the constant prices for 1951 are already unsuitable for measurement purposes and must be replaced by others which are more appropriate under existing conditions of agricultural production.

With the present condition of kolkhoz accounting and reporting, the method of calculating labor productivity indexes in the agricultural kolkhozes is complicated. The application of the method in practice may be shown by an example from kolkhozes in one of the southern oblasts of the USSR for 1952 and 1953.

Gross Output of Oblast Kolkhozes in 1951 Prices
(million rubles)

	<u>1952</u>	<u>1953</u>
Crop cultivation	3,068	3,428
Animal husbandry	726	990
Total	3,754	4,418

According to annual reports in the kolkhozes of the oblast, the following labor-days were recorded:

	<u>No of Labor-Days (in millions)</u>		<u>Labor-Days (% of total)</u>	
	<u>1952</u>	<u>1953</u>	<u>1952</u>	<u>1953</u>
Total for all branches (excluding labor-days credited to pregnant kolkhoz women and other labor-day credits not related to operations,	204.5	215.8	100.0	100.0

STAT

	No of Labor-Days (in millions)		Labor-Days (% of total)	
	1952	1953	1952	1953
Crop cultivation	104.9	103.7	51.3	48.1
Animal husbandry	50.2	55.6	24.5	25.8
Care of draft animals	9.2	10.0	4.5	4.6
Miscellaneous work not distributed by branches of the economy	12.7	12.8	6.2	5.9

According to data from kolkhoz workers' budgets, kolkhoz workers earned 1.85 labor-days per man-day worked in 1952, and in 1953 they earned 1.95 labor-days. Existing data for past years for the same oblast show that the average daily labor-day earning by individual branches of the economy amounted to the following: plant cultivation, 107 percent of the average daily earnings for the kolkhoz economy; animal husbandry, 90 percent; draft animal care, 95 percent; and miscellaneous work not distributed by branches, 97 percent.

Based on these percentages, the average daily labor-day earning according to individual types of the operations are as follows:

	1952	1953
For the collective farm as a whole	1.85	1.95
Crop cultivation	1.98	2.09
Animal husbandry	1.67	1.76
Care of draft animals	1.76	1.85
Miscellaneous work not distributed by branches of the economy	1.79	1.89

On the basis of the data for the total number of labor-days by branches of the economy and data for the average labor-day earning per man-day, the number of man-days by branches may be computed.

No of Man-Days Worked by Kolkhoz Workers (in millions)

	1952	1953
In all branches	110.5	110.7
Crop cultivation	53.0	49.6
Animal husbandry	30.1	31.6
Care of draft animals	5.2	5.4
Miscellaneous work not distributed by branches of the economy	7.1	6.8

Labor inputs for draft animal care and for miscellaneous work are allocated among the branches of the economy in proportion to the number of labor-days earned in each branch, on the assumption that the volume of completed work by branches is reflected in the number of labor-days. Consequently, of the 12.3 million man-days spent in 1952 in work for the care of draft animals and miscellaneous work, 51 percent or 6.3 million man-days must be added to 53 million man-days earned in animal husbandry; in the given case that

STAT

percentage of man-days which must be attributed to work for the care of draft animals is attributed to animal husbandry. In 1953, of the 12.2 million man-days expended on care of draft animals and miscellaneous operations, 48 percent or 5.9 million man-days must be allocated to crop cultivation; and 30 percent or 3.7 million man-days must be allocated to animal husbandry. As a result the following expenditure of labor time of kolkhoz workers in agriculture is obtained:

	Labor Time (million man-days)		Labor Time (% of total)	
	1952	1953	1952	1953
Crop cultivation	59.3	55.5	53.7	50.1
Animal husbandry	33.7	35.3	30.5	31.9
Total	93.0	90.8	84.2	82.0

The following number (in thousands) of kolkhoz workers, including old people and children, were employed on the farms each month:

	1952	1953
January	310.2	328.7
February	331.8	347.2
March	402.5	422.2
April	468.4	506.3
May	511.7	521.2
June	560.6	567.7
July	579.8	609.8
August	566.0	572.7
September	512.9	522.9
October	469.0	486.9
November	425.1	412.9
December	365.0	355.2
Average for year	458.6	471.1

The kolkhoz workers engaged in agriculture must be separated from the calculated number of average yearly kolkhoz workers. To do this, it must be assumed that the kolkhoz workers work the same number of days in both agricultural and nonagricultural branches. Calculations for 1952 show that for all kolkhoz operations 241 man-day per average annual [sic] kolkhoz worker were spent ($\frac{110.5 \text{ million}}{458.6 \text{ thousand}}$), and in 1953, 235 man-days per average annual kolkhoz worker ($\frac{110.7 \text{ million}}{471.1 \text{ thousand}}$). Consequently, there were 385,900 people ($\frac{23 \text{ million}}{241}$) engaged in agriculture in 1952, while in 1953 there were 386,400 people ($\frac{26.8 \text{ million}}{235}$) engaged in agriculture.

STAT

In addition to the kolkhoz workers, including tractor drivers and other tractor brigade workers whose labor is paid according to the number of labor-days earned by them, there are combine operators, weighers, and other MTS workers working in the kolkhozes who receive money wages from the MTS on a piece-rate basis. There is also a relatively small number of hired workers who receive money wages and wages in kind. According to the annual reports of the MTS, 3,700 persons worked in the oblast in 1952, and 6,700 combine operators and other MTS workers in 1953. In 1952 these workers worked 749,000 man-days; and in 1953, they worked 1,339,000 man-days. In 1952 hired production workers were paid 2,828,000 rubles, while in 1953 they were paid 3,247,000 rubles.

Assuming tentatively that the average wages of hired workers in the kolkhozes are the same as the wages of sovkhos workers, and considering that, according to annual reports of the sovkhos of the given oblast, daily earnings of workers amounted to 19 rubles in 1952 and 20 rubles in 1953, we find that hired kolkhoz workers earned 149,000 man-days in 1952 and 162,000 man-days in 1953. Assuming that both the hired workers and the kolkhoz members worked an average of 241 days in 1952 and 235 days in 1953, we find that the total number of hired workers in the kolkhozes, including workers in the nonagricultural branches, amounted to 618 persons in 1952 and 689 in 1953.

Expenditures of hired labor in kolkhoz agricultural production are determined according to proportion of labor expenditure in agriculture of the kolkhoz workers themselves.

Man-day expenditures of hired labor in the kolkhoz agricultural production were as follows:

	<u>1952</u>	<u>1953</u>
Crop cultivation	80,013	81,162
Animal husbandry	45,445	51,678
Total	125,458	132,840
Average annual number of hired workers in agriculture	521	565

The results of all of the above calculation can be summarized in the following table:

	<u>Total Man-Days Worked in Agriculture (millions)</u>	
	<u>1952</u>	<u>1953</u>
Kolkhoz workers	93.0	90.8
MTS workers paid at monetary piece-rates	0.7	1.3
Hired workers	0.1	0.1
Total	93.8	92.2

STAT

Total Man-Days Worked in Crop Cultivation (millions)

	<u>1952</u>	<u>1953</u>
Kolkhoz workers	59.3	55.5
MTS workers, paid at monetary piece rates	0.7	1.3
Hired workers	0.1	0.1
Total	60.1	56.9

Total Man-Days Worked in Animal Husbandry (millions)

	<u>1952</u>	<u>1953</u>
Kolkhoz workers	33.7	35.3
Hired workers	--	--
Total	33.7	35.3

Average Annual No of Workers in Agriculture in Kolkhozes (1,000)

	<u>1952</u>	<u>1953</u>
Kolkhoz workers	385.9	386.4
MTS workers at monetary piece rates	3.7	6.7
Hired workers	0.5	0.6
Total	390.1	393.7

The final calculation of labor productivity indexes in agriculture is shown in the following table:

	<u>1952</u>	<u>1953</u>	<u>1953 (% of 1952)</u>
Gross output in comparable 1951 prices (million rubles)			
Crop cultivation	3,068	3,428	112
Animal husbandry	726	990	136
Total	3,794	4,418	116
Average annual number of workers in agriculture (thousands)	390.1	393.7	101
Over-all agricultural output per average annual [sic] worker (rubles)	9,726	11,222	115

STAT

	<u>1952</u>	<u>1953</u>	<u>1953 (% of 1952)</u>
Labor input (million man-days)			
Crop cultivation	60.1	56.9	95
Animal husbandry	33.7	35.3	105
Total	93.8	92.2	98
Output per man-day (rubles)			
Crop cultivation	51.0	60.2	118
Animal husbandry	21.5	28.0	130
All agriculture	40.4	47.9	119

The uncertainty inherent in all these involved computations is in part the result of inadequacies in kolkhoz accounts and reports, as well as in original MTS data on the number of workers and labor time expended.

Agricultural production, of course, depends on natural conditions: climate, soil, and weather. In bad years the harvest of agricultural crops is smaller than in good years, given the same organizational and production conditions. "Productivity of agricultural labor," said Marx, "is related to the conditions of nature, and depending on the productivity of the latter, the same amount of labor is represented by a greater or smaller quantity of output, of use value."

In relation to the productivity of nature, labor productivity is expressed first by yield of agricultural crops per sown hectare, or by productivity per head of livestock. Economy of labor or, on the contrary, an increase in the amount of labor expended per unit of agricultural output, also thereby depends on the productivity of nature.

The amount of labor expended in agriculture is determined not only by volume of output, but also by the size of the cultivated area sown to specific crops, as well as the amount and nature of the agricultural work required to produce each crop. Therefore, in planning labor in each kolkhoz and each sovkhaz, or according to the kolkhozes and the sovkhazes of a particular rayon, the area sown to individual crops must first be taken into account, and also the average labor input per hectare sown to each crop, depending on the amount and nature of the agricultural work undertaken on each crop, as well as the techniques for carrying out this work.

Let us suppose that according to the plan established on the basis of the existing level of labor productivity, the necessary labor for the production of one metric quintal of wheat equals 0.25 man-days. In this case, 2.5 million man-days would be allocated for the production of 10 million metric quintals of wheat according to the plan. Moreover, in the event of a significant deviation of actual yield from planned yield, for example a 50-percent overfulfillment of the yield plan, the harvest plan would also be exceeded by 50 percent. However, it does not follow from this that labor outlays must also increase 50 percent.

There is an analogous situation in the productivity of animal husbandry. Productivity of labor there depends not only on organizational and production conditions (the zootechnical measures and mechanization), but also on the pedigree of the livestock and the fodder base, which condition the productivity of livestock (the milk yield, the wool clip, the weight of the animals, the egg yield, etc.). Therefore, in studying the productivity of animal husbandry, as in the planning of labor productivity, it is necessary to proceed from the indexes of average labor outlay for the maintenance of productive livestock, and also from the indexes of livestock productivity.

STAT

It is generally known that in the internal economic planning of the agricultural enterprises (in the sovkhozes and kolkhozes having proper economic organization) calculations of labor requirements are based primarily on indexes of average labor outlay per unit of agricultural work, per hectare sown to each cultivated crop, per head of individual types of productive livestock. It is believed that such a system of computing labor productivity in agriculture should be widely adopted in practice in the future. Without it, it is impossible to study such important questions as the effect of agricultural mechanization, agronomical and zootechnological measures which have been adopted, and the economic efficiency of individual machines and their specific complements on the productivity of labor.

The methods of computing general indexes of labor productivity in the kolkhozes and sovkhozes, discussed in this article, have already had practical application in the work of the Central Statistical Administration USSR. However, these methods are inapplicable in studying labor productivity either in individual kolkhozes and sovkhozes or in the various organizational and productive groups. For such a study it would be necessary to organize an appropriate system of original production and labor time accounts in every kolkhoz, sovkhoz, and MTS, which at present is not practicable. However, in studying labor productivity in groups of kolkhozes and sovkhozes operating under varied organizational and economic conditions and engaged in different types of production, the selective method must be widely adopted.

The program of selective surveys must be adapted not only for obtaining indexes which characterize the level of and changes in labor productivity in the basic branches of agriculture and agriculture as a whole, but also for obtaining the above-mentioned, partial indexes of labor productivity for individual products, labor outlays on crops, types of livestock, and for operations. Thus, such a system of indexes of selective surveys is required as would make it possible to determine the effect of the most important factors of labor productivity in agriculture. It would make it possible to begin a direct, general survey of labor productivity in agriculture in the very near future. The practical experience obtained as the result of such surveys would serve as a basis for the gradual introduction of labor productivity accounting in all kolkhozes and sovkhozes.

* * *