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EVALUATION OF METEOROLOGICAL CONDITIONS OF CROP PRODUCTION

Moscow EKONOMIKA SELSKOGO KHOZYAYSTVA in Russian No 8, Aug 84 pp 71-78

[Article by I. Zagaytov, doctor of economic sciences, professor at Voronezh Agricultural Institute: "Economic Evaluation of Meteorological Conditions of Agricultural Production"]

[Text] In the system of measures to improve the mechanism of management of the development of the country's APK a definite place should belong to a refinement of the methodological principles of the factor analysis of the results of economic activity at the level of oblasts, rayons and enterprises. Without this it is impossible to expect an improvement in the quality of planning of the rates, proportions and placement of production and of the distribution of material and labor resources.

Determining the directions in the factor analysis, in particular, we should proceed from the fact that the "productive force of labor is determined by diverse circumstances, among other things, by the average degree of the worker's skill, level of development of science, degree of its technological application, social combination of the production process, size and efficiency of means of production and natural conditions. The same quantity of labor is expressed, for example, during a favorable year in 8 bushels of wheat and during an unfavorable year in only 4 bushels" (Karl Marx and F. Engels, "Soch." [Works], second edition, Vol 23, p 48).

However, modern practice of economic analysis encompasses by no means all the enumerated factors. Although it is known that "nature is to the same extent a source of use values... as labor..." (Ibid, Vol 19, p 13), nevertheless from the total set of natural conditions we have learned to realistically capture at best only the effect of the differences in the quality of land on the production process. With respect to such an important component of natural conditions as the meteorological factor, it still remains outside the area of economic research. Even where it begins to be studied by economists, as a rule, researchers do not exceed the limits of criteria and methods formed in agrometeorology a long time ago and as the object of evaluation are oriented toward the productivity of hydrometeorological elements (precipitation, temperature and so forth) without a connection with the social and economic conditions of manifestation of these elements. In fact, in terms of the factor analysis what Marx said about the quality of soil "...it is closely

connected with modern social relations" (Ibid, Vol 4, p 175) fully pertains to the meteorological conditions of economic activity. Therefore, according to K. Marx's thought, under socialism the economic consequences of poor harvests cannot be as painful as during the preceding period. Since the spontaneous movement of market prices is destroyed, the state "...in advance organizes production so that the annual supply of bread depends on fluctuations in the harvest only to quite a negligible degree" (Ibid, Vol 19, p 375). All this indicates that an economic evaluation of meteorological conditions of agricultural production should be based on a method capable of taking into consideration the social characteristics of economic activity. Its fundamental difference from research performed at an agrometeorological level lies in this.

Under present conditions the importance of this problem has risen considerably, because the scale of production has increased and its structure, geography and intereconomic and intersectorial relations have become complicated. Along with objective prerequisites for an increase in the planned nature of production the role of the subjective factor, in particular of the quantitative effect of meteorological conditions on the results of economic activity, rises. For the time being, it remains big and in a number of regions predominant.

For example, if, deflecting our attention from fluctuations in the weather, we compare the average yield of grain crops on chernozem in Voronezh Oblast and on poorer land in Tula Oblast in 1975-1979, the advantage of the former will amount to 3.5 quintals per hectare. At the same time, under the effect of meteorological conditions fluctuations in harvests within the limits of Tula Oblast ranged from +4.8 quintals in 1976 to 6.2 quintals in 1979 and in Voronezh Oblast, from +7.9 to -3.5 quintals in 1979. It is noticeable that in both cases the meteorological factor had a greater effect on harvests than the differences in the quality of land.

The following calculation also deserves attention. During the postwar period on the basis of an improvement in the technique and technology of production the yield of grain crops in the Volga area, on the average, increased by 0.33 quintals annually. However, in 1978, owing to favorable meteorological conditions, it increased immediately by 5.7 quintals in relation to the average level of the preceding 5-year period--an indicator, whose attainment, as a result of intensification and other factors, would require 17 years (5.7:0.33). Conversely, in 1979 there was a decline in the yield, whose intensity absorbed the economic consequences of all-around progress of grain production during the preceding 10 years. Approximately the same picture is observed on state strain testing plots, where, on the whole, the standard of production reflects the tomorrow of our agriculture. Therefore, one can say with confidence that calculations on the basis of an economic evaluation of meteorological conditions of agricultural production will remain timely for dry farming for a long-term period.

They are especially necessary now, when the system of markups for the sale of agricultural products and wages with different forms of incentives according to the final result of production activity are made dependent on an increase in the volume of gross and commodity output as compared with the level of the

preceding period. In principle, such an incentive system is progressive and meets the demands of the present stage in APK development, because it mobilizes the labor activity of workers and kolkhoz members and the creative initiative of specialists. However, since the real process of agricultural production is under the effect of spontaneous weather fluctuations, incentives for the final result represent only a partial compensation for the bigger quantity and better quality of expended labor. In a number of cases (the above-cited indicators of the Volga area are examples of this) such incentives cannot give the proper effect, because they are mostly utilized in proportion to the economic consequences of extreme meteorological conditions. Therefore, an organization of research on the problem of an economic evaluation of meteorological conditions of agricultural production is necessary. A correction of the indicators of the results of economic activity with due regard for the results of an economic evaluation of meteorological conditions of agricultural production will contribute to an improvement in the incentive system.

How should work on an economic evaluation of meteorological conditions of agricultural production be carried out? In our opinion, we must begin from the substantiation of the most fundamental and methodological problems. At the same time, we must proceed from the fact that meteorological conditions as some of the elements of production resources should be evaluated on the basis of principles common for all types of resources--land, labor and material resources. At the same time, their specific nature must not be forgotten. An economic evaluation of meteorological conditions should be defined as a quantitative measurement of their effect on the final results of agricultural production. By analogy with land evaluation in this case it is possible to measure only the irrational form of value--socially necessary expenditures capable of compensating for the effect of specific weather conditions on the production process.

Comparing an economic evaluation of meteorological conditions of agricultural production with an economic evaluation of other types of production resources, we will draw attention to some factors.

During an economic evaluation of meteorological conditions types of resources, whose physical parameters (precipitation, temperature and so forth) are unstable, are studied. This places special requirements on the method of calculations in what concerns the attachment of evaluation indicators to a strictly fixed time.

Not the absolute level of weather parameters, but only their deviations from characteristics typical for a given place, is taken into consideration in the process of an economic evaluation of meteorological conditions of agricultural production. Conversely, what is stable in weather properties pertains to climatic, not meteorological, factors and is included in the economic evaluation of land as soil and climate properties organically blending in the production process.

In the part of planning calculations an evaluation of meteorological conditions cannot claim such a high accuracy as for other types of resources. The element of nonpredictability of weather fluctuations will diminish in

time, but in any case will remain much higher than according to the dynamics of labor and material resources. Therefore, indicators of an economic evaluation of meteorological conditions of agricultural production inevitably will have a relatively bigger interval of maximum calculation errors.

Like an economic evaluation of any types of resources an economic evaluation of meteorological conditions of agricultural production can be of two types--ecological and general. The former has as its object the determination of the effect of the weather on the development of individual APK sectors, or on the performance of individual operations. Its materials will be useful to a certain extent during the substantiation of the structure of sectors and the maneuver of production resources. In the process of an ecological evaluation the utilization of all the positive things attained by agrometeorology in research on the classification of meteorological factors is of special significance. However, we must not limit ourselves to this. Classification materials must be reflected through the prism of economic circumstances. It is not only necessary to examine the effect of a certain distribution of precipitation, temperatures and other parameters of the meteorological regime during the vegetative period on the productivity of every crop, but also to study complex interconnections of the set of natural production conditions with the dynamics of economic resources and with the change in the structure of crop rotations, work technologies and relative significance of individual crop products.

From the following data one can be easily convinced that this is how matters stand. In the amount and distribution of precipitation during the vegetative period in the country's basic grain producing regions the situation in 1913 essentially corresponded to the indicators of 1973, but the yield of grain crops during those years differed more than two-fold. Therefore, in this case approximately the same meteorological conditions should receive a different economic evaluation. A reverse situation is also possible. In 1980 an excess moisture and in 1981 a severe drought determined a similarly low yield of grain crops in the oblasts of the Central Region. Here an equal economic evaluation of meteorological conditions corresponds to different agrometeorological characteristics.

A general evaluation of meteorological conditions, which is intended to integrate indicators of individual sectors at the level of enterprises and regions, is more complex as compared with an ecological evaluation. In practice, it is manifested in the already formed concepts of favorable and unfavorable weather conditions, taking into consideration the entire set of agricultural operations and requirements of all cultivated crops. In this case the task of evaluation work is reduced to the following: On the basis of the data on the dynamics of gross output and gross and net income to determine in a quantitatively specific manner to what extent the meteorological conditions during one year were better or worse than those during preceding years, despite the fact that, for example, throughout the country in 1982 the yield of cotton and citrus crops decreased and that of potatoes, sugar beets and other crops increased. Therefore, in the process of development of the method of a general evaluation it becomes especially clear that an economic evaluation of meteorological conditions of agricultural production does not need such a comprehensive detailing of the structure and dynamics of diverse

weather parameters as required by a purely meteorological evaluation. Conversely, the task is to carefully select only some of them and for an analysis during periods having the greatest effect on fluctuations in the volume of output and production efficiency.

Since an economic evaluation of meteorological conditions of agricultural production is just as socially specific as an evaluation of all other types of production resources, criteria and indicators of an economic evaluation of meteorological conditions of agricultural production for the conditions of developed socialism should be developed on the basis of the specific nature of the object of production and the means and mechanism of its attainment. In particular, it is necessary to take into consideration as fully as possible that a complex interweaving of commodity and noncommodity relations and of cost accounting and directly social forms of production regulation takes place here. Therefore, both an ecological and a general economic evaluation of meteorological conditions of agricultural production should be performed from two aspects--national economic and cost accounting.

A national economic evaluation of meteorological conditions is to provide APK management bodies with comparable information on the economic consequences of fluctuations in the meteorological regime in indicators independent of the dynamics of current prices taking into consideration the effect of fluctuations in agricultural production on allied sectors. A cost accounting evaluation has as its object an analysis of the consequences of weather instability through the prism of interests of individual farms and associations with due regard for commodity-money relations. In this case calculations should be oriented toward the utilization of actually existing prices, which will make it possible to improve the practice of cost accounting through a more accurate delimitation of objective and subjective factors affecting the results of economic activity and the determination on this basis of expedient directions and measures of regulation of taxes, insurance payments and purchase prices.

National economic and cost accounting methods of evaluation of meteorological conditions can lead to contradictory conclusions. For example, in 1975 in actually existing prices gross output of USSR agriculture totaled 122.3 billion rubles as compared to 121.7 billion rubles in 1974, that is, it increased by 0.6 billion rubles. At the same time, it is well known that the weather conditions of 1975 were much worse than in 1974 and the physical volume of farm output was reduced by more than 10 percent annually and of livestock output, by 3 percent. However, the substantial increase in prices depreciated the economic consequences of the drought. Whereas a national economic evaluation makes it possible to measure our society's losses from this drought in full measure, a cost accounting evaluation shows that agricultural enterprises have not felt these losses financially--they have been compensated to them by society.

As we see, the utilization of an economic evaluation of meteorological conditions of agricultural production from various aspects makes it possible to investigate the effect of meteorological conditions on the production process in a more versatile manner. However, when this leads to contradictory conclusions, it is important to subordinate them correctly and to proceed from

the fact that decisive importance should be attached to national economic evaluations. They should form the basis for managerial decisions, including in terms of such a correction of the cost accounting mechanism, which, in case of need, would make it possible to bring the final indicators of different methods of evaluation closer together.

A dynamic approach, which takes into consideration the change in the economic significance of weather conditions in connection with general technical and social progress, is an important principle of an economic evaluation of meteorological conditions of agricultural production. This factor should be included in the method so that it would be possible to disclose how even with equal values of meteorological parameters a different provision with labor and material resources is manifested.

A dynamic approach to an evaluation of all types of production resources is necessary. However, in the part concerning meteorological conditions it has a number of characteristics. First of all, we will note the fluctuation of the indicators of an economic evaluation of meteorological conditions of agricultural production and their considerable instability. Whereas an economic evaluation of labor and material resources and land reflects the dynamics of efficiency of their utilization quite smoothly and from the nature of their change in the last few years it is possible to confidently forecast these indicators for 1 or 2 subsequent years, in an economic evaluation of meteorological conditions of agricultural production the dynamics is manifested in the form of sharp leaps from a deep decline, for example, in 1963 and 1972, to a significant advance in 1964 and 1973. This hampers the extrapolation of the tendencies of recent periods even for the next year.

Since changes in the efficiency of functioning of meteorological resources cannot be considered a smooth continuation of the tendencies of the base period, in the process of evaluation of meteorological conditions it is necessary to differentiate it into basic and long-term, each of which is based on different methodological principles. Actually formed indicators of fluctuations in production conditions are studied in one case and a forecast bearing the imprint of possible significant inaccuracies in details, which nevertheless should not exceed the limits of the permissible error interval, is worked out in the other case.

In practical terms the expansion of research in the area of long-term evaluations of fluctuations in meteorological conditions is of greater importance, because this will open up fundamentally new possibilities for an active effect on the production process through a substantiated maneuver of the structure and placement of individual sectors, an efficient redistribution of productive capital and an improvement in the organization of import-export operations. In particular, in plans for livestock feeding during the stabling period it is possible to recommend standards, which make it possible to create certain carryover feed reserves and to orient farms to a minimal grazing of winter crops for green feed. A partial redistribution of fertilizers among regions with expected favorable and unfavorable meteorological conditions will be justified. An all-around preparation for the utilization in the Volga area and in drought-dangerous regions of a set of technological and economic measures aimed at limiting the negative consequences of the probable

deterioration in meteorological situations also deserves attention. On the whole, a "...reliable forecasting... would make it possible to see tomorrow better and to adopt substantiated decisions" (K. U. Chernenko, "Izbrannyye rechi i stati" [Selected Speeches and Articles], Moscow, 1984, p 579).

It goes without saying that, if research concerns the yield alone, economic consequences of the deviations of the meteorological regime from typical characteristics will be expressed incompletely, because fluctuations in the levels of production costs and other parameters will remain unconsidered. Nevertheless, an economic evaluation of meteorological conditions of agricultural production should begin precisely from the yield, because this is both technically simpler and makes it possible to utilize more reliable information. Furthermore, the results of calculations on the basis of the yield can be of significant independent importance, in particular during an analysis of individual aspects of the economic activity of enterprises and regions of the same production direction, as well as because data on fluctuations in harvests can form the basis for calculations of the dynamics of gross and net output, net income and so forth. In the latter case quite a big volume of additional research, including with the application of correlation analysis, will be needed. However, such a path seems long-range in practical terms.

When an ecological evaluation of meteorological conditions is limited to information on the dynamics of harvests, the differentiation of the extent to which fluctuations in the yield of the j-th crop in the i-th year are due to changes in meteorological factors and of the extent to which they are due to others--economic and organizational reasons--becomes the main feature. In principle, the solution of such a problem is possible on the basis of two types of models, that is, of the physical level and statistical. In the first case fluctuations in the yield are made dependent on purely physical (meteorological) factors--precipitation, temperature, solar radiation and so forth. Statistical methods presuppose the detection of a steady recurrence of processes occuring in parallel, for example, of the dependence of the yield of one crop on the yield of another crop in the same region on fluctuations in another region, of fluctuations in the current year on fluctuations in some of the preceding years and so forth, not of cause and effect relations.

At first glance it may seem that physical models have an indisputable advantage over statistical models not only in cognitive terms, but also in the part of technical execution. In reality, however, this is by no means so. In what concerns the technical aspect of the matter we will note the low reliability of initial meteorological information according to individual points of observations, limitation of its nomenclature as compared with the volume of factors really affecting the yield and nonspecificity of many parameters of the meteorological regime. For example, the statistics of precipitation does not make it possible to differentiate it according to intensity over a long period, although it is known that this is reflected significantly in the yield and the effect will be minimal when precipitation is showery.

It can be retorted that the enumerated shortcomings in modern meteorological statistics should be smoothed over in many respects if observations of

individual posts are consolidated to the level of rayons and oblasts. However, it should not be forgotten that, at the same time, nonuniformity of aggregated territories begins to have an effect in many cases. For example, in Orel Oblast in the group of western regions the corn yield depends primarily on the length of the period with a temperature of over 10° and in south-eastern rayons, on the amount of precipitation. If these groups of rayons are unified into one object of observations, a great deal will be lost as subsequent calculations. As an example we will cite the data in Table 1.

Table 1. Dependence of Fluctuations in the Yield of Grain Crops in the USSR on the Provision of Basic Grain Producing Regions With Precipitation in April-July

Year	Precipitation, in % of Norm			Yield of grain crops in % of preceding year
	European regions	North Kazakhstan	West Siberia	
1960	90	142	117	105
1961	116	105	117	98
1962	107	84	89	102
1963	86	81	58	76
1964	101	119	97	137
1965	108	83	68	83
1966	92	106	106	144
1967	96	95	88	89
1968	84	95	113	115
1969	102	112	112	94
1970	117	92	127	118
1971	86	108	108	99
1972	94	102	119	91
1973	104	98	106	126
1974	114	94	91	88

As we see, the averaging of precipitation on large areas does not ensure its stable correlation with the dynamics of harvests. For example, in 1961 moisture conditions in the country's basic grain producing regions changed considerably as compared with 1960. However, the yield of grain crops essentially did not react to this--it decreased by only 2 percent. Judging from the provision with precipitation, it would seem that in 1968 there was no basis for a significant increase in the gross output of grain, but the yield rose by 15 percent. Conversely, in 1969 moisture conditions were obviously more preferable everywhere, but the yield decreased by more than 6 percent. To some extent this also applies to the indicators of 1972. For big territories it is difficult to expect a high efficiency of application of both indicators characterizing the combined action of precipitation and temperatures. It is also necessary to introduce data on the reserves of productive moisture in soil, number of plants per unit of area and so forth. However, this will be an evaluation not only of meteorological conditions, but also of the efficiency of their utilization on farms, since the moisture reserve largely depends on methods of soil cultivation and the number of preserved plants, on the set of agrotechnical operations and so forth.

Table 2

Evaluation of Meteorological Conditions for Grain Crops in Lipetsk Oblast

Year	Yield, q/ha		Majorant ratios of yield of grain crops		Sign of fluctuations in harvests of grain crops		Calculated values for Lipetsk Oblast	
	Lipetsk Oblast	CChR+ Tula, Ryazan, Orel oblasts	Lipetsk Oblast	CChR+ Tula, Ryazan, Orel oblasts	Lipetsk Oblast	CChR+ Tula, Orel, Ryazan oblasts	Majorant ratios	Indices of meteorological conditions
1947	7.4	7.5						
1948	5.7	5.7	0.77	0.76	-	-	0.74	0.88
1949	5.3	5.6	0.72	0.75	-	-	0.72	0.86
1950	5.8	6.2	0.78	0.83	+	+	0.82	0.98
1951	6.6	7.0	0.89	0.93	+	+	0.93	1.11
1952	6.4	6.7	0.86	0.89	-	-	0.88	1.05
1953	5.4	5.7	0.73	0.76	-	-	0.74	0.88
1954	7.5	7.1	1.01	0.95	+	+	0.94	1.12
1955	9.2	11.5	1.23	1.53	+	+	1.62	1.92
1956	7.2	8.0	0.78	0.70	-	-	0.67	0.80
1957	9.9	9.9	1.08	0.86	+	+	0.85	1.01
1958	9.8	11.1	0.99	0.97	-	+	0.98	1.17
1959	9.1	10.3	0.92	0.90	-	-	0.86	1.06
1960	9.3	10.5	0.94	0.91	+	+	0.90	1.07
1961	11.9	12.7	1.20	1.10	+	+	1.13	1.35
1962	12.7	13.1	1.07	1.03	+	+	1.05	1.25
1963	8.3	8.6	0.65	0.66	-	-	0.62	0.74
1964	11.3	12.9	0.86	0.98	+	+	0.99	1.18
1965	11.5	13.0	0.91	0.99	+	+	1.00	1.19
1966	13.5	14.1	1.06	1.08	+	+	1.10	1.31
1967	14.7	14.2	1.09	1.01	+	+	1.02	1.22
1968	16.9	15.9	1.15	1.12	+	+	1.15	1.37
1969	21.6	19.8	1.28	1.25	+	+	1.30	1.55
1970	18.0	18.3	0.83	0.92	-	-	0.92	.09
1971	14.7	16.1	0.68	0.81	-	-	0.79	0.94
1972	14.1	14.5	0.65	0.73	-	-	0.70	0.83
1973	24.1	21.7	1.11	1.09	+	+	1.11	1.32
1974	19.2	19.3	0.80	0.89	-	-	0.88	1.05
1975	14.1	13.3	0.58	0.61	-	-	0.56	0.67
1976	20.1	21.9	0.83	1.01	+	+	1.02	1.22
1977	15.4	15.9	0.64	0.73	-	-	0.70	0.83
1978	17.4	18.3	0.72	0.84	+	+	0.83	0.99
1979	7.2	9.5	0.30	0.43	-	-	0.35	0.42
1980	11.7	13.1	0.49	0.60	+	+	0.55	0.66

All this points to the limited possibilities of application of models of the physical level and advisability of approval of statistical models. We see the merit of the latter, in particular, in the fact that they make it possible to integrate diverse meteorological factors in the harvest in a relatively small number of indicators and in the greater accuracy and simplicity of derivation of initial information. At the same time, however, it is important to process it so that it may reflect as fully as possible fluctuations in weather, not other, conditions of agricultural production. To attain such a result, it is necessary to use mass material, in which the individual economic and organizational characteristics of enterprise activity are canceled.

In this respect practice has accumulated definite experience, which must be studied carefully, utilized in an ever more efficient manner and supplemented with more reliable and effective scientifically substantiated solutions. For example, at present, when the economic activity of enterprises and rayons is summed up, the indicators of each of them are compared with indicators average for the group of adjacent enterprises. It is assumed that with such a comparison differences in natural conditions of production will be insignificant. In principle, such an approach is legitimate, but with certain reservations. Proximity in the location of farms and rayons is not necessarily concomitant with similarity of meteorological parameters determining the harvest dynamics. Furthermore, if neighboring objects of an economic evaluation of meteorological conditions of agricultural production differ significantly in the provision with labor and material resources, or in the level of their utilization, even with the same amounts of precipitation and temperatures throughout the vegatative period economic results will differ not only in the absolute value, but also at times in the sign. For example, in Voronezh Oblast 1971 and 1974 were noted for a decline in the yield of grain crops, whereas in neighboring Kursk Oblast during the same years it increased. Such contradictory tendencies are also uncovered during a comparison of fluctuations in harvests in a number of other neighboring oblasts.

Therefore, the existing practice of formation of combinations of farms, rayons and oblasts, which are used for a description of typical meteorological conditions in a given region and are considered the basis for an evaluation of production conditions in objects of interest to us, needs to be refined. Here it is necessary to be oriented toward the realization, as a minimum, of the following criteria. First, a region with typical (for the studied farm, rayon or oblast) meteorological conditions should confirm its typicality, at least with a good coincidence of the sign of fluctuations in harvests, during a sufficiently long period. Second, if the preceding condition can be fulfilled in an equally efficient manner by several methods, preference should be given to those that ensure the biggest value of the correlation ratio of harvests in the studied object and in the region studied for typicality.

As our calculations for Lipetsk Oblast have shown (Table 2), the region consisting of all oblasts in the Central Chernozem Region with the addition of Tula, Ryazan and Orel oblasts to it should be considered the indicator of typical meteorological conditions of grain production. According to the data of Table 2 one can be easily convinced that during 1948-1980 only once, that is, in 1958, the decline in the yield in Lipetsk Oblast was accompanied by its

increase in the indicated region. In the remaining 32 cases declines and advances in the yield coincided and, therefore, there is reason to believe that the dependence among fluctuations in harvests is statistically stable and suitable for analysis in the form of a correlation dependence of the following type:

$$\frac{Y_i}{Y_{maj}} = a_0 + a_1 \frac{X_i}{X_{maj}},$$

where Y_i is the yield of grain crops in Lipetsk Oblast in the i-th year.

Y_{maj} is the biggest (majorant) level of the yield of grain crops in Lipetsk Oblast during the period preceding the i-th year; X_i is the yield of grain crops in the group of oblasts forming the indicating region, that is, the region with meteorological conditions of grain production typical for Lipetsk Oblast; X_{maj} is the biggest (majorant) level of the yield of grain crops in the indicated region during the period preceding the i-th year.

Calculations by the method of minimal deviations showed that with values $Y_i : Y_{maj}$ and $X_i : X_{maj}$ determined according to the data in the table equation parameters were $a_0 = -0.14$; $a_1 = 1.15$. In this case standard indicators of majorant ratios of the yield of grain crops in Lipetsk Oblast take on the values indicated in the next to penultimate column, their mean linear deviation from the corresponding data of the third column is 8 percent and the share of variation described by the equation, 66.9 percent.

Thus, only one-third of the total amount of fluctuations in the yield in Lipetsk Oblast can be attributed to the combined effect of purely specific production conditions and two-thirds are explained basically by the nature of meteorological processes common for the entire examined group of oblasts. Since during a long period of observations the average level of majorant ratios was 0.84, individual values of individual years calculated in relation to this average level can be considered indices of the meteorological situation (I). In Table 2 they are presented in the last column and make it possible to evaluate the scope of fluctuations in meteorological conditions of grain production in a quantitatively specific manner over a long period. An analysis of these data indicates that in Lipetsk Oblast weather conditions unfavorable for grain crops can remain for several years in succession. This requires appropriate corrections for recommendations by the method of calculation of the size of reserve funds of agricultural enterprises, which proceed from the assumption that declines and advances in harvests are subject to the law of normal distribution.

On the basis of the method set forth above an economic evaluation of meteorological conditions of agricultural production can be made for other oblasts. For example, the effect of the weather on fluctuations in the yield of grain crops in Tula Oblast is well indicated by the data of the Central Region, in Chelyabinsk Oblast, by the materials of the Ural Region of the RSFSR and so forth. In the part of the basic evaluation of the meteorological situation throughout the country two versions should be studied: calculation

of indices according to the principle of weighted averages of the data of all oblasts; through the search for a region repeating All-Union fluctuations in harvests over a long period in quite an efficient manner. The former variant is more preferable in terms of the accuracy of evaluations, but, in practice, can be realized only after substantial expenditures on the performance of an economic evaluation of meteorological conditions of agricultural production throughout the country's territory. The second variant is simpler technically and has made it possible to obtain in the first approximation the following data: The territory of Saratov and Kuybyshev oblasts is the region ensuring a systematic coincidence with All-Union declines and advances in harvests of grain crops. The equation for the calculation of the index of meteorological conditions throughout the USSR takes the following form: $I=0.745+0.32X_i : X_{maj}$, where X_i is the average yield of grain crops in Saratov and Kuybyshev oblasts in the i-th year.

When the indicated equation was used, the error of determination of fluctuations in the yield of grain crops throughout the country in 1948-1982 comprised 7.2 percent. However, the share of the variation described by the equation was less than 35 percent, which indicates the need to search for regions and parameters more adequately expressing the dynamics of meteorological conditions of grain production on a countrywide scale. Nevertheless, when comparing the indices of the meteorological situation of individual oblasts with the All-Union indicator calculated by the indicated method, it is possible to differentiate the amounts of insurance compensations and insurance payments and short-term crediting norms in a more substantiated manner, to correct procurement volumes and so forth.

Let us turn again to Table 2 and compare the indicators of the third and penultimate column. Since in 1975 the actual value of $Y_i : Y_{maj}$ was bigger than the calculated value (0.58>0.56), it can be concluded that during that year the oblast managed to slightly cancel the effect of the unfavorable weather through various kinds of organizational and economic factors. Conversely, in 1974 good meteorological conditions were not at all utilized fully (0.80<0.88) and in 1979-1980 the results of economic activity were much worse than should have been expected under poor weather conditions. A skillful separation of organizational-economic and natural factors in the results of economic activity acquires especially great importance under present conditions, when production efficiency, a scientifically substantiated distribution of material-technical and personnel resources and the introduction of forms and methods of incentives, which more fully take into consideration the actual contribution of collectives to the final production result, become the criteria of the quality of managerial activity at all levels.

On the basis of the presented method of calculating indices of meteorological conditions it is possible to change over to a dynamic evaluation of the effect of the weather on fluctuations in the yield, that is, to an evaluation reflecting the dynamics of a meteorological situation through the prism of progress in the technique and technology of agricultural production. The following data indicate how significantly this will be reflected in the indicators of an economic evaluation of meteorological conditions of agricultural production. Whereas throughout kolkhozes and sovkhozes in

Lipetsk Oblast the index of meteorological conditions of grain production was 1.55 in 1969, on state strain testing plots, where a scientifically substantiated farming system was applied more systematically and a higher stability of production was attained, the effect of favorable meteorological conditions in 1969 was manifested more weakly: the index was 1.20. On kolkhozes and sovkhozes in Lipetsk Oblast for 1972 the index of the meteorological situation was determined at the level of 0.83, whereas on state strain testing plots, 0.87; in 1973--1.32 and 1.07 respectively; in 1975--0.67 and 0.89; in 1979--0.42 and 0.68. Fluctuations in indices coincide in the sign, which should be considered an additional argument in favor of the applied method. However, the marked divergences in indices point to the importance of bringing evaluation work up to the indicators of the dynamics of dependence of fluctuations in harvests on meteorological conditions as the technique and technology of production improve.

In general form a dynamic economic evaluation of meteorological conditions of agricultural production can be made on the basis of the equation

$$D_{ij}=a_0+a_1I_i+a_2K_{ij},$$

where j are groups of farms formed according to the level of production intensity in a given sector; K_{ij} is the ratio of the indicator of production intensity in the j-th group of farms to the average level in the region in the i-th year; D_{ij} is the indicator characterizing the extent to which $Y_i:Y_{maj}$ in the j-th group of farms differs from the mean values for the examined region during the entire period of observation.

If this equation is supplemented with certain physical parameters (precipitation, temperatures of a certain period and so forth), the quality of calculations will rise. It is not ruled out that this will make it possible to obtain sufficiently efficient evaluations of meteorological conditions on individual farms and, thus, to have additional information for improving the mechanism of economic regulation of production at the level of enterprises.

From the editorial staff. Publishing Prof I. Zagaytov's article, we invite readers to take part in a discussion of the further improvement in the method proposed by the author and to express their views on its scientific and practical significance.

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MAJOR CROP PROGRESS AND WEATHER REPORTING

EFFECT OF METEOROLOGICAL CONDITIONS ON PRODUCTION DISCUSSED

Moscow EKONOMIKA SELSKOGO KHOZYAYSTVA in Russian No 1, Jan 86 pp 72-76

[Article: "Problems of Economic Evaluation of Meteorological Conditions of Production"]

[Text] Having published I. Zagaytov's article "Problems of Economic Evaluation of Meteorological Conditions of Agricultural Production" in No 8, 1984, the journal's editorial staff invited readers to take part in a discussion of the further improvement in the method proposed by the author and to express their views on its scientific and practical significance. Comments received by the editorial staff note the timeliness of the formulation of this important and as yet little-studied problem. Many mention the aspects of the application of this method.

V. V. Safronov, docent at the Kursk Agricultural Institute, believes that the idea advanced by Professor Zagaytov on the need for an economic evaluation of meteorological conditions and the method proposed by him are exceptionally urgent and of great national economic importance. Meteorological conditions represent a rich combination of factors with a varying effect on socioeconomic, ecological and technological processes. Therefore, he supports the author's opinion on the need to study their effect by two fundamentally different methods not excluding, but supplementing, each other, that is, with the application of models of the physical level and through the singling out of typical meteorological conditions.

"Familiarity with this method," he writes further, "shows that the possibilities of its utilization are very broad. It can become the basis for the development of planned standards of the yield, purchases of agricultural products, evaluation of the level of utilization of objective conditions of production, formation and evaluation of the economic potential of a farm, rayon and oblast, determination of standards of formation of reserves and insurance stocks, refinement of the amounts of material incentives according to final results, calculation of the structure of net income and allocation of unearned income and annuity, improvement in the system of distribution of income and insurance payments and further development of the method of determination of the efficiency of socialist agricultural production. The

fact that the method of economic evaluation of meteorological conditions of agricultural production proposed by Professor Zagaytov makes it possible to complete the process of development of the general method of evaluation of economic conditions in agriculture and in the national economy as a whole is its advantage."

Taking into consideration the overall effect of meteorological conditions on the state of agriculture, including on the level of material and monetary expenditures and the utilization of productive capital, Comrade Safronov considers it advisable to utilize production cost as the synthetic indicator, which is the basis for the determination of the index of meteorological conditions.

A number of comments point to the advisability of application of materials of an economic evaluation of meteorological conditions of agricultural production during the development of prices of agricultural products for large agroindustrial regions, during the substantiation of basic directions in capital investments in the development of agriculture, in research on the efficiency of agrochemical services and land reclamation and in the solution of many problems of production forecasting.

Candidates of economic sciences P. G. Akulov and M. Z. Tarasov note that the urgency of formulation of the problem of the quantitative and qualitative measurement of the effect of meteorological conditions on the results of economic activity does not evoke any doubt. According to their data, on kolkhozes and sovkhozes in the central chernozem zone fluctuations in the harvest are determined to a greater extent by weather conditions and to a lesser extent by the development of the material and technical base and labor activity. For example, in Belgorod Oblast during the period from 1961 through 1983 the sharp (15 percent and more) reduction in annual precipitation as compared with average long-term data occurred in seven cases. In five of them this led to a significant reduction in the harvest of grain and in six, of sugar beets, corn for silage and green feed. At the same time, years with an abundant moisture, as a rule, were accompanied by an increase in the harvest. During years when precipitation comprised 85 percent of the norm the yield of basic agricultural crops was 8 to 14 percent lower than the average annual level during the analyzed period. Conversely, during years when precipitation made up 15 percent above the norm and more the harvest exceeded the average level by 9 to 13 percent.

The importance of meteorological conditions in the formation of high harvests is especially noticeable under chemicalization conditions. During wet years a rise in the level of mineral nutrition, as a rule, ensured the maximum gross output. The years 1973, 1976-1978 and 1980 are cited as an example. Conversely, low fertilizer doses and comparatively moderate weather conditions did not give the desired result (1965, 1966, 1968 and 1970).

In the opinion of P. T. Akulov and M. Z. Tarasov, the importance of consideration of meteorological conditions in the practice of agricultural production is especially important not from the point of view of their economic evaluation, but from the positions of the determination of the integral indicator--the criterion for the measurement of the degree of effect

of meteorological conditions on production efficiency. Therefore, they do not agree with I. Zagaytov's proposal to take not the absolute level of weather parameters, but only their deviations from characteristics typical for a given locality, for an evaluation of meteorological conditions and believe that some physical indicator, or an indicator integrated on this basis, should serve as a measurer of weather conditions.

With reference to the consideration of meteorological conditions of the central chernozem region the degree of effect of indicators describing the state of the weather, that is, annual precipitation, precipitation during April-June and April-July and the hydrothermal coefficient during April-June and May-June, on the size of the harvest of leading agricultural crops in the zone was studied.

As the authors believe, the last two indicators make it possible to connect together factors characterizing the state of the water and temperature regime during the period of the most active plant vegetation.

They propose to calculate the hydrothermal coefficient according to the following formula: $K=10P:\Sigma t$, where K is the hydrothermal coefficient, mm/^{o}C; P is the amount of precipitation during the studied period, mm; Σt is the sum of all temperatures during the same period, ^{o}C.

The interconnection of factors characterizing meteorological conditions and the harvest was uncovered for the period of 1969 through 1983 in Valuyskiy and Belgorodskiy rayons in Belgorod Oblast. To measure the closeness of this connection, the paired correlation method was utilized. It made it possible to establish the value of effect of every factor separately on the harvest of leading agricultural crops: grain crops, sugar beets and corn. The indicator characterizing the hydrothermal coefficient for May-July had the greatest value of the correlation coefficient. The authors believe that this coefficient can be considered the criterion (main indicator) of evaluation of meteorological conditions from the point of view of agricultural production in the central chernozem zone. By means of it in the description of fluctuations in the harvests of grain crops a paired correlation coefficient at the level of 0.60 to 0.66 is attained, which corresponds to a determination coefficient of 0.36 to 0.44. True, such a result is much worse than the evaluations obtained on the basis of majorant ratios of harvests in especially selected indicating regions. For example, in Lipetsk Oblast I. Zagaytov obtained a determination coefficient of 0.67. This is natural, because in fluctuations of majorant ratios of harvests the dynamics of meteorological conditions is expressed economically, not purely physically, in a complex interconnection with the level of production technique and technology on farms typical for a given region. At the same time, supplementation of models of an economic evaluation of meteorological conditions of agricultural production with a number of physical parameters, including the hydrothermal coefficient, will make it possible to investigate the effect of fluctuations in weather conditions on the process of agricultural production in a more versatile manner.

The remarks and supplements by M. D. Yevseyev, chief of the Department of the Automated Control System for Planning Calculations of the Orel Oblast Planning

Committee, and V. I. Barmin, senior economist at the Orel Agricultural Information Computer Center, are of indisputable interest, especially as they are based on the specific experience of approval of I. Zagaytov's proposals--long-term and mass material of farms in Orel Oblast with the utilization of standard computer programs. This experience indicates that, despite certain difficulties in the practical execution of work on an economic evaluation of meteorological conditions of agricultural production, including the most complex aspect--selection of indicating regions--it is possible in the very near future to utilize it in a certain manner in the interest of improvement in the management of the development of agriculture at the level of oblasts and rayons.

In the opinion of Comrade Yevseyev and Comrade Barmin, the method of determining the index of the meteorological situation proposed by I. Zagaytov did not take into consideration the trend in the harvest in the studied region and the standardization of fluctuations in the harvests in relation to the average long-term level of majorant ratios did not receive the proper substantiation in his article. In connection with this they propose the establishment of an index of a meteorological situation in the form of the ratio of the calculated value of the yield of grain crops in the region studied on the basis of an economic evaluation of meteorological conditions of agricultural production to the actual yield in the indicating region. It is also noted that I. Zagaytov does not take into consideration the differences in the quality of land of studied and indicating regions manifested to a certain extent. Therefore, the authors consider it advisable to find an efficient way of combining the method of an economic evaluation of meteorological conditions of agricultural production with the method of economic land evaluation, which, in their opinion, will make it possible to fully separate the effect of objective and subjective factors on final production results.

Concerning software for research on an economic evaluation of meteorological conditions of agricultural production, Comrade Yevseyev and Comrade Barmin note that I. Zagaytov recommends the processing of initial information by means of the minimal deviation method previously substantiated by him. However, this method is less labor intensive as compared with the least square method during the manual performance of calculations. If, however, we are oriented toward the use of computers, the least square method, for which good software has been created, will have indisputable technical advantages. They also believe that in I. Zagaytov's article problems connected with the forecasting of meteorological conditions of agricultural production, which are an integral part of an economic evaluation of meteorological conditions of agricultural production, are set aside in a totally unjustified manner. Definite experience in successful long-term forecasts of fluctuations in harvests has been accumulated by now. Apparently, it is time to carefully study this experience and to map out measures to prepare appropriate methodological recommendations.

V. Shiyan, candidate of economic sciences, and graduate student A. Sklyarov tested the method proposed by I. Zagaytov with reference to the conditions of two oblasts in the Ukraine. The use of the method of formation of a region-indicator of typical meteorological conditions of grain production has shown

that for Voroshilovgrad Oblast the region consisting of Donetsk, Dnepropetrovsk, Poltava, Kharkov, Rostov, Volgograd and Voroshilovgrad oblasts is such a region. During the 1947-1983 period the signs of fluctuation in the yield in Voroshilovgrad Oblast and the indicating region did not coincide only in 1962, 1969 and 1970. The calculation of the correlation dependence between fluctuations in harvests made it possible to obtain an equation, which describes 56.3 percent of the variation in the yield. Such is the share of fluctuations in the yield explained by meteorological processes common for all the oblasts of the examined region. The index of a meteorological situation was also applicable during an analysis of the utilization of grain production resources by individual farms and rayons in Kharkov Oblast, when along with basic factors this index was introduced into correlation-regression models of the yield of grain crops. The same index was taken for all farms within the limits of one administrative region and was determined by the division of the majorant ratio of the yield of grain crops in a given region in the i-th year by the average level of majorant ratios over a long-term period.

As a result of a computer solution according to the multiple linear regression equation, models, whose characteristics attest to the existence of a close connection between the set of factors and the level of the yield of grain crops, have been obtained. The calculation of beta-coefficients making it possible to compare the strength of effect of individual factors has shown that meteorological conditions of production, the quantity of applied mineral fertilizers and the quality of arable land play the biggest role in an explanation of the variation of the yield level, although their significance differs for agrosoil regions and individual models.

Comrade Shiyan and Comrade Sklyarov believe that with the introduction of the index of a meteorological situation into models the reliability of different parameters of regression equations rises, because the values of such characteristics as the multiple correlation coefficient and F- and t-criteria increase.

Since the consideration of the meteorological factor is of great importance in investigations of problems of increase in the stability of production in the APK system, calculations by Candidate of Economic Sciences V. N. Afanasyev (Orenburg Agricultural Institute) are of interest. On the basis of the regression analysis of materials of sovkhozes in Orenburg Oblast in 1976-1980 he showed that even a rise of 1 percent in the stability of grain production increased the profit of farms approximately by 0.125 rubles per quintal of sold grain, which totaled about 5 million rubles annually on the oblast scale.

On the whole, supporting the idea of development of a method of an economic evaluation of meteorological conditions of agricultural production, readers note that such a method can be basic and forecast. I. Zagaytov's article examines specifically only one and, moreover, the simplest case--a basic ecological evaluation of fluctuations in the set of weather conditions and their manifestation on the scale of oblasts through indicators of the yield of grain crops. The method should be developed further in the following directions: an evaluation of meteorological conditions at the level of rayons and farms, substantiation of an annual or long-term forecast economic evaluation of meteorological conditions of agricultural production and methods

of determination of cost accounting indicators. I. Ye. Glazunov's (All-Union Scientific Research Institute of Economics of Agriculture) critical remarks proceed in two directions. Doubting that fluctuations in harvests of grain crops throughout the country can be repeated quite regularly in any region (according to I. Zagaytov's data the combined territory of Kuybyshev and Saratov oblasts is such a region), he proposes in calculations of the All-Union index of meteorological conditions not to be oriented toward a search for the indicating region, but to follow the path of determination of the weighted mean index according to the data of all USSR oblasts. When an economic evaluation of meteorological conditions of agricultural production is used in an analysis of the results of economic activity, he considers it advisable to compute the index of meteorological conditions not from comparisons of actual and calculated values of majorant ratios of harvests, but on the basis of multifactor regression models, in which interannual fluctuations in the meteorological component of the harvest are examined in connection with the dynamics of economic factors.

An exchange of views on problems concerning an economic evaluation of meteorological conditions of agricultural production has shown that an important step in the substantiation of the principles of an economic evaluation of meteorological conditions of agricultural production, in the determination of basic directions in its efficient practical application and in the development of the appropriate method has been taken. Now the task should be to transfer research in this area from an initiative to a planned basis and to coordinate the work of a large group of economists investigating this problem.

It is important to organize research so that work on an analysis of the effect of meteorological conditions on the economics of agriculture (basic economic evaluation of meteorological conditions of agricultural production) and on the development of long-term forecasts of fluctuations in weather conditions (forecast economic evaluation of meteorological conditions of agricultural production), which is now carried out separately, may be performed on the basis of unified methodological approaches as different aspects of one problem, that is, an economic evaluation of meteorological conditions of agricultural production. The development of sufficiently reliable background forecasts of fluctuations in harvests with such a term and with such a small interval of the maximum error, which will make it possible to utilize them during the elaboration of management decisions significant in practice, should be the main task of a forecast evaluation.

In this respect work by Candidate of Economic Sciences A. G. Prudnikov (Krasnodar Scientific Research Institute of Agriculture) is of interest. The method of forecasting the yield of agricultural crops was set forth by him in our journal in 1975 (No 10). Then he appeared on the journal's pages in connection with problems of forecasting agricultural production two more times (No 10 in 1980 and 1983). In the material received by the editorial staff A. G. Prudnikov reviews some results in the application of the proposed method in Krasnodar Kray and introduces some improvements in his method.

He notes that the utilization of forecasts in the yield is effective not only in the correction of the planned structure of sown areas, but also in the

determination of the most efficient agrotechnical measures for the cultivation of grain crops. For example, with due regard for forecasts in the yield in 1980-1984 scientifically substantiated recommendations for an increase in grain production, which envisaged a set of measures aimed at a reduction in the effect of unfavorable weather conditions, were developed in advance and introduced in Krasnodar Kray.

The introduction of the developed measures contributed to an increase in the gross output of grain and in the stability of grain production. For example, in 1961-1965 the maximum reduction in grain production during an unfavorable year in relation to its average annual level during those years comprised 15 percent, in 1966-1970, a total of 32.1 percent and in 1971-1975, a total of 23.6 percent. In 1976-1980, when yield forecasts were utilized, the greatest decrease in production was 11.7 percent and in 1981-1984, 8 percent.

As A. G. Prudnikov believes, an annual maneuvering of the structure of sown areas of grain crops is possible in many cases without a violation of crop rotations through a change in the ratio of the area sown with winter and spring grain crops, variation of the proportion of winter wheat and winter barley in the group of winter crops and optimization of the structure of sown areas in the group of spring grain crops.

The efficiency of correction of the structure of sown areas largely depends on the consideration of the periodicity of the possible death of and damage to sowings of individual crops owing to unfavorable weather conditions. For example, in Krasnodar Kray in the last 24 years the biggest areas of winter grain crops were subjected to unfavorable wintering conditions, as a rule, between the 3rd and 4th year. Unsatisfactory weather conditions for corn occurred mainly during years of extremes of solar activity. During those years the yield of grain crops as a whole decreased significantly. At the same time, the yield of winter wheat, on the average, during years of maximums of solar activity exceeded the average yield during years of minimums by 35.4 percent. A. G. Prudnikov believes that the consideration of this pattern in the change in the yield, when the forecast of the development of grain production is worked out, is of great importance, because it makes it possible to envisage in advance efficient agrotechnical and organizational measures to lower the effect of possible unfavorable weather conditions.

The determination of the forecast yield of grain crops is the most complex stage in an annual improvement in the structure of sown areas. The selected forecasting method should ensure a high accuracy of the forecast yield of every crop, or a correct ratio of the levels of their productivity during a certain year. In A. G. Prudnikov's opinion, methods based on the consideration of the patterns in the dynamics of gross output of grain and the yield of grain crops are most acceptable. For the development of the forecast of the yield of winter wheat and winter barley he proposes to use the following model:

$$y_{pr}=y_f+\sum_{1}^{4}\Delta y+E_y,$$

where Y_{pr} is the calculated yield; Y_f is the average arithmetic yield in 3 years taken in sequence 4 years after the year, for which the forecast is worked out; Δy is the increase in the yield in 4 years preceding the forecast year; E_y is the stochastic (random) component calculated according to the following formula:

$$E_y = \sqrt{\frac{\sum_1^3 (y_{fi} - \bar{y}_f)^2}{2}} \; ; \; i = 1, 2, 3.$$

The author notes that the accuracy of the forecast largely depends on the absolute value and sign of the random component. During a substantial variation of the actual yield the random component takes on a relatively large significance, lowering the quality of the forecast. Therefore, he proposes, when its magnitude comprises 15 percent of the arithmetic mean basic yield and more, to preliminarily level out or smoothen the actual yield according to the equation of the second-order parabolic curve, the exponential function, the least square method and the moving average. In this case the calculation of the forecast yield is performed according to the formula presented above, only with the difference that the forecast itself is developed according to smoothed (leveled) yield data and the sign of the random component is determined according to the nature of the curve in the change in the unsmoothed (unleveled) actual yield.

It is evident from the data presented by the author that during the period from 1972 through 1984 the forecast yield differed from the actual yield by ± 8.1 percent and the average annual value of the increase in the gross output of grain in Krasnodar Kray obtained from an improvement in the structure of crops on the basis of forecasting totaled about 3.5 million rubles.

These results are not bad. Apparently, it is necessary to utilize the methods used by A. G. Prudnikov during the further development and improvement in a forecast economic evaluation of meteorological conditions of agricultural production.

In conclusion it should be noted that the further development of an economic evaluation of meteorological conditions of agricultural production and its utilization in the regulation of the structure and placement of production, in an efficient organization of intersectorial relations, during the development of balances of agricultural output and so forth will require an immediate concentration of efforts on the preparation of annual-term forecasts as a minimum. Certain research experience in this area has already been accumulated. It is necessary to generalize it and to speed up the working out of economic problems of evaluation of meteorological conditions of agricultural production.

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REGIONAL DEVELOPMENT

AGRICULTURAL PROJECTIONS IN NEW FIVE-YEAR PLAN

Moscow SELSKOYE KHOZYAYSTVO ROSSII in Russian No 2, Feb 86 pp 2-3

/Article by V. Baturin, Candidate of Economic Sciences: "At the Start of the New Five-Year Plan"/

/Text/ "The second turning point with regard to production intensification and reorienting each enterprise and each branch towards complete and priority utilization of the quality factors associated with economic growth must now be realized" reads a statement in the draft new edition of the CPSU Program. "The conversion over to a highly organized and efficient economy with thoroughly developed productive forces, mature socialist production relationships and a well organized economic mechanism must be ensured. The country's production potential must be doubled by the year 2000 and improved in a high quality manner."

This is the basic task confronting the agricultural workers of Russia. Today the republic's agroindustrial complex has a truly tremendous economic potential at its disposal, a potential which in recent years has been utilized more effectively than in the past. In 1985 the fixed productive capital increased by a factor of almost 1.4 compared to 1980. Agriculture was supplied with 894,000 tractors, 589,000 trucks, 340,000 grain harvesting combines and billions of rubles worth of equipment for livestock husbandry complexes and farms and other items of equipment. The power-worker ratio in agriculture was raised from 32.7 horsepower per average annual worker in 1980 to 41.5 horsepower in 1985.

New and large livestock husbandry complexes, poultry factories, hothouse combines and other important production installations have been introduced into operations. The area of irrigated and drained lands has been increased by 21 percent. The kolkhozes and sovkhozes received 55.1 million tons of mineral fertilizer in active agent, which was 27 percent more than the figure for the 10th Five-Year Plan. This made it possible to increase the mineral fertilizer applications per hectare of sowings and especially in the case of technical crops. New generations of agricultural machines have been created, including the Don-1500 and SK-10 grain harvesting combines, highly productive wide-cut harvesters, cultivators, anti-erosion equipment and other machines.

The mastering of industrial technologies for the cultivation of row crops serves as an example of the large-scale use of scientific developments. Last year,

such technologies were introduced into operations on an area of 3.3 million hectares. Here labor productivity was raised by a factor of 1.5-2 and the crop yields -- by 40-50 percent.

The effectiveness of the use of intensive technologies for cultivating grain crops is especially high. This technology was first introduced into operations on Russian farms in 1984 and the following year intensive technologies were being used for cultivating winter and spring wheats on 11 million hectares. Experience has shown that on leading farms this technology furnishes an increase in yield that is twice as great as that obtained from the conventional technology. The farms in Astrakhan, Volgograd and other oblasts have achieved fine results from the use of progressive technologies for the cultivation of vegetables. Extensive use is being made in livestock husbandry of the tethered and loose-housing box maintenance systems for cows, with milking being carried out in dairy units, and of intensive technologies for the fattening of animals.

On the whole, 95 billion rubles worth of capital investments, or 11.5 percent more than during the years of the 10th Five-Year Plan, were allocated for agricultural development in the republic for an entire complex of operations to be carried out during the 11th Five-Year Plan.

Measures aimed at strengthening the logistical base for agriculture throughout the republic and for improving the socio-domestic conditions for field and farm workers produced fine results. As noted during the 2d Session of the RSFSR Supreme Soviet, 11th Convocation, which approved the plan for the economic and social development of the RSFSR for 1986, the average annual volume of gross agricultural output increased by 5 percent in comparable 1983 prices and amounted to 92.4 billion rubles and labor productivity increased by 9.9 percent. The average annual production of vegetables and eggs increased by 17 percent and meat -- by 7 percent. Increases were recorded in the procurement volumes for the principal types of products. The five-year plan for egg, wool and tea procurements was fulfilled. In 1985 the republic fulfilled the tasks called for in the RSFSR Food Program with regard to vegetable and egg production and came close to fulfilling the tasks for sugar beets, potatoes and milk. All of this made it possible to improve the supply of goods for the population. Increases took place in the consumption of vegetables, fruit, eggs, meat, milk and other food products. Thus the agricultural industry of Russia is performing in a better and more confident manner and the kolkhozes and sovkhozes are obtaining more from the land.

The agricultural workers in the Russian Federation will be confronted by very important tasks during the 12th Five-Year Plan. In conformity with the Draft Basic Directions for the Economic and Social Development of the USSR During the 1986-1990 Period and for the Period Up To the Year 2000, a program is persistently being followed throughout the republic aimed at completely satisfying the requirements for agricultural products and further strengthening the logistical base of agriculture and the social reorganization of the rural areas. All branches of the agroindustrial complex will undergo accelerated development. The plans call for agriculture to be converted over to an industrial basis through all-round mechanization, the use of chemical processes, electrification, land reclamation and the extensive introduction of intensive technologies. Stability in the production of agricultural goods must be achieved and the dependence of such production upon natural-climatic conditions must be reduced to a minimum.

For an entire complex of operations to be carried out during the 1986-1990 period in connection with agricultural development throughout the republic, the plans call for the allocation of capital investments in an amount which will be greater by 7.1 percent than the limits established for the 11th Five-Year Plan. The task consists of utilizing each ruble allocated in an intelligent and effective manner. The periods for the repayment of capital investments must be shortened and such investments must be concentrated on priority undertakings and particularly on the renovation of fixed productive capital and on modernization. Considerable increases are also being planned in the capital investment volumes for housing, municipal, highway and cultural-domestic construction at each kolkhoz and sovkhoz, in the interest of solving for the most part the problem of ensuring housing for the workers.

Compared to the 11th Five-Year Plan, the average annual gross output volume will increase by 13-15 percent and amount to almost 110 billion rubles in 1990. The plans call for such an increase to be achieved mainly by intensive factors in the development and introduction of modern scientific and engineering achievements and leading practice and the efficient use of the production potential already created. Labor productivity must increase by 24 percent.

The production and delivery to agriculture of new and highly productive machines, especially equipment for the extensive introduction of industrial and intensive technologies, must be further accelerated. The plans call for the production of equipment for livestock husbandry and particularly for feed production and feed preparation to be developed at leading rates.

In addition to a further technical re-equipping of agriculture and the introduction of industrial technologies into field crop husbandry and livestock husbandry operations, work will continue in an active manner with regard to mastering scientifically sound farm management systems, expanding the use of soil protective methods for cultivating land and carrying out anti-erosion measures and carrying out a complex of measures for raising the fertility of soils.

Just as in the past, a central task continues to be that of increasing the production of grain -- the foundation for creating food and forage funds. Roughly 140-142 million tons of grain must be obtained in 1990. This is an important and complicated task. Success in solving it will be ensured by the implementation of scientifically sound farming systems on each farm and observance of the grain crop structure, crop rotation plans and the cultivation technology as recommended by science. A great amount of work remains to be carried out in order to improve plant breeding and seed production work and the protection of plants against pests, diseases and weeds. A sharp increase must take place in the areas set aside for the sowing of winter and spring wheats using intensive technologies. This year the progressive technology will be employed on an area of 16.7 million hectares, compared to 11 million in 1985. This measure will make it possible to obtain 15 million additional tons of grain. The plans call for a considerable increase in the production of durum and strong wheats, groat and pulse crops and corn.

By 1990 the gross yields of sugar beets must be raised to 31-32 million tons, potatoes -- to 45-47, vegetables -- to 14.5-15, fruit and berries -- to 3.7 and

grapes -- to 1.1 million tons and also flax fiber -- to 195,000 tons. Compared to the 11th Five-Year Plan, the plans call for the average annual production of grain to be increased by 35 percent, sugar beets -- by 23.5, sunflower seed -- by 34, flax fiber -- by 21, potatoes, fruit and berries -- by 16 and vegetables and grapes -- by 12 percent. The procurement volumes for these types of products will be increased considerably and this will make it possible to ensure a better supply of food products for the population and raw materials for industry.

Field crop husbandry has been assigned still another important task -- that of satisfying the requirements of livestock husbandry for high quality coarse and succulent feeds. Work associated with the intensification of field and meadow-pasture feed production will be continued and more extensive use will be made of progressive technologies for the cultivation of forage crops and the procurement and storage of forage. The kolkhozes and sovkhozes must increase considerably the production of plant feed protein through an expansion in the sowings and increases in the yields of alfalfa, clover, peas, sunflowers, soybeans, rape and other crops having a high protein content. Increases will take place in the volumes of use, for feed purposes, of the secondary products of the food and fish industry and also waste food scraps. The task has been assigned of creating the necessary base on each farm for the storage of feed and preparing it for feeding to the animals and for reducing grain expenditures for forage purposes.

Public livestock husbandry operations will undergo further development during the new five-year plan. Compared to the 1981-1985 period, the plans call for the average annual production of meat to be increased by 11 percent, milk -- by 7.6, eggs -- by 6 and wool -- by 2.3 percent. The plans call for meat production in dressed weight to be raised to 10-10.2 million tons by 1990, milk -- to 54-55 million tons, eggs -- to 45-46 billion units and wool -- to 230,000 tons. It is expected that the established tasks will be carried out mainly on the basis of intensive factors -- strengthening of the feed base, the use of genetics and plant breeding achievements, improvements in the herd, the introduction of progressive technologies and improvements in the professional knowledge of the livestock breeders. Considerable work must be carried out aimed at improving existing and creating new highly productive strains, types and lines of animals that will be suitable for the industrial technology for producing products.

The local Soviet and economic organs will intensify their work aimed at developing the subsidiary farms of enterprises and organizations, furnishing assistance to the population in private plot management and creating orchard and gardening associations.

The implementation of the tasks of the long-term program for land reclamation, for the purpose of creating large-scale zones for the guaranteed production of grain, feed, vegetables and other products in the north Caucasus, the Volga region, the nonchernozem zone of the RSFSR, Siberia and the Far East, will be continued. The plans call for the placing in operation, over a five-year period, of 1,410,000 hectares of irrigated and drained land and 1,640,000 hectares of swampy and water-logged land and for the carrying out of soil improvement work on land which does not require drainage on an area of 6 million hectares. The

carrying out of this program in 1986 requires 4 billion rubles worth of capital investments -- 7 percent more than in 1985. A great amount of work must be carried out in order to improve the exploitation of reclaimed lands and to raise the return from each hectare of renovated land.

The fertility of soils must be raised in a planned and steady manner based upon the use of chemical processes in agriculture and an expansion in the use of organic fertilizer. By 1990, the deliveries of mineral fertilizer in active agent will be increased to 15.6 million tons, or 20 percent more than the level for 1985. Deliveries of lime materials will be increased to 56 million tons. Applications of organic fertilizer will be increased to 575 million tons, an increase of 21 percent compared to last year.

The volumes of capital investments for the construction of warehouses for storing mineral fertilizer and toxic chemicals and also farmyard manure storehouses will be increased.

The all-round agrochemical cultivation of fields will undergo further development. By 1990, the volume of this work will have increased to 4.5 million hectares annually. This will constitute almost a threefold increase in the deliveries to agriculture of chemical additives and feed preservatives. The plans call for considerable improvement in the extent to which the kolkhozes and sovkhozes will be supplied with growth stimulators, biological means for protecting plants and various types of coatings and polymer materials.

The plans call for measures aimed at strengthening the kolkhoz and sovkhoz economies to be continued. Special attention has been given to the extensive introduction into operations of internal cost accounting and the collective contract, to achieving economies in the use of all types of resources and to reducing production costs.

This year the new five-year plan signifies the commencement of the implementation of large-scale measures by the party aimed at reorganizing the administrative system for the agroindustrial complex. A single central organ has been created -- RSFSR Gosagroprom and new organs of administration have been created in the various areas and this will undoubtedly promote successful work and stable growth in agricultural production. At the present time, it is a matter of honor for each agricultural worker and for all agroprom workers to utilize their potential to the maximum possible degree. Today, at the start of the new five-year plan, the task consists of raising the work rates to the maximum possible degree, exercising strict control over the carrying out of obligations and plans and stimulating the human factor in every possible way. The more confident and extensive the initial steps of the 12th Five-Year Plan, the greater will be the prerequisites for further and high quality changes in agricultural production in Russia.

7026
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REGIONAL DEVELOPMENT

DISPROPORTION IN AZERBAIJAN APK DEVELOPMENT VIEWED

Baku IZVESTIYA AKADEMII NAUK AZERBAYZHANSKOY SSR, SERIYA EKONOMIKI in Russian
No 4, Apr 85 pp 27-31

[Article by A.A. Makhmudov: "Questions Pertaining to the Improvement of Balance and Proportion in the Development of the Union Republic APK"]

[Text] The achievement of a fundamental improvement of effectiveness in public production at the stage of developed socialism depends in great part upon the effective functioning of the agroindustrial complex. Improving balance and proportion in the development of this complex is one of the main conditions for achieving this. The Food Program calls for the proportionate and balanced development of the agroindustrial complex, for improving planning and incentives in all its branches, ensuring good end results and getting the APK to function more effectively by systematically converting it to an industrial basis.

A number of measures aimed at improving and strengthening the economies of the kolkhozes and sovkhozes, increasing procurement prices and establishing price supplements have been implemented in accordance with the decision adopted at the May 1982 Plenum of the CPSU Central Committee. All of these measures have produced positive results and attest to the timeliness and the good effectiveness of the steps taken by the party and the government to develop agriculture.

The decree passed by the CPSU Central Committee and the USSR Council of Ministers on the long-range land reclamation program calls for working out and establishing norms for providing the kolkhozes and sovkhozes with tractors and agricultural machinery for cultivating agricultural crops with programmed yields. Almost 40,000 tractors are presently being used in agriculture in the AzSSR, and there are 4,400 units in its grain combine pool. During the period 1970-1983 the total tractor power increased more than 2-fold, and agriculture's power capacity in the republic increased 2.2-fold. Scientific and technical progress in the capital producing branches of the APK is strengthening agriculture's materials and equipment base and creating conditions for increasing labor productivity and the output of crop cultivation and animal husbandry. More significant successes could be achieved in the agrarian sector of the economy, however, if proportion and balance were observed in the development of all enterprises making up the agroindustrial complex. As the economy is converted more and more to primarily intensive development, there is an increasing interconnection and interdependence in the entire aggregate of the production process, balance and proportion

in the APK's development. In the process the APK is being turned into a smoothly functioning complex, and its effectiveness and its role in providing the population more and more fully with agricultural and food products are increasing. At the same time, a lack of proportion in one of the components of the agroindustrial complex produces corresponding disproportions throughout the technological system of the complex and retards its development with respect to achieving good end results and providing the population with food products.

There are presently disproportions in the APK's development among its individual spheres of activity and the phases of the reproduction process. These disproportions exist between agriculture and the branches producing the means of production for it, between the volume of agricultural output and capacities for processing, storing and transporting the products, and between agricultural equipment repair needs and existing capabilities for performing the repairs well. It is apparent from this that the task of making the APK's functioning more effective is accomplished not just by making more efficient use of materials, manpower and material incentives for the development of production, but also by ensuring balance and proportion in the development of all components of the agroindustrial complex.

This is what makes it essential to strengthen each component and the entire agroindustrial complex as an object of independent planning. Balance and proportion should be ensured in the APK's functioning by economic and social development plans for the nation and for the individual Union republics. However, planning and the provision of incentives for the APK are mainly directed toward branch results, do not support a system of management of the APK as a whole and are not directed toward the achievement of good end results.

The plan should take into account the interests of both the producer and the consumer, provide for a practical combination of branch and territorial interests and consider those of all branches making up the agroindustrial complex. The strengthening of the rayon element represented by the RAPOs [rayon agroindustrial associations], which include kolkhozes, sovkhozes, enterprises and organizations of all the other spheres of the rayon APK, must have a special role with respect to ensuring organizational and economic unity among the individual components and branches of the APK. In our opinion, the rayon agencies should boldly resolve interbranch questions, eliminate the disproportions and improve the balance and relations among the various spheres of the APK.

In our opinion, a number of problems should be resolved in order to accomplish this. First of all, it is essential to achieve the necessary unity of interests in the functioning of all the APK elements. The servicing organizations continue to give priority to departmental interests and do not demonstrate proper concern for the affairs of the kolkhozes and sovkhozes.

Second and no less important is the fact that the kolkhozes and sovkhozes, which are the nucleus of the APK, have dual subordination: they are subordinate to the branch ministries on the one hand and to the RAPO on the other. All resources pass through departmental agencies, which weakens the RAPO's role with respect to ensuring proportion and balance.

In order to correct this situation it would be expedient to deliver volumes of capital investments, material and technical resources to the territorial agencies

for the entire regional APK, without a breakdown by branches. The territorial agencies, in this case the RAPOs, would themselves distribute the allocated financial, material and technical resources among the individual branches. This would promote the balanced development of spheres and branches, help to eliminate bottlenecks and contribute to the comprehensive resolution of social problems.

In the interest of the nation's economic and social development, however, it is essential to work out and implement a unified, comprehensive plan for the APK's economy. This would make it possible to increase balance and proportion in the development of agriculture and interacting sectors of the national economy and to achieve good end results for the APK as a whole.

Proportion and balance are achieved in the APK through equivalent exchange and equal opportunities for expanded reproduction for all of the enterprises making up the branches of the agroindustrial complex. However, a departmental approach sometimes weakens the common interest in the achievement of equal opportunities for expanded reproduction for all of the APK enterprises with a view to achieving the end national economic results.

The All-Union Economic Conference pointed out the increased cost of services provided agriculture by the partners. Certain new and more productive machinery increased the basic cost of the product, and outlays for maintaining it in serviceable condition are increasing more rapidly than the productivity, reliability, durability and effectiveness of the equipment. Equipment repair and maintenance services are still extensive.

Prices should ensure an equal interest on the part of all branches of the agroindustrial complex in achieving good end results and an equal interest in delivering products both for industrial processing and to be sold fresh.

In order to provide balance and proportion in the development of the Union republic APK it is essential to further increase growth rates for the branches providing agriculture with the means of producing, processing, transporting and storing agricultural products and delivering them to the consumer. The achievement of maximum satisfaction of industry and agriculture's needs for their products is the main element of planned balance and proportion in the APK's development. And the main role goes to the industry which provides for outstripping growth of the capital-production and capital-labor ratio in agriculture and increasing labor productivity. The industry must provide agriculture not with individual types of machinery and equipment, but with the entire system of machinery for complete technological lines for raising each crop and for each production process in animal husbandry. Agriculture is not receiving the complete system of machinery and equipment, however, which is preventing it from drastically reducing the amount of manual labor existing in agriculture. There is still a lot to do to raise the level of mechanization of the individual agricultural operations, to create and improve the machines and devices for agriculture's complete mechanization. The planting of vegetables was only 8 percent mechanized in the republic's agriculture in 1983; cotton harvesting, 27; milking, 21; and the watering of cattle, 39 percent. Complete mechanization was at a level of only 15 percent on the farms and complexes in general. Many of the jobs in viticulture--pruning and harvesting, among others--are performed manually. All of

this attests to the fact that tens of thousands of agricultural workers in the republic are still engaged in unproductive, heavy, physical manual labor. Along with other causes, this is due to a certain degree to the fact that agriculture, which is the central element in the agroindustrial complex, is at the present time practically isolated from the sectors of the national economy expected to service it and process its output, and does not exert an active influence upon those sectors with respect to the creation of a system of machinery for complete mechanization. The level of complete mechanization and the rate at which it is completed depend in great part upon the observance of proper proportions in the provision of agriculture with the right equipment, taking into account the requirements of the technological processes and the need to improve the operating features of the technical means and to make highly productive use of them. Industry must not only create modern, highly productive and reliable equipment for shifting the APK onto an industrial basis but also ensure the proportionate development of a corresponding repair and service base making it possible to maintain the equipment in operating condition for its established life and provide it with spare parts. Enormous funds and enormous amounts of labor are expended on the production and repair of the modern equipment, and their judicious use depends upon a balance between the operations of the manufacturers of the equipment and the enterprises providing for its operation, technical servicing and repair. At the present time there is almost no balance between the operations of those enterprises in the plans for national economic development.

As agriculture, which is the main complex-forming branch and the nucleus of the agroindustrial complex, develops, it is in turn acquiring ever increasing importance with respect to providing the processing industry with agricultural raw materials. According to figures for the interbranch balance of the AzSSR economy, all material outlays in the republic's agriculture increased by 77.4 percent during the period 1972-1980, including an increase of 87.5 percent in industrial outlays. The portion accounted for by the latter in the total material outlays increased from 41.6 percent in 1972 to 44.0 percent in 1980, while industry's portion of the consumption of agricultural products grew from 49.9 to 63.5 percent.

The APK's rates of development and its effectiveness depend upon the balance and proportion in its interbranch connections and the connections between spheres I and II, and upon the degree to which agriculture and the processing industry are provided with means of production for accelerating their transition to a modern industrial basis. And it is essential to take into account the specific nature and the specific features of the APK's development in each Union republic and the formation of large, highly specialized subcomplexes there, which combine the production, procurement, storage and processing of the output of the given subcomplex on the one hand and its growing need for various means of production on the other. This necessitates the development of individual branches of sphere I of the APK in this or that region of the nation. A large viticulture subcomplex of the republic's APK is being formed in the AzSSR. The AzSSR presently produces more than 28 percent of the total Union production of grapes, the gross harvest of which will reach 2.5 million tons by 1990. Naturally, the production and processing of such a quantity of grapes means that it is essential to create in the republic branches producing the means of production for this complex and performing its technical production servicing.

The achievement of balance between volumes of agricultural output and capacities for processing and storing it, the establishment of correct proportions between agriculture and branches of the processing industry and the creation of appropriate raw materials zones for each enterprise of the processing industry constitute an important task. The transporting of agricultural raw materials over great distances results in losses, nonproductive outlays and deterioration of the quality of the raw materials and the finished product. The optimal correlation between spheres II and III of the APK has still not been achieved in many of the republic's natural economic zones, as a result of which some of the raw materials are not processed in certain areas because of a shortage of capacities, while capacities are not fully utilized in others due to a shortage of raw materials. A highly developed raw materials zone must be established for each processing enterprise.

Investment policy, improvement of the patterns of application of capital investments and their judicious redistribution have the primary role in the improvement of proportion and balance in the development of the individual APK spheres and branches and the elimination of existing disproportions among them. The distribution of capital investments must take into account the need to create the conditions for development of the capital producing branches and branches of the infrastructure and to increase production capacities for processing agricultural products, bearing in mind production volumes and prospects for improving branches of the agricultural structure. The structure of capital investments needs to be further improved for the republic's agroindustrial complex. The fact that the structure of capital investments for the republic's APK is imperfect is demonstrated by the fact that during the years of the 10th Five-Year Plan capital investments in the capital producing branches amounted to 1.4 percent and capital investments in the complex forming branches 93.2 percent, including 77.5 percent in agriculture and 5.4 percent in branches of the infrastructure. This distribution of capital investments, materials and equipment does not give proportion or balance to the development of the production, procurement, processing, storage, transportation and sale of agricultural and food products. An organic merging of agricultural and industrial production has not yet been achieved as a result of this, and the process of increasing the processing of the raw materials is proceeding slowly. Balance has not been achieved between production and consumption. Despite a steady increase in the production of agricultural products, facilities for their storage and processing lag behind the rates of growth. This is particularly apparent in the cotton ginning, wine-making, canning and tea industries. The problem of shifting agriculture onto a modern industrial basis cannot be resolved unless agriculture has an adequate quantity of transport equipment, loading and unloading machines and devices capable of supporting a smooth and even production process. Outlays for transportation significantly influence agriculture's effectiveness. The level of transport support for the republic's APK is still low, and development of the road system is unsatisfactory, as a result of which fruit and vegetable losses amount to 4-6 percent and grape losses to 6-8 percent.

Rural road construction is one of the urgent problems with respect to developing agriculture and enhancing its effectiveness. A considerable amount of work has been performed in this area in the republic in recent years. The total length of the road network, particularly roads with a hard surface, has been increased,

among other things. It should be pointed out that only with a ramified network of good roads can the effectiveness of agricultural transportation be ensured. The sum total of economic losses from the unsatisfactory state of the roads and from the lack of roads over a number of years sometimes exceeds the total amount of capital investments necessary for building them. Calculations show that the largest outlays are involved not in the movement of freight but in its loading and unloading. It is essential to make extensive use of belt and pneumatic conveyors, pipelines and so forth for mechanizing these labor-consuming operations in the situation of extensive production concentration.

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USSR SUPREME SOVIET REVIEWS NONCHERNOZEM ZONE ELECTRIFICATION

Moscow SELSKAYA ZHIZN in Russian 29 Apr 86 p 2

[Unattributed article: "At the Presidium of the USSR Supreme Soviet: The Fulfillment of the State Plan Targets for the Development of Rural Electrification and Electricity Conservation in Agricultural Production in the Nonchernozem Zone of the RSFSR"]

[Text] As has already been reported, the Presidium of the USSR Supreme Soviet, at a session on April 25, reviewed the question of the fulfillment of state plan targets for the development of rural electrification and the conservation of electricity in agricultural production in the Nonchernozem Zone of the RSFSR.

In a decree adopted on the given question, it was noted that in accordance with the resolutions of the Communist Party, certain work was done over the 11th Five-Year Plan in the Nonchernozem Zone of the RSFSR on strengthening the material and technical base of agriculture and the social reconstruction of towns. The power-worker ratio and the consumption of electricity at kolkhozes and sovkhozes increased by more than one third, which made possible an improvement in the working and living conditions of rural dwellers.

At the same time, the growth projected for the 11th Five-Year Plan in the consumption of electricity and the power-worker ratio in the Nonchernozem Zone of the RSFSR was not secured. The USSR Council of Ministers and the USSR Ministry of Power and Electrification did not take adequate measures for strengthening and developing the electrical base of towns, accelerating the electrification of production processes in farming and animal husbandry, and increasing its effect on the achievement of steadier development in agricultural production and its transition to an industrial basis.

The electrification of thermal technological processes, which could to a certain extent compensate for shortcomings in manpower and free up substantial fuel resources, especially petroleum products, is being developed unacceptably slowly. Shortcomings in electrification reduce the return on major capital investments and do not permit the full utilization of the established potential of the RSFSR Nonchernozem Zone, which today supplies almost one third of agricultural produce output in the RSFSR.

The USSR Ministry of Power and Electrification did not fulfill the plans for rural power-system construction in the 11th Five-Year Plan, and work on its reconstruction and repair was conducted in insufficient volume and maintenance was implemented unsatisfactorily.

The condition of the electrical system frequently does not ensure a reliable supply of electricity for rural consumers. Approximately 30 percent, and more than 60 percent in a number of oblasts, of the major animal-husbandry complexes, poultry farms, and other agricultural facilities that are in the first category with regard to reliability of consumer electrical supply do not have reserve sources of electrical supply. A considerable number of emergency disconnections of consumers occurs every year, in connection with which the farms suffer large losses.

Effective measures for raising the quality of electricity are not being adopted, and the established state indicators are being crudely violated. Voltage deviations in rural electrical systems frequently reach 20 and more percent, which substantially reduces the service life of electrical equipment, illumination instruments and household appliances.

The material and technical base of the inter-farm productive associations of Rosagropromenergo [RSFSR Agricultural Power Industry] have not been developed as necessary. Many farms receive practically no assistance in maintaining electrical installations on the part of the specialized organizations, and as a rule there are no bases for this at kolkhozes and sovkhozes.

Verification has shown that the rate and quality of developments executed by the scientific research, planning and design organizations of the USSR Gosagroprom [State Agricultural Industry] system and industry ministries in the sphere of agricultural electrification do not provide for the realization of party directives for accelerating scientific and technical progress. The existing scientific potential is poorly utilized for resolving tasks in the development and improvement of the efficiency of electrification and the incorporation of energy-conserving equipment and technology in agricultural production. Scientific research is conducted without the proper coordination. The fulfillment of a number of most important targets envisaged in the state scientific and technical program for the development and incorporation of new methods and equipment for agricultural electrification is lagging. The appropriate connection between science and the kolkhozes and sovkhozes is lacking. The material, and especially the experimental test, base of scientific institutions is in need of reinforcement.

Work on the rational and economical utilization of electricity requires decisive improvement. The limits of its consumption are established without regard for real requirements and existing standards. The accounting and monitoring of electrical consumption is poorly arranged at kolkhozes and sovkhozes. The need for electric meters is very poorly met. Measures for electricity conservation are not being developed by the majority of farms.

Kolkhozes and sovkhozes are inadequately supplied with qualified workers and specialists for operating power equipment. More than 40 percent of the number of personnel do not have specialized training. Questions of improving the

day-to-day living conditions of rural power workers are being resolved too slowly.

The allocated resources for many types of electrical equipment, apparatus and other articles do not satisfy the growing requirements of the farms. The USSR Ministry of the Electrical Equipment Industry does not provide for the fulfillment of the established targets for the assimilation and production of new types of equipment.

The industry produces a limited product range of electrical appliances for domestic and private-farm use. The question of applying an abatement tariff for electricity utilized in the everyday life of the rural population is being resolved too slowly.

The soviets of peoples' deputies and their executive and regulatory organs are devoting insufficient attention to coordinating and monitoring the activity of enterprises and organizations of the USSR Gosagroprom system and the USSR Ministry of Power and Electrification in the resolution of questions of rural electrification.

Guided by the directives of the 27th CPSU Congress on the persistent execution in life of the party's modern agrarian policy and considering electrification as a most important means of intensifying production and improving the working and living conditions of Soviet laborers, the Presidium of the USSR Supreme Soviet directs the attention of the USSR Ministry of Power and Electrification and personally Comrade A. I. Mayorets of the RSFSR Council of Ministers to the unsatisfactory state of reliable electrical supply for the towns and orders them to adopt measures to eliminate the shortcomings noted. They are instructed to strengthen the work on the electrification of agricultural production, the expansion of the use of electricity in cultural and domestic services for the rural population, the economical and rational utilization of all fuel and energy resources, the reinforcement of the productive base of construction and operational-repair organizations, and, in 1986, the completion of the passing of electrical systems from kolkhozes and sovkhozes to the rest of the enterprises of the USSR Ministry of Power and Electrification system and the organizations for their quality servicing. They are required to implement measures for increasing the preparation and consolidation of rural power personnel.

The task is placed before the USSR Ministry of Power and Electrification of achieving, in the shortest possible time, an increase in the reliability and quality of electrical supply for rural consumers, ensure the unconditional fulfillment of the state plans for the construction of rural electrical systems and an increase in the amount of their reconstruction and repair, complete the creation of necessary reserve capacity for first-category consumers in the 12th Five-Year Plan, and expand considerably the scope of incorporation of automated and telemechanical equipment for rural power system administration.

It is ordered that the utilization of the productive base of the construction and installation and operational-repair organizations be strengthened and improved. Exactingness toward personnel and responsibility of the appropriate

enterprises and organizations for uninterrupted electrical supply must be raised, and moral and material incentives for this must be used more fully.

The Presidium of the RSFSR Supreme Soviet and the RSFSR Council of Ministers are entrusted with strengthening the work of the soviets of peoples' deputies of the autonomous republics and oblasts of the RSFSR Nonchernozem Zone and of their executive and regulatory organs for leading the agricultural industry committees and associations in the cause of raising the reliability of electrical supply and fulfilling the plan targets for rural electrification. Measures must be taken for strengthening the material and technical base of rural power engineering and the economical and rational consumption of electricity, for resolving the tasks of improving the social and domestic conditions of power service workers, and for more actively distributing the experience of the leading collectives in this matter. The necessary cooperation and monitoring of the activity of enterprises and organizations of higher affiliation that are implementing the electrification of agriculture must be ensured.

It is recommended that USSR Gosagroprom and the All-Union Academy of Agricultural Sciences imeni V. I. Lenin:

--adopt measures for the further expansion of the utilization of electricity in agriculture and the incorporation of energy-conserving equipment, technology, and mechanization and automation that permits a substantial increase in the productivity of labor, a reduction in losses of produce and a raising of its quality;

--ensure the strengthening of organizational work and the monitoring of the realization of scientific and technical programs in the sphere of agricultural electrification; accomplish the reconstruction of the activity of scientific research and planning and design organizations on problems of agricultural electrification, and bring it nearer to the needs of kolkhozes and sovkhozes; accelerate the development of experimental-test bases for the appropriate scientific institutions;

--develop, in conjunction with the USSR Ministry of Power and Electrification and the USSR Ministry of the Electrical Equipment Industry, measures for accelerating the creation of efficient electrical and thermal equipment for rural electrification.

The necessity of completing, in the near future, the practical resolution of questions associated with the organization and reinforcement of the power services in the operation of the appropriate equipment at kolkhozes, sovkhozes, inter-farm and other enterprises and organizations is also pointed out to USSR Gosagroprom.

The USSR Council of Ministers is ordered to adopt measures that envisage, in particular, an increase during the 12th Five-Year Plan in the amount of work on the development, reconstruction and repair of rural power systems, the substantial improvement of the supply of equipment and instruments for accounting for the consumption of electricity, materials and transportation equipment, and on that basis increase the reliability of electrical supply for

rural consumers and resolve other tasks arising from the USSR Provisions Program; the creation of the necessary conditions for a further significant expansion in the utilization of electricity, including at night, in agricultural production and the everyday life of the rural population; and, an increase in the economic responsibility of power-supply organizations for losses occasioned by halting the electrical supply to agricultural consumers.

It is recommended that the Supreme Soviets of union and autonomous republics adopt measures for improving rural electrification, more fully utilize the possibilities of local soviets of peoples' deputies in the resolution of these questions, and raise the responsibility of the appropriate economic organizations and their managers for the uninterrupted and high-quality supply of electricity to rural consumers.

12821
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AGRO-ECONOMICS AND ORGANIZATION

PRODUCTION POTENTIAL OF KAZAKH APK BRANCHES UNDERUTILIZED

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 2, Feb 86 pp 92-94

[Article by V. Streltsov, director of a USSR Gosplan section: "On the Utilization of Production Capacities in the APK Branches of Kazakhstan"]

[Text] A group of specialists of USSR Gosplan, with the participation of employees of the ministries and departments that comprise the agro-industrial complex, and the Kazakh SSR Central Statistical Administration, as well as the agro-industrial complex's planning agencies and statistical administrations and organizations in the oblasts and rayons conducted a checkup in November 1985 on progress made in the development and utilization of production capacities in its branches. It showed that in recent years the Kazakh SSR has been increasing production capacities in the agro-industrial complex as well as taking steps to improve their utilization.

The republic has an important role in the formation of the country's food resources. A substantial amount of tractors, trucks, grain harvester combines and capital investments were allocated for the development of its agriculture in the 11th Five-Year Plan. The supply of mineral fertilizers should increase 1.5-fold, including an increase in phosphorus fertilizers by a factor of 1.8, compared to the 10th Five-Year Plan period. Fixed production capital of kolkhozes and sovkhozes will grow by 26 percent during the Five-Year Plan period, including fixed capital for livestock breeding by 23 percent. This will make it possible to increase the production and procurement of livestock breeding output. Thus, the average annual procurement of livestock and poultry in 1981-1985 will increase by 15 percent, milk by 5 percent, wool by 6 percent and eggs by 12 percent in comparison with the 10th Five-Year Plan period.

At the same time, the efficiency of agricultural production has deteriorated, above all because of the underutilization of production capacities. In spite of annual growth in the provision of fixed capital and mineral fertilizers to kolkhozes and sovkhozes, agricultural production rates have slowed during the 11th Five-Year Plan and labor productivity and return on assets have dropped. Thus, according to our calculations, the republic's average annual volume of gross agricultural output remained at the level of the 10th Five-Year Plan while labor productivity dropped by 9 percent and return on assets by 28 percent.

An inspection of the organization of work in accounting and the calculation of capacity utilization balances was conducted at 54 facilities: in Alma-Ata, Kustanay, Karaganda, Dzhambul, Pavlodar and Ural Oblasts. This work is being done extremely poorly in the majority of rayons, sovkhozes, kolkhozes and even oblast organizations that were checked. Calculations are not being made in accordance with instructions of the USSR Central Statistical Administration and the USSR Ministry of Agriculture currently in effect, while planning estimates for the use of production capacities in agriculture violate the USSR Gosplan's instructions. Certain specialists at farms, rayon and oblast organizations, and even republic APK organizations do not know the procedure for filling out statistical reports and planning estimates for production capacity balances. This complicates the processing of statistical reports and results in breakdowns in their scheduled submission to local and oblast agro-industrial associations, statistical administrations and oblast planning committees, especially with respect to agriculture. Report forms 47-s-kh are not being examined and analyzed by farm specialists and executives, nor by rayon and oblast agro-industrial associations.

The primary reasons for the underutilization of production capacities in the Kazakh SSR's agriculture are as follows:

the low productivity of livestock. At present these indices are worse than those of the 9th and 10th Five-Year Plans.

the disparity between growth in the size of livestock herds and number of poultry on the one hand and fodder resources for animal husbandry on the other. The consumption of fodders calculated per conventional head of livestock dropped from 31.4 centner feed units in 1980 to 28.2 centner feed units in 1984. However, despite the weakening of fodder resources, the size of cattle herds grew by 7 percent, including a 6 percent growth in the number of cows;

the structure and quality of fodders does not meet the requirements of the intensive development of livestock breeding. There is an annual 10 percent to 15 percent shortage of digestible protein in the republic's fodder balance, which leads to the overconsumption of fodders. Fodder outlays for the production of one livestock unit in kolkhozes and sovkhozes exceed the norm. Less attention is being paid to increasing the production of high-protein crops and the area sown to oil crops has been reduced. Existing feed and fodder centers at farms are not being put to full use;

veterinary problems with livestock due to the inadequate feeding of animals, lack of balanced rations and incomplete provision of livestock with shelter that meets livestock breeding and veterinary requirements, as well as the ineffective implementation of essential veterinary and curative measures;

shortcomings in pedigree livestock breeding and animal husbandry;

the incomplete provision of livestock to livestock sections and complexes due to poorly substantiated design work, poor quality construction and the slow development of capacities. For example, complexes for the production of milk

in Alma-Ata Oblast were provided with livestock at only 78 percent of capacity in 1984 and the yield of milk per cow totaled 2421 kg, which is 719 kg below the projected amount. During the design of the livestock breeding complexes, no provision was made for supplying them with irrigated fodder pastures. Due to the poor quality of construction, close to 20 percent of major mechanized livestock sections were in a stage of premature reconstruction and protracted development in 1984.

Capacities for the processing of livestock and poultry at enterprises of the meat industry are not being put to adequately efficient use. Thus, during 1984 one fifth of these capacities were underutilized. They are put to especially poor use at the Alma-Ata Meat Industry Production Association, the Semipalatinsk, Aktyubinsk and Ushtobinsk Meat Combines and others. These enterprises account for roughly half the republic's total production capacities. The remaining enterprises are operating with capacities at 100 percent and greater, which indicates a need to carry out work to rearrange the meat combines' raw material zones. Capacities for livestock breeding in agriculture exceed capacities for its processing in industry by a factor of 1.2 to 1.3.

At present, the republic's dairy industry enterprises can accept and process about one-half as much milk per shift as they did during the maximum 24-hour reception period in 1985. In 1984 capacities for the production of whole milk output, lard, rennet cheese and processed cheese were virtually put to full use, yet some capacities for the production of dry skim milk (DSM), whole milk substitutes (WMS) and dry whey were underutilized. Capacities for the production of DSM and WMS at enterprises of the East Kazakhstan, Kokchetav, Semipalatinsk and Turgayskoye Dairy Associations are not being put to satisfactory use.

The results of the checkup on the development and utilization of production capacities in Kazakhstan's agro-industrial complex were examined at a collegium of the republic's Gosplan with the participation of all the ministries and departments that comprise the APK, as well as the republic's Central Statistical Administration. As a result of discussion on this question, the collegium of Kazakh SSR Gosplan instructed organizations within the republic's agro-industrial complex:

to intensify work in analyzing the use of production capacities for the purpose of uncovering reserves to increase production efficiency, devoting special attention to a reduction in the time required to put existing production capacities back into operation;

to organize the economic training of specialists from kolkhozes, sovkhozes, rayon statistical agencies, rayon planning committees and other enterprises that are a part of the agro-industrial complex in the calculation and compilation of report and plan balances of production capacities and the study of the correlation of plan assignments to existing production capacities, as well as to indices for the actual volume of output produced;

to carry out work to rearrange the raw material zones of the meat and dairy industry's enterprises with a view to the greater utilization of capacities.

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PRIVATE PLOT DEVELOPMENT, PUBLIC RESPONSIBILITY

Moscow GOLOS RODINY in Russian No 6, Feb 86 pp 12-13

[Article by Aleksandr Fedotov, Candidate of Economic Sciences, Docent at the Riga Polytechnic Institute ("Novosti" Press Agency), under the rubric "Who Benefits From This": "Casting Aspersions"]

[Text] The development of socialist agriculture is always given an important place in Western literature on "Sovietology."

Latvian emigre writers also write a great deal about this. They are loyal to the subject of idealization of the small private peasant holding as the "foundation" of the Latvian nation.

They are forced to admit, however, that agriculture in Latvia and Estonia, as an example, presently "feeds" a far larger number of urban residents than before the war and that the two republics are experiencing a significant growth of output per farm worker. The bourgeois writers, however, continue to talk about the "bankruptcy" and "failure" of the kolkhoz system.

Bourgeois propaganda invariably describes the personal plots as the "private sector," in contrast to the socialist economy, identifying them with private entrepreneurship.

In this respect one should note first of all the incorrectness of putting the personal plots on the same level with the private capitalist farms. The personal plots of citizens in the socialist society do not have the main, definitive feature of the private agricultural enterprise: private ownership of the land and the most important tools of production--that is, those prerequisites which are essential for the development of a system of exploitation. The personal plots under socialism are a type of personal ownership by the workers.

There can be no doubt that the household operation plays a substantial economic role, a fact stressed in pertinent party and state documents of recent years. At the same time, it is not difficult to see that the public sector has the crucial role in agricultural production both in the USSR as a whole and in the Latvian SSR. Personal plots accounted for 27 percent of the total gross agricultural output in the Latvian SSR in 1980. As the collective farms continue to develop, these plots will account for an increasing specific portion of the output of the most important food products.

The kolkhozes and sovkhozes are the main producers of commercial agricultural products. Kolkhozes, inter-farm enterprises, sovkhozes and other state associations produced 88 percent of the commercial agricultural products in the nation as whole in 1980.

It is not difficult to see that the personal sector plays a substantial role in the production mainly of two groups of products: vegetables, including potatoes, and livestock products (meat, milk and eggs). Specifically, the fact that they account for a large portion of the value of gross agricultural output is due precisely to the fact that they account for a larger portion of animal husbandry which produces goods of high value. At the same time they produce almost none of such important types of crops as grain and industrial crops. At the same time, despite the great importance of potatoes and other vegetables for consumption, it is grain farming which has been and remains the main element of all agricultural production. Grain and industrial crops also account for the largest portion of crop land in the nation, 65 percent (47 percent in Latvia).

With respect to potatoes and other vegetables, this group of crops occupies the smallest area: 4.2 percent of the planted area in the USSR as a whole and 7.3 percent in the Latvian SSR. Not one of the bourgeois writers mentions the fact that 4.25 of 9.25 million hectares planted to potatoes and other vegetables in the USSR (59,000 of 121,000 hectares in Latvia) were on personal plots in 1978.

And so, instead of false calculations of total land area, the matter should be presented in the following manner: with 46 percent of the area planted to potatoes and other vegetables in the USSR and 49 percent in Latvia, the personal plots produce 61 and 58 percent respectively of the vegetables. It is apparent that the personal plots are not performing some sort of "economic miracle" in this case.

Average vegetable yields in the republic were the following during the period 1976-1980: 138 quintals per hectare on state farms, kolkhozes and inter-farm enterprises, and 128 quintals per hectare on farms of the household sector.

Thus, there are presently no grounds for speaking of greater effectiveness from the personal plots.

The calculations made by emigre writers with respect to livestock products are the most baseless. It would be more appropriate to compare the volume of output not based on the amount of arable land in use on the personal plots but on the total herd of livestock belonging to them. As of 1 January 1980, the population owned 20 percent of the cattle (including 30 percent of the cows) and 20 percent of the hogs in the USSR (with corresponding figures of 21, 28 and 13 percent for the Latvian SSR). And according to the statistics, the average milk yield per cow in the nation was greater on the kolkhozes and sovkhozes than on the personal plots.

The reproduction of livestock and poultry in the personal sector is accomplished with the direct support of the state. The personal plots simply could not exist in isolation from or running counter to the public economy.

Soviet researchers, among others, cite data which shows that two-thirds of the feed for livestock and poultry on the personal plots is acquired free or under special terms from the public sector.

When the bourgeois economists speak of the effectiveness of the personal plots, they ordinarily substitute the concept of income for that of effectiveness. Referring to data provided by Soviet researchers for 1965 on the role of the subsidiary plots in the formation of the income of the kolkhoz family in the Latvian SSR in 1974, for example, A. Ayzsilniyeks concluded that the household farm operation is far more profitable for the peasants than the "bureaucratic and mechanized kolkhoz giant." The emigre economist is clearly suppressing evidence from the same writers which shows that in 1969 the kolkhoz workers' income from public farming in Soviet Latvia already amounted to 41.7 percent of their total income, exceeding their income from personal plots (36.7 percent). By 1980 the income per worker from public farming on the kolkhozes for kolkhoz workers of the Latvian SSR exceeded the 1965 level by almost 2.8-fold.

It is apparent from the statistical data that the increase in agricultural production in the nation is being achieved primarily on the kolkhozes and sovkhozes. Furthermore, there has been a clear reduction in production volumes on the personal plots of the public in recent years. This is not yet a desirable trend. It has become apparent in the situation which has developed that active steps must be taken to support the personal plots.

And so, stimulation of the development of the personal plots and increased state support for them in no way indicate a lessening of attention to the public sector or a reduction in the role of the latter. The socialist state's agrarian policy unvaryingly gives priority to the interests of the public economy.

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SUGAR BEET PROCUREMENT PRICES, PERIODS OF PROCESSING ANALYZED

Moscow EKONOMIKA SELSKOGO KHOZYAYSTVA in Russian No 3, Mar 86 pp 69-71

/Article by A. Shpichak, Candidate of Economic Sciences at UkrNIIEOSKh: "Sales Period and Procurement Price Level"/

/Text/ Among the problems of the economic mechanism of the agroindustrial complex, importance is attached to the problem of taking into account the sales period and the procurement price level. Let us examine some of its aspects in conformity with the differentiation of procurement prices for sugar beets.

The economic essence of an increase in the procurement prices for sugar beets sold during an earlier period consists of a need for compensating a supplier for a shortfall in crop caused by a forced shortening of the growing season. Moreover, numerous scientific-research and production experiments carried out in our country and abroad have shown that high yields, sugar content and sugar yields per unit of area can be obtained with maximum extension of the growing season. The latter is achieved by means of early sowing periods and late harvesting schedules. Data obtained from test plots of beet growing farms indicates that considerable increases in the weight and sugar content of industrial beets are achieved in our country during August and September. Thus, according to data supplied by the Belotserkovskiy Plant Breeding Station, the Chernyshi Experimental Base of VNIS /All-Union Scientific Research Institute of Sugar Beets/ and farms in the raw material zone of the Kreshchatik Sugar Plant in Ternopol Oblast, increases in the weight and sugar content of beets take place practically up to 1 November.

In the Ukraine, the greatest weight and sugar content in beets are achieved prior to the second 10-day period in October. If during this period the crop was harvested without losses, then on the average for the 1976-1983 period and assuming a late schedule for harvesting the sugar beets, the Ukrainian SSR would have over-fulfilled to a considerable degree the state procurement plan for this crop. However, under present conditions neither the producer of the raw material nor those who process them are capable of commencing the harvest and processing the sugar beets after they have achieved their maximum weight and sugar content. The producers, taking into account existing labor resources, harvesting and transport equipment, roads and weather conditions, will be unable to harvest completely and ship the raw materials to the procurement points. For the processing personnel, assuming existing processing capabilities

and the start-up of the sugar plants during the 3d 10-day period in October, the losses in beet weight and sugar at the end of processing (February and March) will be greater than the increase in raw materials resulting from a late harvest. Thus, under the given conditions, during both the 2d and 3d spheres of the sugar beet agroindustrial sub-complex, there are general objective interests -- to commence harvesting the crop during earlier periods. However, considerable disagreements arise among the beet growing farms and the sugar plants when deciding upon a specific date for commencing the harvest. Thus, according to data supplied by the All-Union Scientific-Research Institute of Sugar Beets (VNIS), with use being made of the available harvesting and transport equipment the beet harvesting operations in the Ukrainian SSR can be carried out in less than 25 working days and be completed by 25 October. An analysis of weather conditions over a period of many years in the republic's zones of industrial beet production reveals that owing to rainfall and the water-logging of soil there are 5 non-working days in September and 7 in October. Thus, from 20 September to 25 October the number of working days is more than 25. It bears mentioning that computations have been carried out repeatedly in the Ukrainian SSR which convincingly prove the advisability of commencing the sugar beet harvest during the 20-23 September period. However, despite the obvious advisability, from an agricultural standpoint, of commencing the harvest of industrial beets during later periods, such work is being started in the republic at an earlier time.

The latter circumstance is conditioned by the fact that with existing processing capabilities the losses in beet weight and sugar, even with the harvest work being started during the 3d week in September, as a result of a prolonged processing period, will be greater than a shortfall in raw materials associated with an earlier harvest. Under the conditions which have been created, it is economically more advantageous for a procurement specialist to compensate the beet growing farms for a shortfall in the crop and to commence the start-up of the sugar plants earlier. In this regard, over a period of 30 years (since 1956), we have employed a bonus in the amount of 30 percent for RSFSR kolkhozes and sovkhozes, for adding on to the price for sugar beets sold prior to 1 September in an amount agreed upon with the sugar plants and in the amount of 20 percent for all remaining republics for beets sold accordingly prior to 15 September.

It would appear that the extensive introduction of mechanized methods for harvesting beets, the use of wide-cut root and haulm harvesting machines, highly productive loaders, high tonnage motor transport vehicles for shipping crops and the intensification of production capabilities for the processing of beets are making it possible to reduce the quantities of beets being delivered in the Ukrainian SSR prior to 15 September. However, both the absolute and relative volumes of raw materials being delivered prior to 15 September, compared to the overall procurements, are increasing. Thus, compared to the 1966-1970 period, when an average of 1.9 million tons of beets (4.5 percent) were procured in the Ukrainian SSR, with an additional payment of 20 percent, during the 1976-1980 period -- 3.6 million tons (7.9 percent) and during the 1981-1983 period -- 6.1 million tons (16.2 percent).

An increase in the volume of sugar beet procurements prior to 15 September is conditioned to a considerable degree by the practice that has developed in recent years of starting up the sugar plants of the Ukrainian SSR in August.

Thus, compared to 1950 when only 14.6 percent of the overall number of sugar plants in the republic were started up prior to 3 September, in 1982 -- 36.8 and in 1983 -- 76 percent. The justification for the start-up periods for the sugar plants is provided annually, since various controlling factors which may constantly change play a role here (expected volume of raw materials to be processed, production capability of a plant, the availability of harvesting and loading equipment, labor resources and transport for shipping the beets, forecast data for weather conditions during the harvest period, the availability and condition of hard surface roads, the status of storage areas and so forth). Of the numerous factors mentioned, the most difficult to take into account are the expected volume of raw materials for processing and the weather conditions during the harvest period.

For the purpose of an annual determination of the expected sugar beet processing volume, all of the country's sugar plants carry out observations of growth in the weight of the sugar beet roots and haulm and also of the accumulation of sugar in the root crops. These observations are conducted every 10 days on test plots (from 1 July to 1 October). When determining the expected beet yield, the actual weight of a root according to data for 20 July is taken as the initial value. Hence, prior to the commencement of the mass harvesting work, there are still approximately 2 months during which the beets continue to gain in both weight and sugar content. In this regard, when determining the expected yield, use should ideally be made of the data for 20 August and it should be used as the basis for establishing the start-up period for the sugar plants.

It bears mentioning that when establishing the start-up periods for the sugar plants special importance is attached to the question of the duration of their production period.

In recent years, the production capabilities of sugar plants in the Ukrainian SSR have increased substantially. For example, during the 1981-1983 period they increased by a factor of 3.2 compared to 1950 and the quantity of beets procured throughout the republic per 100 tons of daily capability decreased accordingly (by 10.3 percent) and amounted to 8,200 tons. As a result, during 1981/82 - 1983/84, the duration of juice procurement operations in the Ukrainian SSR amounted to 90 days. However, the mentioned reduction in the juice procurement period was caused not only by growth in the production capabilities but also by considerable non-fulfillment of the plan for state procurements. Computation have shown that if the planned procurement volumes for 1981-1983 had been fulfilled, the juice procurement period would have lasted approximately 125-130 days and this would have been considerably more than the duration accepted for the country -- 100-110 days.

Studies have established the fact that the trend towards earlier start-ups for sugar plants in the Ukrainian SSR is conditioned to a considerable degree by economic factors. Under the existing system of additional payments for the sale of beets prior to 15 September, not only early but also extra-early start-up periods for the sugar plants are economically profitable for the processing enterprises.

Thus the lowest production costs for sugar occurred at plants which commenced their production prior to 31 August. Data for the 1982-1983 production season

is typical in this regard. The production cost for sugar at 12.1 percent of the republic's plants which commenced production prior to 31 August amounted to 459.8 rubles per ton. And at plants which process raw materials having the same sugar content (16 percent) and relatively the same duration of juice extraction (85-87.7 days), but which commenced production after 13 September, the production cost for the sugar was 512 rubles per ton, or 11.4 percent higher. Moreover, a lower sugar production cost at plants started up prior to 31 August was achieved here even with the processing of a considerably greater quantity of beets, procured with an additional payment of 20 percent added on to the price, than at plants which commenced production after 13 September. Such results were obtained mainly owing to a reduction in the amount of raw materials subjected to prolonged storage. In addition, as borne out by the data, earlier schedules for the commencement of sugar plant production extend the period for juice extraction. Thus, at sugar plants which commenced their production prior to 22 August, the juice extraction period lasted 130.3 days and those started-up after 16 September -- only 80-83 days. Moreover, at enterprises having a longer juice extraction period, the complete production cost for the sugar was considerably lower than at plants having a short period.

Thus, a lengthening of the juice extraction period, caused not by a dragging out of the processing time to February or March but rather by an earlier start of plant operations, is economically profitable for the food industry. An extension of the processing period leads to a reduction in the proportion of plant amortization deductions per ton of sugar and it more than compensates for an increase in the cost of sugar caused by purchases of more expensive raw materials.

In our opinion, all of this convincingly underscores the failure of cost accounting relationships between the 2d and 3d spheres of the sugar beet agro-industrial sub-complex in the matter of taking into account the processing periods in the procurement price level. With the existing system of additional payments for sugar beets delivered in the Ukrainian SSR prior to 15 September, in the volumes called for in the contractual agreements, it is advantageous for the plants to commence their processing even earlier than 22 August. Under these conditions, a definite contradiction is created. The agricultural enterprises strive to produce more raw materials while the processing enterprises, not being able to use them during the best periods, commence their production considerably earlier, thus reducing considerably the gross production of sugar beets.

In order to correct the mentioned shortcomings, it will be necessary to eliminate the economic prerequisite of extra-early periods for the starting-up of sugar plants and establish a more effective system of additional payments for raw materials processed during early periods. The most ideal variant for compensating agricultural enterprises for a shortfall in sugar beet yield, caused by a forced early harvest, would be a payment for the difference between the actual yields obtained during the mass and early periods for digging up the crop. However, the practical carrying out of such a computation is very labor consuming and hence will not be acceptable in the immediate future. Under present conditions, it is more advisable to differentiate the amount of additional payments for early schedules by decades for digging up the crop and also to establish them according to the actual losses in raw material weight during a particular 10-day period, compared to that obtained during the period

of mass harvesting operations from 1 to 25 October. Based upon an increase in beet weight on the test plots of sugar plants in the Ukrainian SSR, on average during the years of the 10th Five-Year Plan, our computations established the fact that the amount of additional payment added on to the price for beets, delivered to a sugar plant from 10 to 20 August in the amounts called for in the schedule, must amount to 80 percent, from 21 to 31 August -- 50, from 1 to 10 September -- 30, from 11 to 20 September -- 20 and from 21 to 31 September -- 10 percent. It bears mentioning that the proposed amounts for additional payments can be considered as minimal, since they do not compensate the farms for shortfalls in pulp residue, syrup, mixed feed or sugar in a counter sale for products and also the bonus fund for sugar plants owing to a reduction in the volume of beet procurements.

The proposed improvement in economic relations between agricultural enterprises and the sphere for the procurement and processing of agricultural products will promote an improvement in cost accounting relationships and an increase in the production of final product.

7026
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AGRO-ECONOMICS AND ORGANIZATION

NEW TERMS OF ECONOMIC MANAGEMENT IN AGROPROM STATUTE DISCUSSED

Moscow SOVETSKAYA ROSSIYA in Russian 1 Apr 86 p 1

/Article: "Agroprom: A New Stage"/

/Text/ The conversion over to new methods for administration and management is continuing in the agrarian sector of our country's economy. Unified organs for administering the agroindustrial complex have been formed in the center and in the various areas. This is a fundamentally important step. In essence, a completely different organizational structure has been created. It has now been strengthened by an effective economic mechanism. The CPSU Central Committee and the USSR Council of Ministers have adopted the decree entitled "Further Improvements in the Economic Mechanism for Management of the Country's Agroindustrial Complex." It is aimed at creating all of the conditions required for more complete utilization of the existing production potential, for introducing the achievements of science and leading practice into operations on a more extensive scale, achieving stable development for agriculture and its associated branches and for successfully solving the problems concerned with the social reorganization of the rural areas.

The complex of planned measures encompasses a broad range of problems -- the introduction of new methods for planning and economic stimulation based upon progressive norms, an expansion of the rights of kolkhozes, sovkhozes and other enterprises and organizations of the agroindustrial complex with regard to solving economic problems and increased interest and responsibility on the part of labor collectives for achieving high final results.

The initial responses to this document, sent in to the Editorial Board of SOVETSKAYA ROSSIYA, underscore the tremendous amount of attention which the Soviet people are devoting to the measures planned by the party and to its economic strategy, developed during the 27th CPSU Congress. They see in it a manifestation of the constant concern being displayed by the party and Soviet Government for the welfare of the people.

In the decree of the CPSU Central Committee and the USSR Council of Ministers, special attention is being given to improving the supply of food goods for the population through maximum use of the local resources of kolkhozes, sovkhozes and also subsidiary farms and collective gardening. The new principle of planning is raising the interest of farms in constantly increasing production. Firm and unchanging purchase plans, by years and for the five-year plan, are now

being established for the kolkhozes and sovkhozes. And everything obtained over and above the plan can be used at their own discretion. The resources of meat, milk and other products, once the deliveries to the all-union and republic funds have been carried out, remain completely at the disposal of the councils of ministers of autonomous republics and oblast and kray executive committees. The kolkhozes and sovkhozes are also authorized to sell up to 30 percent of the planned volume of purchases of potatoes, vegetables, fruit, berries, table grapes and melon crops to consumer cooperation organizations and at kolkhoz markets.

In particular, grain production is being stimulated. Commencing this year, bonuses are being established for grain sold to the state above the average annual level for the past five-year plan and also bonuses added on to the purchase prices for durum wheats, buckwheat, peas, millet, beans and some other crops. Counter sales of automobiles, tractors, individual types of agricultural machines and other resources for which there is a high demand are being organized for those farms which over-fulfilled their plans for grain sales. Here it is important to emphasize that the decree imposes complete responsibility for timely deliveries of food products to the all-union and republic funds upon the Soviet organs and agroindustrial committees.

Certainly, here a great deal will depend upon planning. The decree stipulates that it must be carried out based upon control figures for purchases of agricultural products, capital investment limits and deliveries of the principal material resources. They will be determined taking into account an economic evaluation of the land and the availability of fixed productive capital and labor resources. The farm plans are presented to higher organs following discussion in the labor collectives. The operational results of its initial years have underscored the high effectiveness of this form of agroindustrial integration. The need for the measures called for in the decree for achieving complete use of raw material resources and for solving the problems associated with the processing and storage of products is also borne out by other examples. Some beet growing oblasts are still experiencing difficulties with the processing of sugar beets. The capabilities of plants are being developed with a lag taking place in the production of raw materials, the modernization of an entire series of food industry enterprises is being carried out very slowly and, as a result, there is much manual labor and considerable losses in product.

Certainly, some time is required for implementing measures aimed at developing the capabilities for processing products and for forming specialized raw material zones, but the economic methods will be employed on a constant basis. In order to reduce losses in fruit and vegetable products and exert an active influence on lowering prices at kolkhoz markets, the decree authorizes the agroindustrial committees of krays and oblasts to establish the retail prices for vegetables, fruit, grapes, potatoes, melon and green crops and also other highly perishable products being sold at subordinate stores.

The economic methods which form the basis for the new economic mechanism encompass all elements concerned with the production and sale of products. They raise the importance of cost accounting procedures and they confirm the principle of self-support and the dependence of income upon final results.

Commencing in 1987, in the interest of intensifying these principles, the plans call for the formation of a wage fund for the farms based upon stable norms for the five-year plan.

Cost accounting and the collective contract constitute a most important factor for raising production efficiency. They will undergo further development. A task has been assigned to the agroproms -- within a brief interval of time, to organize the conversion of all subunits of agricultural, processing and other enterprises over to collective contract and cost accounting conditions. This will be promoted by the entire system of wages. Many statutes are already in operation and yet there are also new ones. For example, farm leaders are authorized to issue to workers attached to contractual collectives, in the form of payments in kind, up to 25 percent of the output obtained over and above the volume set forth in the contract.

Under the new conditions for management, special importance is being attached to the system for financing and to the use of credit, income and profit. Sovkhozes and other state agricultural enterprises are authorized to distribute profit at their discretion -- following payments into the budget and an interest payment for USSR Gosbank loans.

Experience is being accumulated in the various elements of the agroindustrial complex. The need is emphasized in the decree for having the agroproms, with the participation of interested ministries and departments, expand and intensify the carrying out of all-round economic experiments aimed at further improving the system of administration.

The economic conditions are changing radically with the introduction of the new mechanism for administration. And this requires a serious change in the style and methods for managing the agroindustrial complex. Much work remains to be done in the interest of erecting a reliable barrier against departmentalization and parasitical tendencies and in order to develop initiative still further. All organizational and political work, as required by the 27th CPSU Congress, must be aimed mainly at strengthening party, state and technological discipline raising the creative activity of labor collectives and instilling in each worker a sense of high exactingness and responsibility for achieving high final results. The most important task, it is emphasized in the decree, is that of ensuring that all sectors of the agroindustrial complex are supplied with skilled personnel who will be capable of managing it efficiencly based upon the latest achievements of scientific-technical progress.

Having acquainted themselves with the decree of the CPSU Central Committee and the USSR Council of Ministers concerning further improvements in the economic mechanism of the agroindustrial complex, workers in the Russian Federation have unanimously approved the measures planned and they are fully resolved to accelerate considerably the implementation of the Food Program and to make a worthy contribution towards carrying out the decisions of the 27th CPSU Congress.

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TILLING AND CROPPING TECHNOLOGY

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PROBLEMS IN INTENSIFICATION OF GRAIN PRODUCTION DISCUSSED

Moscow EKONOMIKA SELSKOGO KHOZYAYSTVA in Russian No 4, Apr 86 pp 41-50

[Interview with Yuriy Platonovich Kovyryalov, editor-in-chief of the journal ZERNOVOYE KHOZYAYSTVO, candidate of agricultural sciences, RSFSR honored agronomist: "Problems in Intensive Grain Production"; date and place not specified]

> [Text] To steadily augment the production of grain--the basis for the establishment of the country's food and fodder stocks. To increase the production of durum and strong wheat and groat crops, especially buckwheat. To improve the structure of grain fodder production and to raise the gross output of pulse crops and corn significantly. To continue the establishment of large zones of guaranteed production of grain, especially corn, on irrigated land. To most fully utilize the capabilities of the country's grain regions.
>
> From Basic Directions in the Economic and Social Development of the USSR for 1986-1990 and for the Period Until the Year 2000

It is well known what great significance our party attaches to the development of grain farming. Basic Directions in Economic and Social Development for 1986-1990 and for the Period Until the Year 2000 approved by the 27th CPSU Congress stress that a steady increase in grain production is the basis for the establishment of the country's food and fodder resources. Grain production is to be increased to 250 or 255 million tons by 1990. At the same time, it is envisaged obtaining no less than 200 million tons of grain in any year unfavorable in terms of weather conditions and 250 million tons and more under normal conditions. This is the strategic mission of our farmers.

To reach the new goals of grain production, there is a need for quantitative and qualitative changes in farming, which are reflected in a modern, higher stage of its development characterized, first, by an overall utilization of intensification factors for an increase in soil fertility and, second, by the "biologization" of grain production, that is, by a fuller utilization of the productive potential of plants. In order to activate all these factors, scientists have developed and recommended intensive technologies of cultivation of winter grain crops, spring wheat, corn, rice, and millet to kolkhozes and

sovkhozes. Their application makes it possible to sharply increase the degree of utilization of the bioclimatic potential for the growth of the yield of these crops and improvement in the quality of grain.

The mastering of intensive technologies gave rise to a large number of many-sided questions, which we asked Yuriy Platonovich Kovyryalov, editor-in-chief of the journal ZERNOVOYE KHOZYAYSTVO, candidate of agricultural sciences, RSFSR honored agronomist, to answer.

Question: First of all, Yuriy Platonovich, I would like you to disclose the essence and characteristics of the grain problem at the present stage of economic development.

Answer: If we consult a dictionary of the Russian language, we will see that the word "problem" is defined as a "complex theoretical or practical question requiring a solution." With reference to the national economy the grain problem is one of such "complex practical questions."

The term "grain problem" appeared during the years of the first five-year plans, when a divergence between grain production in the country and its rapidly growing consumption was formed historically. This problem is in a constant development. Whereas during its conception it was generated by the need for an immediate satisfaction of the systematically growing quantitative demands for grain (read the "grain problem"), now it is due to the quantitative and qualitative changes in the needs of our society.

The grain problem now includes the need for ensuring the stability of gross grain output irrespective of weather conditions and a constant increase in the production of grain of a high quality and a wide assortment for meeting the country's growing needs for food and fodder resources and for expanding export opportunities. We would also like to stress that the grain problem is not only an increase in the production of grain, but also its efficient utilization.

The country's needs for food grain in its total volume have been solved fully. The rates of increase in the gross output of grain in our country exceed the rates of population growth almost fourfold. With the growing consumption of other food products (except for potatoes) the consumption of grain products (kg per capita) is decreasing.

	1960	1984	1984 in % of 1960
Meat and meat products	39.5	60.4	152.9
Milk	240	317	132.1
Eggs	118	256	216.9
Fish	9.9	17.5	176.8
Vegetables and melon crops	70	103	147.1
Potatoes	143	110	76.9
Grain and grain products	164	135	82.3

Baking enterprises produce about 800 types of bread and flour products--for any taste--in our multinational country.

The Food Program envisages measures to improve the nutritional structure of the Soviet people. An increase in the share of livestock products in it is possible only at high rates of development of the fodder base. Our calculations have shown that by 1990 the country's need for feed will be 19.1 to 19.5 times greater than for food grain (in equivalent terms). This indicates convincingly that in agriculture principal attention should be given to feed production. However, even in the solution of this problem a significant role belongs to grain farming. After all, from 3 to 5.6 kg of grain must be expended on food and industrial processing and about 600 kg, on feed purposes.

We must not fail to mention another very important aspect of the solution of the grain problem.

Question: You have in mind the complexity of natural conditions for stable farming?

Answer: Yes. We have to farm under complex natural conditions. There are more than 100 types of soil alone. Specialists believe that, to obtain a guaranteed grain harvest, no less than 700 mm of precipitation are needed annually. Meanwhile, in the Soviet Union only 1.1 percent of the total area of agricultural land is located in zones with such an amount of precipitation, while in the United States, for example, 60 percent. In our country more than 60 percent of the area sown with grain crops is located in insufficient and unreliable moisture zones, including two-thirds, in an arid or very dry zone, where the average annual amount of precipitation is 400 mm. Have you pondered over the fact that our country does not know a year, when its entire territory would be free of drought, which encompasses from 20 to 100 million hectares out of a little more than 220 million hectares of the total arable area?

Question: This, naturally, leads to sharp drops in production levels. Can this be illustrated with several figures?

Answer: In the last 20 years the gross output of grain decreased by an average of 11 percent as compared with the average annual level and during especially unfavorable years, even more, that is, in 1975 by 56 million tons, or by 25 percent, and in 1979 by 40 million tons, or by 20 percent. That is why for ages the farmer has sought to overcome the elements and for the attainment of a stable land productivity has placed irrigation, field fertilization, mechanization equipment, and many other things at his service. Therefore, land reclamation, chemicalization, selection, and the application of zonal farming systems are not matters of fashion, but an economic need.

Question: As is evident, grain losses are considerable and the following question arises: Is it possible to alleviate the unfavorable effect of natural conditions on the productivity of the grain field?

Answer: Yes, it is. To back up my statement, I will cite an example. In 1976-1980 the average annual yield of grain crops in the country, on the average, exceeded its level in 1961-1965 by almost one-third. About 30 percent of the total increase in the harvest was ensured through the application of fertilizers. The introduction of more productive varieties and improvement in seed breeding gave approximately 15 percent of it, land reclamation, 10 percent, improvement in crop rotations and in the structure of sown areas, 20 percent, and improvement in technologies, 15 percent. This is the price of the "responsiveness" of the grain field to intensification factors. Speaking in the "language of the economy," a systematic intensification in farming is the main path of increasing the country's food stock. This path finds a practical embodiment in the application of intensive technologies of cultivation of grain crops.

Question: We have become witnesses of an almost simultaneous appearance of two terms, that is, "industrial technology" and "intensive technology." What are they--synonyms describing the same thing--or is it a question of different technologies?

Answer: Industrial technology (from the Latin industria--industry) is advanced technology based on a system of machines corresponding to the present level and ensuring an overall mechanization of cultivation of agricultural crops. Speaking in the "language of mathematics," the degree of mechanization is equal to a unit (C_m=1). The basic principles of construction of industrial technology are as follows: maximum correspondence to biological characteristics of the cultivated agricultural crop; exclusion of expenditures of manual labor; minimalization of operations; flow nature of production; full correspondence to zonal (economic) characteristics of cultivation of agricultural crops; minimal negative effect on the environment; reduction in the material and power intensiveness of processes and saving of material resources; sharp reduction in live labor per unit of area and output; decrease in production costs; labor productivity growth; increase in the yield and improvement in the quality of output.

However, intensive technology (from the Latin intensio-intensity, intensification) is technology based on an "increase in intensity," that is, on an overall concentration of ameliorants, fertilizers, pesticides, growth regulators, new technical facilities, and other production resources against the best agrotechnical backgrounds ensuring the highest recovery of expended resources through high-quality grain. Whereas traditional (for grain production--industrial) technology is provided with material and technical facilities on the basis of what is available, intensive technology, on the basis of what is necessary to obtain maximum output with a decrease in expenditures per its unit.

I will cite an example. On the experimental farm of the All-Union Scientific Research Institute of Fertilizers and Agrochemistry (in areas near Moscow) 330 kg of fertilizers (in terms of a 100-percent content of nutrients) per hectare were applied to winter wheat sown on a limed plot and on such a predecessor as a vetch-oats mixture and 45.6 quintals of the grain of this crop per hectare were obtained. On the same plots, but with the application of herbicides (against weeds), the grain harvest totaled 55.7 quintals per hectare and with

the addition of retardants, 61.8 quintals per hectare, and on plots, where all the above-mentioned plus fungicides (against plant diseases) were applied, 74.9 quintals per hectare. As we see, additional 3 tons of grain per hectare were obtained as a result of an overall application of chemicalization agents. This forms the essence of intensive technology.

At the same time, to obtain stable harvests of high-quality grain, it is important to learn to observe three conditions, that is, to fully take into consideration the capabilities of a specific region, climate, field, and variety, to increase soil fertility systematically, to "consult" plants constantly, and to fulfill their "wishes" immediately.

Therefore, the essence of intensive technologies of cultivation of grain crops lies in the following:

chemical soil reclamation on the basis of the liming of acid soil or gypsuming solonets soil and placement of crops on the best predecessors in the crop rotation system;

cultivation of high-yielding varieties responsive to an increased agricultural background, resistant to lodging, and included in the lists of strong and valuable wheat varieties;

high provision of plants with elements of mineral nutrition with due regard for their content in soil;

split application of nitrogenous fertilizers during the period of vegetation on the basis of the data of soil and plant diagnosis;

regulation of plant growth with retardants;

utilization of an integrated system of protecting plants against diseases, pests, and weeds;

industrialization of grain production;

prompt and qualitative fulfillment of all technological methods aimed at protecting soil against erosion, accumulating moisture in soil, and creating favorable conditions for the development of grain crops;

intensification of the role of the human factor--competent mastering of intensive technologies and utilization of collective forms of organization of labor and wages according to final results.

The matter boils down not only to varieties, equipment, and chemical agents, but also to work organization and to the psychological training of specialists and machine operators, who are decisive factors in turning real opportunities into concrete actions. As M. S. Gorbachev stressed, in our country many people have become accustomed to working as follows: We sowed and harvested what grew--with all the worries. With intensive technologies it is impossible to work in such a way. Crop cultivation requires fine and skilled work on the part of farmers. That is why it is necessary to teach personnel that without

profound knowledge there will be no progress. A reliable path to obtaining high and stable harvests lies... in this.

Intensive technology leans on all the components of industrial technology, but its distinctive feature lies in the fact that the performance of vegetative topdressing and operations connected with protecting plants against pests and diseases is generated by the need to control the harvest on the basis of the consideration of the biological characteristics of plants according to the phases of their development. Intensive technology is a qualitatively higher stage in an overall utilization of the achievements of science and technology at all the stages of cultivation of agricultural crops.

Question: As applied to grain farming the following production system functions: "soil-plant-equipment-chemistry-land reclamation-technology-organization-harvest." Is there a central link in this system?

Answer: There are two such links--soil and plant--in the system of intensive grain production. Being biological means of production, they determine the efficiency of plant growing.

Setting for ourselves the goal of obtaining high and stable grain harvests, we utilize for this the properties of mechanical implements of labor--agricultural and land reclamation machines and mechanisms, chemical properties of fertilizers, herbicides, retardants, and so forth, biological properties of plants, and a certain feature of land--economic soil fertility. The latter is very important, because without this distinctive means of production, even with the most improved mechanical facilities and chemical and biological agents, a harvest cannot be obtained. We would like to stress that economic soil fertility, not land in general, is a means of production created owing to the labor invested in it.

In this connection it is appropriate to mention the following: K. Marx often stressed that soil fertility is not only the product of nature. It is closely connected with social relations and with man's activity. Therefore, it can diminish, but also increase, if land "is handled properly" (K. Marx and F. Engels, "Soch." [Works], second edition, Vol 25, Part II, p 343).

V. I. Lenin also often spoke of the need to handle nature properly. He wrote the following in the fundamental work "Agrarnyy vopros i 'kritiki Marksa'" [The Agrarian Problem and "Marx's Critics"]: "Both in industry and in farming man can only use the effect of the forces of nature if he gets to know their effect and can facilitate for himself this use by means of machines, implements, and so forth." ("Poln. sobr. soch." [Complete Works], Vol 5, p 103); specifically on farming and, on the whole, on agriculture: "In order to increase in significant proportions the amount of capital invested in land, it is necessary to invent new machines, new field cropping systems, new methods of keeping livestock, transporting products, and so forth" (ibid, p 101).

"It is necessary to invent"! Lenin stressed the word "to invent." It is necessary to invent not one system--Lenin talked about field cropping--but systems--in plural! After all, in our country, as noted above, there are more than 100 types of soil and more than 100 types of agricultural crops are

cultivated. Therefore, to ensure optimum consideration of the multifactor nature of farming, this most ancient occupation of man (farming) must enter into a mutually advantageous alliance with the latest achievements of science and technology. Such a task was designated a long time ago, but, in practice, in all its gigantic volume and in all its urgency and immediacy it was set for science and practice only in our day. Its accomplishment is founded on a firm economic basis, which has required a significant increase in capital investments in agriculture and a substantial replacement of its fixed capital. This has become possible under the conditions of the maximum possible increase in the country's scientific and technical potential. The energy power of agriculture has now increased to 720 million hp (there are 3 hp per hectare of our entire vast field, whereas, for example, 20 years ago there was only 1 hp). The machine-worker ratio in the sector rises accordingly (in 1984, as compared with 1965, the power-worker ratio increased 3.6-fold and the capital-labor ratio, 5.2-fold). On the average, in the country there are now operating machines worth more than 5,000 rubles per each of the 4.6 million machine operators. The applied machine system makes it possible to overally mechanize grain production. In 1985 rural areas received 25.4 million tons of mineral fertilizers, as compared with 3.3 million tons in 1960. Grain crops of no less than 150 new varieties capable of yielding more than 60 quintals of grain per hectare against a high agricultural background in various natural zones are cultivated on fields. On the country's kolkhozes and sovkhozes clean fallow occupies about 22 million hectares, or 9.4 percent of the total area of arable land, which meets the requirements of zonal farming systems.

Question: In our country regions with a big moisture deficit are the basic regions of commodity wheat production. Consequently, clean fallow should become the guaranteed basis for a stable output of high-quality grain. What demands are placed on the clean fallow field in modern farming?

Answer: For grain farming under the conditions of dry farming clean fallow serves as a means of intensification alleviating the effect of unfavorable climatic factors and aimed at obtaining high and stable grain harvests. Clean fallow is not "inactive" land--it does not "divert itself" without crops, as it is thought sometimes. According to the peasant's definition, it "develops" its fertility. Most importantly, land not only feeds, but itself asks "to eat."

The positive value of clean fallow is determined by many measures implemented on these fields, that is, fertilized land reclamation (liming or gypsuming and the application of organic and mineral fertilizers), phytosanitary measures (soil cultivation against weeds, causative agents of diseases, and plant pests), moisture accumulating measures (snow retention and a soil cultivation system), and soil improvement measures (leveling and other measures ensuring a highly productive utilization of equipment in field operations). A clean fallow field is a reconditioned field.

Clean fallow plays its positive role only if the entire set of moisture accumulating methods and measures for the control of weedy vegetation is observed. Otherwise, only harm can come from fallow. From the fertilizers applied to soil weeds assimilate 65 percent more phosphorus and 25 percent more nitrogen than spring wheat. About 68 mm of soil moisture per hectare is expended on

the formation of 1 ton of the dry substance of weedy plants, which is equivalent to a deficiency of 6 to 11 quintals of wheat grain per hectare (depending on the cultivation zone).

Long-term practice has shown that the efficiency of clean fallow sharply increases against the background of fertilizers and, moreover, the fertilizers themselves are recovered through the grain harvest to a greater extent on areas sown with wheat, where fertilized clean fallow is its predecessor. The data of the Stavropol Scientific Research Institute of Agriculture are very convincing in this respect. In experiments conducted by the institute in the steppe zone every kg of phosphorus applied with fertilizers to winter wheat sown on cereal predecessors was recovered through an increase of 7 quintals of the grain harvest per hectare, on corn for silage, of 13, on sainfoin, of 15, and on clean fallow, of 20 kg per hectare.

The concentration of fertilizers on clean fallow also gives a high effect in the dry zones of the country's eastern regions, where spring wheat is the basic grain crop. For example, the Novouralsk Experimental Production Farm in Omsk Oblast (steppe zone, annual amount of precipitation of 300 mm), on the average, in 8 years (1976-1983) from an area sown with grain crops on nonfallow predecessors obtained 19.9 quintals of grain per hectare, and from the area where fertilized clean fallow was their predecessor, more than 25 quintals per hectare. On the farm fertilizers were applied in the following doses (kg/ha): P_{60-80} to the fallow field and, on the average, $N_{40}P_{20}$ to subsequent crops. Every kg of nutrients in fertilizers with due regard for the aftereffect was recovered through an increase of 7 to 10 quintals in the harvest of high-quality grain per hectare.

However, at the conference of the party and economic aktiv of Kazakhstan's oblasts and krays and oblasts in Siberia and the Urals on 7 September 1985 it was noted that in such major grain producing regions as Omsk, Saratov, Orenburg, and Tselinograd oblasts and Altay Kray the increase in the fallow area did not yet ensure the proper growth of the gross output of grain. The whole point is that often land is allocated for fallow, but proper work with fallow is not carried out.

It is not superfluous to mention that with the harvest many more nutrients are removed from soil than farmers apply to it with fertilizers. It turns out that they borrow from nature without a return. However, nature is not a bottomless fountain and with all its generosity and tolerance can, finally, lose its balance and "refuse credit" to the farmer. That is why he must construct his work according to the following principle: "If you want to take from land, be generous with it." Land is public property and it is time for all those that have connected their life with it to have a proprietary attitude toward it."

At the same time, not only the creation of a high economic soil fertility, but also an increase in the degree of its utilization through the stimulation of the biological potential of plants, should become the characteristic feature of intensive management of farming.

Question: Yuriy Platonovich, you mentioned the "plant" as the second central link in the system of intensive grain production. What properties of this means of production should be utilized to increase the recovery of technology?

Answer: First of all, it should be kept in mind that the plant as the biological means of production changes in time--it grows and develops. For example, scientists singled out 12 development stages in the winter wheat plant, that is, shoots, fall tillering, spring tillering, beginning of shooting, shooting, stem growth (two phases), heading, blossoming, caryopsis growth, grain forming, and complete grain ripeness. During the mentioned periods of development the plant makes specific demands on the set of external conditions.

Here are several examples. The second stage (fall tillering), at which nodes, internodes, and leaves of plants are formed, is of the greatest practical importance. These processes determine the density of crops (tillering). The potential productivity of the ear is formed at fourth and fifth stages (beginning of shooting and shooting), when inflorescence lobes and spikelets develop. Real productivity is determined at the tenth stage (caryopsis growth), when blossoming ends and the mass and number of spikelets are formed.

Winter crops are very responsive to nitrogenous nutrition. Therefore, correctly applying their topdressing with nitrogenous fertilizers, it is possible to control the development and formation of the plant stand density and other factors in the yield growth. However, in itself a high output of grain is not yet everything, because a negative dependence, a so-called negative correlation, between the yield and the content of protein in grain, has been uncovered. It is very difficult, but possible, to overcome it. As experiments have shown, the time before blossoming is the crucial period of accumulation of protein in the ear. It is precisely during this period that it is necessary to increase the "protein reservoir" in the plant.

To ensure a successful development of plants and the formation of the harvest, it is important to apply intensive technology with an obligatory observance of three principles: "at the proper time," "constantly," and "in a substantiated manner." I will decipher them briefly. "At the proper time" means to carry out topdressings and protective measures when plants and the condition of crops demand this; "constantly," that is, to do this when necessary throughout the entire vegetative period; "in a substantiated manner," to apply fertilizers not according to the method "I apply as much as I want," but with due regard for the content of nutrients (in particular, nitrogen) in soil and plants and for the need to ensure the formation of the programmed harvest.

Question: The plant cannot talk about its needs--when, what kind of, and how much "food" it needs. At the same time, without a constant and continuous "dialogue" between the grain grower and the plant a stable and high harvest cannot be obtained. Where is the way out? And is there a way out at all?

Answer: There is. The agrochemical service, whose workers make a soil, leaf, and tissue diagnosis, helps to give an answer to problems connected with sound plant nutrition. It is carried out three or four times during the vegetative period and nitrogenous topdressing are applied in accordance with results. Pay attention to the following important fact. Topdressings during tillering and

shooting phases, basically, ensure the accumulation of the grain harvest and subsequent ones affect its quality, that is, increase the content of gluten and protein in it. This makes it possible to control the harvest efficiently, which forms one of the advantages of intensive over traditional technologies.

One of the essential conditions of application of new technology lies in the selection of the most productive variety responsive to fertilizers. Academician P. P. Lukyanenko, having tested 30 winter wheat varieties, established that they reacted differently to the same types of fertilizers. The harvest of grain per hectare of sown areas in the same varieties was almost four times higher than in others (changed from 6.3 to 23.6 quintals).

Varieties differ from each other not only in ripening periods, resistance to pests and diseases, and other characteristics traditionally taken into consideration, but also in agrochemical properties.

Specific varieties, not wheat, barley, rice, and corn in general, are cultivated in the field. Every variety has a distinctive "ceiling" of fertilizer utilization. Tests conducted on Siberia's fields have shown that, all things being equal, different varieties of grain crops respond differently to a full dose of mineral fertilizers. For example, the yield of spring wheat of the Inna 68 variety increases by 4.8 quintals per hectare, while Rollo, by 19 quintals per hectare. During years favorable in terms of weather conditions the yield of barley of the Ganna Loosdorfskaya variety with topdressing with mineral fertilizers increased 2- to 2.5-fold, while that of Yuzhnyy, only 15 percent. This means that every variety reacts to the same amount of "food" in its own way. This is a very important economic factor. Not to take it into consideration during the introduction of intensive technologies will be a very gross mistake.

Practice shows that, all things being equal, the application of intensive technologies ensures an increase of 30 to 50 percent in the yield of grain crops as a result of the cultivation of new intensive varieties, of 30 to 35 percent, as a result of the application of fertilizers, and of 25 to 30 percent, as a result of the treatment of crops with pesticides and retardants. Therefore, the correct selection of varieties and hybrids is of paramount importance. On the basis of varieties tested at the state strain testing network, which received a positive evaluation, kolkhozes and sovkhozes should form their varietal structure of crops corresponding to the specific conditions of a farm.

Question: What place in intensive technology does the protection of plants against diseases, pests, and weeds occupy?

Answer: One can realize the extent to which plant protection is multifaceted and multifactorial by becoming familiar with the list of basic directions in its implementation. The following are of special importance: before sowing--treatment of seeds against smut diseases and root rots; during the period between the appearance of shoots and fall tillering--control of mouse-like rodents, pentatomids, cereal leaf beetles, Lema species, and flea beetles and the application of herbicides; from the beginning of spring tillering until

the end of blossoming--treatment of crops against brown rust, powdery mildew, and root rots; at the end of blossoming and during stem growth--control of pentatomids, green bugs, frit and hessian flies, and thrips; during the period of milky ripeness--treatments of crops against bug larvae, corn weevils, and so forth. These "parasites" in the full sense of the word at times carry away up to one-half of the harvest.

The problem now is as follows: No additional investments in grain production and no steps along the path of the sector's further intensification will be effective if just as intensive measures of phytosanitary support for the field are not taken. Therefore, an integrated protection of plants against weeds, diseases, and pests, which implies the summing up of agrotechnical, chemical, and biological means and methods of controlling them at different stages of plant development, has become the "crux" of intensive technology.

The protection of grain crops cultivated according to intensive technology is not cheap--more than 100 rubles per hectare. In order to recover these expenditures, as well as other additional expenses, it is necessary to ensure an increase of 15 to 20 quintals in the harvest of full-weight grain per hectare. Advanced farms strive for this. Additional payments for the value and high standards of wheat grain provided when all agrotechnical and phytosanitary requirements are fulfilled strictly are also used to replenish the monetary income of farms. Such technologies are already applied on millions of hectares and will be applied on an even bigger area. This is advantageous both for farms and for the state as a whole.

An unconditional observance of the set dates for the application of chemical agents is the law of intensive technology. Under any circumstances they must be observed. They are strictly timed to coincide with a certain phase of development of weedy plants and with a vulnerable stage in the development of causative agents of diseases. A delay, like an unnecessary haste, can lead to a "blank shot:" Money will be spent, but the infection will remain.

Question: Is the application of growth regulators on areas sown with winter crops with intensive technologies obligatory?

Answer: As a rule, modern intensive systems of cultivation of high and stable harvests of winter wheat and rye applied in world practice envisage the combination of three elements of agrotechnology: split application of nitrogenous fertilizers (in high doses) to soil and treatments of crops with fungicides and growth regulators. Such a combination makes it possible to increase the efficiency of the effect of each of these elements.

The application on areas sown with winter wheat of such a growth regulator as the TUR preparation [chlorocholine chloride] and on areas sown with winter rye of a mixture of campozan with the TUR preparation suppresses the growth of straw, as a result of which it is shorter and thicker. Therefore, it is able to hold a big "load"--the ear.

Question: Yuriy Platonovich, you have enumerated several technological operations necessary to ensure a balanced nutrition of plants and a set of measures to protect them during the period of vegetation. Did their inclusion in technology not produce changes in the performance of sowing operations?

Answer: It did. All machines performing operations connected with the top-dressing and chemical treatment of plants during the period of vegetation follow an unsown trail--a so-called technological track. It is laid during sowing.

Imagine a tended grain area, in which an unsown track--a double trail 1.8 meters wide--is cut accurately every 10.8 meters. This is a very unusual part for the cultivated field. However, such a track will enable the tractor with machines and units to pass through the sown field as many times as is needed for plants. Furthermore, the unsown track prevents an excessive or insufficient dosage of fertilizers and plant protection agents owing to overlaps or omissions during their application, that is, it ensures a more uniform feeding of plants and grain ripening and creates the possibility of controlling the harvest.

Maximally strict technological discipline at all the stages of harvest formation is the characteristic of the mastering of intensive technologies of cultivation of grain crops. To make a rough comparison, technology has placed the agronomist and rural machine operator essentially under the same conditions as those of the engineer and the plant worker. It makes it possible to program the harvest so long as all technological parameters without exception are maintained with due regard for the demands of plants. The technological track makes it possible to fulfill the given program on the dates scheduled with a high quality of work and the observance of dosages.

Question: Judging from your story, intensive technology is highly resource intensive. Are there data on its economic efficiency?

Answer: Improvement in the agrotechnology of cultivation of grain crops has always demanded an increase in production expenditures per hectare of sown area (of arable land as well). As is well known, every agricultural method has a double meaning: On the one hand, it is a factor in the yield and, on the other, a carrier of expenditures. It is impossible to attain an increase in the productivity of 1 hectare of arable land without investing additional funds in it. This is one. However, let us rapidly glance at the traditional practice of farming. From what did it proceed? First of all, from the hectare principle, that is, from the fact that every hectare of land should carry an equal load in terms of output. Therefore, in practice, it turns out that one field is set aside for clean fallow, fertilizers are applied on the second, and other means of intensification are applied on the third. Such a scattering and nonoverall nature of investments lower their return and do not ensure the expected effect. Intensive technology concentrates all means of intensification on one field, in unity and interconnection. Such an approach ensures the maximum return on the invested funds. This is two and this is the chief thing.

Now on the economic efficiency of intensive technology. The data of scientific institutions point to it with sufficient persuasiveness (see table).

Efficiency of Intensive Technology of Cultivation of Winter Wheat at the Panfilyevsk Experimental Station of the Ukrainian Scientific Research Institute of Farming (Kiev Oblast, data for 1985)

	Technology	
	traditional	intensive
Sown area, hectares	30.0	420.0
Yield, quintals per hectare	34.9	47.7
Production expenditures per hectare, rubles	175.2	226.4
Production cost per quintal of grain, rubles	4.65	4.40
Content of gluten in grain, %	20.2	26.6-30.4
Purchase price of grain, rubles per quintal	12.90	15.00
Purchase price increment for the quality of grain, rubles per quintal	-	1.50
Profit per hectare, rubles	287.9	577.2
Level of profitability of grain production, %	177.4	275.0

I shall cite calculations for the Rossiya Kolkhoz in Novoaleksandrovskiy Rayon in Stavropol Kray. In 1984, on the average, it gathered 55 quintals of grain per hectare on an area of 475 hectares sown with winter wheat cultivated according to intensive technology and only 36 quintals per hectare, on the kolkhoz as a whole. In the first case the production cost per quintal of grain totaled 3.03 rubles and in the second, 3.37 rubles. In the first case the sale price was 2.37 rubles higher, because grain from the intensive field was sold to the state as strong grain. Every quintal of grain produced a net income of 7.24 rubles and 398.2 rubles per hectare. Additional hectare expenditures (47.17 rubles) were recovered through an increase of 19 quintals in the output of grain per hectare, or by the sum of 195.13 rubles, that is, every ruble of additionally invested funds gave additional output worth 4.31 rubles.

Examples of the high economic efficiency of introduction of intensive technology can be cited for many zones in the country.

However, we must not fail to draw the attention of the workers of the economic service to the fact that in many cases intensive technologies do not receive an economic evaluation. This is very harmful, from whatever point of view one looks at this. When introducing a new thing, one must see what it costs. However, the lack of an economic evaluation not only deprives us of objectivity, but also does not make it possible to correctly determine the long-term paths of economy and thrift.

How not to mention here Lenin's famous words: "Various changes in farming techniques are inseparably connected with each other and, inevitably, lead to the transformation of the economy" (V. I. Lenin, "Poln. sobr. soch." [Complete Works], Vol 3, p 212).

Question: What is the scale of introduction of intensive technologies of cultivation of grain crops during the 12th Five-Year Plan?

Answer: During the current five-year plan priority significance is attached to the cultivation of grain crops--winter wheat and rye, spring wheat, corn, millet, and rice--on the basis of intensive technologies. Whereas in 1985 these crops were cultivated according to intensive technologies on an area of about 17 million hectares, in 1985 such an area will total 31 million hectares and during subsequent years, no less than 60 million hectares.

Intensive technologies represent a qualitatively new level of management on land ensuring a reliable basis for the production of high and stable harvests and one of the achievements of scientific and technical progress.

As is well known, the advanced line of the fight for an acceleration of scientific and technical progress now passes through science. The very concept of "scientific and technical progress" fuses the achievements of science and technology. That is why, now, as never before, it is necessary to decisively turn the entire front of science to production needs and production, to science and to strengthen all the links connecting science, technology, and production.

The decree of the CPSU Central Committee "On the Work of the Siberian Department of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin on the Fulfillment of the Decrees of the CPSU Central Committee and the USSR Council of Ministers on an Increase in the Production of High-Quality Spring Wheat Grain Through the Intensification of Its Cultivation" drew special attention to this aspect.

The party sets the task of transforming agrarian science into a genuine catalyst of acceleration of scientific and technical progress in farming and, primarily, of a systematic intensification of grain production. Practice has shown that not all the recommendations developed for this sector are accurate, some have not been tested sufficiently, and do not give a noticeable return. It will be necessary to improve intensive technologies with due regard for the characteristics of zonal natural conditions, development of means of mechanization and chemicalization, and the genetic potential of new varieties and hybrids, and to attain their high efficiency. It is important to concentrate the best forces of agrarian science on this priority direction, keeping in mind that it is a question of solving the key problem of agriculture--a sharp increase in grain production.

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TERMS OF 1986 TIMBER INDUSTRY ECONOMIC EXPERIMENT

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[Article: "A Step into Tomorrow"]

[Text] The draft for the Basic Directions makes provisions to convert, during the 12th Five-Year Plan, all sectors of the economy to the new operating conditions. Since 1984 such an experiment has already been under way in a number of sectors. The first steps in this direction are also being taken in the timber industry. On 1 January 1986 a broad scale economic experiment begins. Its goal is to increase output and improve quality on the basis of scientific and technical progress, to develop creative initiative and increase the interest of labor collectives in improving production efficiency and to strengthen cost accounting. It includes:

The BSSR Ministry of the Timber and Wood Processing Industry;

The LiSSR Ministry of the Furniture and Wood Processing Industry;

The Tsentromebel [Central Furniture], Karellsprom [Karelian Timber Industry] and the Tyumenlesprom [Tyumen Timber Industry] All-Union Production Associations;

The Balakhninskiy Cellulose-Paper Combinat.

What changes will the experiment make in operating methods? We will explain them in order.

PLANNING

The role of enterprises in the formation of plans is to be intensified and there will be increases in their responsibility for more completely meeting the national economy's and the public's demand for the products they produce.

The number of plan indicators approved from above is to be reduced by more than two fold. Henceforth the following indicators are established in annual plans:

Volume of output sold;

Production, in physical units, of basic types of output, including output for export;

Targets for the development and introduction of new technology and equipment;

Output in highest quality category as a percentage of total output;

Growth in labor productivity (for commercial output);

Wage fund for nonindustrial personnel;

Limiting level of outlays per ruble of commercial output;

Profits;

Limits on centralized state capital investments, construction-installation work and the operational introduction of production capacity and facilities through the use of such;

Funds for the basic types of material-technical resources and targets for reductions in their expenditure norms;

Norms for allocations, from calculated profits, to the state budget -- for production associations (enterprises);

The normed relationship between growth in average wages and labor productivity;

Eliminated are: value unit targets for production volume, normative net product and a number of others.

In addition to these annual indicators, the five-year plan includes: growth rate of commercial output and norms for the formation of the production development fund. The wage fund for workers at newly introduced enterprises and facilities, the material incentives fund for existing enterprises, the sociocultural measures and residential construction fund are stipulated separately in the five-year and annual plans for enterprise economic and social development. Norms for the formation of a single fund for the development of science and technology are introduced for ministries.

The norms set in the five-year plan are not subject to change or re-approval.

As can be seen, a leading role in the plan is held by qualitative indicators, in the development of which the normative method is used. Managers and labor collectives now have an interest in solid growth in the plan, and in striving

to overfulfill it. Appeals to live well, create growth and improve product quality are directed to each collective participating in the experiment.

RIGHTS AND RESPONSIBILITIES

There are to be expansions in the rights and operational independence of experiment participants. At the same time their own responsibility for the results of their work, first of all the observation of contracts, is to be strengthened.

The economic activity of production associations (enterprises) is evaluated in summing up results of work and socialist competition. Above all, attention is focused on the fulfillment of the following plan targets:

Output sales volume in accordance with contracted deliveries (especially strict account is given to obligatory deadlines, assortment and quality);

The development of science and technology;

Improvements in output quality;

Increases in labor productivity;

Reductions in prime cost;

Operational introduction of new production capacity and facilities.

One of the experiment's main tasks is to accelerate the introduction of new equipment, increase the pace of technical reequipment and reconstruction and the realization of scientific-technical programs. The following is becoming the most acute: concern about the mastery of new types of industrial production, the application of progressive technology, the use of all potentials for production mechanization and automation, the rational consumption of resources allocated to enterprises from the ministry fund for the development of science and technology. Outlays for the mastery of new technology will be included in the plan for industrial output sales, and not, as previously, in its prime cost. If this indicator is not met, the actual output sales figure will be reduced by the total nonfulfillment of new technology measures.

The experiment puts associations (enterprises) in conditions in which they have an interest in increasing output, using minimal material and labor resources, and in the development of their own production through their own and borrowed resources. The principles for the use of these funds are subordinated to just these tasks.

Thus, ministries and VPO's have been given the right to independently dispose of production development funds, intended mainly for the technical reequipment and reconstruction of enterprises. Those who want to have "pocket money" for the needs of production reconstruction and expansion should first earn it. A strict norm links this fund to the amount of enterprise profits. If the fund is not large, one can turn to subsidized bank credit.

If a production association (enterprise) has above norm reserves of uninstalled equipment or material-technical valuables not credited by a bank, it will make an additional payment of three percent of the value of such items to the state budget

More freedom of action is given in the disposal of funds for wages, material incentives, sociocultural measures and residential construction. However, these are spend upon agreement with labor collectives.

Authorization is given to switch some of the material incentives funds to related enterprises and contracting organizations in order to stimulate timely deliveries of high quality raw materials, other materials and accessories and to speed up work on the technical reequipment of active production operations.

Ministries and VPO's have the right to authorize subordinate PO's (enterprises) to sell, at their discretion, up to 50 percent of of their above plan production-technical output, on the condition that they fulfill their contractual obligations for deliveries of this output, and to supply trade organizations with mass consumption goods manufactured in a planned manner, in accordance with signed contracts, and which the customer refused. Their sales are counted towards the fulfillment of delivery plans. One must assume that a market will always be found for good products.

Thus, the experiment creates conditions in which production managers are obligated to live "by their wits" and to show initiative and entrepreneurial behavior. It is fitting to note that managers' [khozyastvennik] sluggishness is now far more threatened by sanctions than it was previously.

STIMULI AND FUNDS

Under the new operating conditions there is an increase in the role of material stimuli and payments to labor in improving the qualitative indicators of enterprise activity.

This opens the possibilities of strengthening the interests of the labor collective and each worker in the results from their activities and in improving labor productivity.

Wages and material incentives funds now depend completely upon final production results and improvements in efficiency.

The wage fund is formed from the total wage fund for the base year plus an additional fund, calculated by a norm for each percent growth in commercial output.

Under the experiment, savings in wage funds remain at the enterprise. The administration, upon the agreement of the trade union committee, is given full powers to use it to increase additional payments for high professional skills as follows: up to 12 percent of wages rates for workers in category III, up to 16 percent for those in IV, up to 20 for V and to 24 percent for VI. Additional payments are established for the mastery of more than one

profession, and for highly skilled workers employed in especially important and responsible work, salaries are increased up to 250 rubles.

Raises (nadbavki) of up to 50 percent of the position's salary can be given to highly skilled ITR (engineering-technical personnel) and employees, and, if the enterprise or association achieves good final results, to managers.

Importantly, raises and additional payments to management personnel are not included in the limiting allocations for maintaining the apparatus.

The size of the additional payments and raises is determined on the basis of each worker's personal contribution to the collective's labor. If work indicators deteriorate, these payments can be reduced, or halted completely.

The material incentives is made up of its base year figure and increments for each 1 percent reduction in outlays per ruble of commercial output. Fund formation indicators for logging associations (enterprises) can use other data which more accurately describe the efficiency of their work (growth in labor productivity, production of commercial timber, etc).

The size of allocations to this fund depends upon:

Fulfillment of output sales, including delivery obligations; for each 1 percent underfulfillment the fund is reduced 3 percent, if contracts are completely fulfilled the fund increases by 15 percent;

Growth in the production of mass consumption goods per ruble of wages fund;

Additional profits obtained through incentives markups on retail prices of improved quality mass consumption goods and on the wholesale prices of production-technical items with the State Mark of Quality.

One of the new principles in awarding bonuses to workers is the switching from one bonus for several indicators to several bonuses for each work indicator, that is, to factor bonuses. Bonuses for basic work indicators are paid to enterprise and association management workers only upon fulfillment of the alanned targets for output sales, including contract delivery obligations.

If quarterly plans and targets for the mastery of new technology and progressive experience are unfulfilled, management workers bonuses will be reduced by at least 25 percent. This will be a stricter demand than at present.

The USSR Ministry of the Timber, Pulp and Paper and Wood Processing Industry is authorized to use its reserve to award bonuses to workers at logging production associations. These are up to 1.5 fold above bonuses and are for fulfillment of annual plans and additional targets for producing commercial timber.

The fund for sociocultural measures and residential construction consists of its planned base year component and allocations of an additional 4 percent for each percent growth in labor productivity over the base year. The ministry and

VPO's are authorized to differentiate this norm, depending upon enterprise requirements for housing and childrens kindergartens.

In order to attract highly skilled workers, association (enterprise) administrations are authorized to, upon agreement with labor collectives, keep at their disposal up to 15 percent of the housing area built by resources from their funds.

Ministries of union republics and VPO chiefs are given the right to approve tables of organization for the central administration in their department without observing the ratio between the number of specialists in their wage fund and the established number of personnel.

No use is to be made of the procedure for reserving bonuses. If an enterprise works well it gets bonuses, if it doesn't, control by the ruble.

The incentives introduced are outstanding in their potentials for awarding the best workers, keeping them at an enterprise and for carefully using labor resources. It will become more profitable for collectives to work intelligently rather than by the number.

ITS TIME TO DARE

The transition to the new working conditions is a difficult and exceptionally important matter. It requires dynamism, sober calculations, a creative approach, the use of all economic tools, and all means of educating people. The experiment inspires hopes for improvement where it is in effect. However, this does not mean that it solves all problems and eliminates all bottlenecks. It would be more correct to say that it begins a turn in the needed direction.

It is important for each worker to know the essentials, basic points, requirements and potentials of the new operating conditions. With time, after the initial steps we will move to the massive introduction of these methods. We are faced with the implementation of a complex of measures to perfect production planning and organization and to improve its management structure.

One can not now live by the principle: plan less, but give more bonuses. Both psychological and organizational restructuring are needed. An especially great role in this restructuring is played by the USSR Ministry of the Timber, Pulp and Paper and Wood Processing Industry's Commission on the introduction of new operating methods and the intensification of their effect to accelerate scientific and technical progress. This commission is headed by G. L Medvedev, a deputy minister. It also includes ministry administrations, the managers of union republic ministries, VPO and enterprises participating in the experiment.

Innovation's success depends to a great extent upon an active position by labor collectives and each worker. Party and trade union committees should give special attention to the organization of socialist competition under the experiment's conditions and help collectives find still unused internal reserves.

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